Client Characteristics and Treatment Retention in an Outpatient Drug-Free Chemical Dependency Program

Jessica A. Thull
Marquette University

CLIENT CHARACTERISTICS AND TREATMENT RETENTION IN AN OUTPATIENT DRUG-FREE CHEMICAL DEPENDENCY PROGRAM

by

Jessica A. Thull, B.A., M.A.

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ABSTRACT
CLIENT CHARACTERISTICS AND TREATMENT RETENTION IN AN OUTPATIENT DRUG-FREE CHEMICAL DEPENDENCY PROGRAM

Jessica A. Thull, B. A., M.A.

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Substance abuse and dependence have detrimental effects at both micro and macro societal levels. Even so, these disorders appear to be amenable to treatment and persons who receive treatment for such problems generally achieve positive outcomes. However, reported substance abuse treatment dropout rates have varied greatly and no consistent "treatment dropout" profile has been detected. This study aimed to describe the characteristics of clients entering an intensive outpatient chemical dependency treatment program and to examine how these variables differed between clients who were retained in treatment to completion and clients who dropped out of treatment prematurely. Additionally, it explored whether meaningful subgroups of this sample could be identified. Results indicated that age, marital status, income, psychological comorbidity, substance(s) of use, and extent of substance use were related to treatment retention. Cluster analysis findings delineated four subgroups of clients based on age, negative consequences related to substance use, and ASI composite scores across medical, employment, alcohol and drug, legal, social, and psychiatric domains. Identified subgroups appeared to vary along two broad dimensions: degree of functional impairment and type(s) of substance use. Results are compared and contrasted with the existing substance abuse treatment literature. Study limitations are discussed, along with implications regarding theory building, assessment, and treatment interventions. Future investigations at the individual program level are recommended to guide the design, implementation, and evaluation of clinically-relevant and empirically-driven assessment procedures and treatment interventions to enhance substance abuse treatment retention and outcomes within a particular program.

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Chapter I: Introduction

Substance Use Disorders in the United States

Definition of Substance Use Disorders

Substance use disorders have typically been defined as either symptom-based or diagnosis-based. Symptom-based conceptualizations focus on the types and severity of problems related to the use of a particular substance, while diagnosis-based descriptions are based on whether or not a person meets a specified set of criteria generally associated with the use of a particular substance (Sobell, Wagner, & Sobell, 2003). Practitioners and researchers have tended to utilize the diagnostic classification of substance use disorders to maintain consistency in their clinical nomenclature. This study will use the term substance use disorder when referring to one of the two categories of substance-related disorders delineated in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text-Revision* (*DSM-IV-TR*): substance abuse and substance dependence (American Psychiatric Association, 2000).

The *DSM-IV* diagnostic criteria for substance abuse are:

> A. A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12 month period:
>
> > (1) recurrent substance use resulting in a failure to fulfill major role obligations at work, school or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)
> > (2) recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use)
> > (3) recurrent substance-related legal problems (e.g., arrests for substance-related disorderly conduct)
> > (4) continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the

substance (e.g., arguments with spouse about consequences of intoxication, physical fights)

B. The symptoms have never met the criteria for Substance Dependence for this class of substance. (APA, 2000, p. 199)

The *DSM-IV* diagnostic criteria for substance dependence are:

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:

(1) tolerance, as defined by either of the following:

(a) a need for markedly increased amounts of the substance to achieve intoxication or desired effect

(b) markedly diminished effect with continued use of the same amount of the substance

(2) withdrawal, as manifested by either of the following:

(a) the characteristic withdrawal syndrome for the substance [For example, with alcohol withdrawal, two or more of the following symptoms are necessary: autonomic hyperactivity, increased hand tremor, insomnia, psychomotor agitation, anxiety, nausea or vomiting; and rarely, grand mal seizures or transient visual, tactile, or auditory hallucinations or illusions.]

(b) the same or closely related substance is taken to relieve or avoid withdrawal symptoms

(3) substance is often taken in larger amounts or over a longer period than intended

(4) there is persistent desire or unsuccessful efforts to cut down or control the substance use

(5) a great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects

(6) important social, occupational, or recreational activities are given up or reduced because of substance use

(7) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption). (APA, 2000, p. 197)

Prevalence of Substance Use Disorders

The annual National Survey on Drug Use and Health (NSDUH) is the primary source of statistical information on the use of alcohol and illicit drugs in the civilian, non-institutionalized population of the United States aged 12 years old or older (Substance

Abuse and Mental Health Services Administration [SAMHSA], 2007). The most recent NSDUH survey estimated that 22.6 million persons met criteria for a substance use disorder in the past year. Of these, 3.2 million were classified with dependence on or abuse of both alcohol and illicit drugs, 3.8 million were dependent on or abused illicit drugs but not alcohol, and 15.6 million were dependent on or abused alcohol but not illicit drugs. These estimates have remained relatively stable since 2002 (SAMHSA, 2007).

The Cost of Substance Use Disorders

Estimates of annual overall economic costs of substance abuse and dependence in the United States, including health- and crime-related costs as well as losses in productivity, approach approximately $185 billion for alcohol and $181 billion for illicit drugs (Harwood, 2000; Office of National Drug Policy, 2004). Detrimental societal consequences include, though are not limited to, the spread of infectious disease, deaths due to drug and alcohol use complications, effects of use on unborn children of pregnant substance users, child abuse and neglect, accidents, homelessness, diminished work productivity, and crime (Harwood, 2000; Office of National Drug Policy, 2004). Considering the extent of this burden, which permeates the lives of substance users, the family systems they are a part of, the communities they live in, the health care system, the criminal justice system, and the economy, substance use disorders are of great public concern (Fletcher, Tims, & Brown, 1997; Simpson, 1993).

The Value of Substance Abuse Treatment

An upside to this seemingly dim state of affairs is that substance abuse treatment evaluation studies conducted over the past 40 years have consistently found that treatment "works." In other words, when treatment is delivered to clients seeking services for substance use problems, alcohol and drug use decreases, engagement in crime is reduced, and other social functioning measures improve during and following treatment (Anton et al., 2006; Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; Hubbard et al., 1989; Moyer & Finney, 2002; Project MATCH Research Group, 1998b; Simpson, 1993; Simpson & Sells, 1982; Weisner, Matzger, & Kaskutas, 2003). Furthermore, many of these studies and numerous others have reported a positive relationship between length of time spent in treatment and favorable outcomes, a finding that spans treatment modalities, programs, and treatment models (Hubbard et al., 1997; Hubbard et al., 1989; McLellan, Luborsky, Woody, O'Brien, & Duley, 1983; Moos & Moos, 2003; Simpson, 1981; Simpson & Sells, 1982).

Substance Abuse Treatment Dropout

At the same time, many clients do not remain in substance abuse treatment long enough to reap its benefits. Although the percentage of clients who do not complete substance abuse treatment due to dropout or expulsion varies widely and can be difficult to measure because treatment modalities have diverse treatment expectations, some general trends have been observed. Lower estimates of the dropout rates for inpatient alcohol and drug treatment programs are around 20%, while upper estimates can reach 70% (Rabinowitz & Marjefsky, 1998; Stark, 1992; Wickizer et al., 1994). Outpatient alcohol and drug treatments tend to fare much worse and often exhibit dropout rates exceeding 60% to 70% (Stark, 1992; Wickizer et al., 1994). Overall, approximately 50%

of clients involved in substance abuse treatment drop out within the first month (Stark, 1992). Despite these alarming statistics, they correspond to attrition rates in other health service sectors. In a meta-analysis of 125 studies on psychotherapy dropout, Wierzbicki and Pekarik (1993) found mean dropout rates of 47%. More recent studies conducted in mental health centers in various countries found dropout rates routinely fluctuate between 35% and 55% (Barkham et al., 2006; Berghofer, Schmidl, Rudas, Steiner, & Schmitz, 2002). Estimates for medical treatment are even higher with attrition rates ranging from 50% to 80% (Meichenbaum & Turk, 1987). Nevertheless, clients who drop out of treatment prematurely often incur high "front-end" costs due to the amount of program resources that need to be dedicated to initial assessments and the treatment planning process, and high attrition can reduce the operational efficiency and overall effectiveness of a treatment program (Simpson, Joe, et al., 1997, p. 280). In light of these observations, treatment retention has emerged as an important intermediate outcome measure in the study of substance abuse treatment (Chou, Hser, & Anglin, 1998).

Importance of Evaluating Substance Abuse Treatment Retention and Outcomes

The increased utilization of research methodologies, assessment procedures, and statistical analyses designed to evaluate the inherent complexities of treatment processes (i.e., engagement, participation, therapeutic relationship) and how they relate to treatment retention and outcomes is allowing researchers to expand areas of inquiry and to continue building the theoretical and applied knowledge base in the treatment for substance use disorders. Contemporary questions of interest have focused on identifying relationships amongst client-, counselor-, and program-level variables and investigating how they relate to treatment retention and outcomes; devising and evaluating innovative

interventions to improve retention and outcomes; determining if certain modalities or treatment philosophies are more appropriate for particular clients; ascertaining the amount of treatment needed to be effective for certain clients; determining if specific ingredients are necessary for treatment to be effective; and examining how treatment systems and the clients they serve have transformed over time (Fletcher et al., 1997; Moyer & Finney, 2002; Leshner, 1997; Simpson, 1993; Swearingen, Moyer, & Finney, 2003). It is the answers to these queries that have impacted and will continue to influence substance abuse policy and decisions regarding the development of treatment service components, evaluation methodologies, the allocation of funds, and third-party payer guidelines (Etheridge, Hubbard, Anderson, Craddock, & Flynn, 1997; Fletcher et al., 1997).

Importance of Program-Level Research

Despite these advances, uncertainties remain regarding the extent to which such empirical evidence can be applied to substance abuse treatment programs at the local level. Client attributes, problems, and treatment needs are highly diverse, leading to systematic variations in the respective clientele served by individual substance abuse treatment programs (Simpson, Joe et al., 1997). Additional programmatic heterogeneity exists with reference to treatment approaches and services offered. Not surprisingly, these inherent complexities of real-world clinical settings do not often correspond to the homogeneous samples and manual-driven treatment conditions in efficacy trials and controlled therapy research (Carroll & Rounsaville, 2003; Persons & Silberschatz, 1998; Tucker & Roth, 2006). Since data from large-scale randomized trials and naturalistic investigations are often collapsed across certain types of clients, sites, and even treatment

modalities, relevant between- and within-program differences that might be of value to a specific program are potentially masked. Consequently, individual substance abuse treatment programs need to deduce if and how assorted research findings regarding treatment effectiveness, retention, and outcomes pertain to their respective programs in order to make informed decisions regarding interventions, policies, and resource allocation (Etheridge et al., 1997). Ultimately, program-level investigations can help shape substance abuse treatment practices and contribute to the general knowledge base regarding the treatment of these disorders, both vital activities in trying to narrow the observed science-practice gap that exists within the substance abuse treatment field (Persons & Silberschatz, 1998; Tucker & Roth, 2006).

Importance of Group-Level Research

The characteristics of individuals participating in alcohol and drug treatment programs have dramatically changed over the past several decades (Anglin, Hser, & Grella, 1997). Considering the shifts in substances of abuse and demographic profiles of individuals participating in treatment, an initial step in determining the relevance of assorted research findings to a particular treatment program is to identify who is participating in that program. Traditionally, the examination of client characteristics and description of samples has remained at the individual level of analysis. However, Rapkin and Dumont (2000) suggest it may be more meaningful to study multiple dimensions of identity and behavior and to "discover the variables that define and delimit" meaningful groups within a heterogeneous set of individuals (p. S396). More specifically, "a deeper understanding of natural groupings would help us fine-tune questions about causes and treatment of problem behaviors" and identify groups that may be responsive to certain

types of treatment interventions, programs, or modalities (Rapkin & Dumont, 2000, p. S396). Moreover, exploring different patterns of variables and their prevalence within a certain population may also provide insight into potential complex relationships that exist amongst those variables.

Statement of the Problem

Substance abuse and dependence have detrimental effects at micro and macro societal levels, accruing both measurable economic costs (e.g., lost productivity, increased health care utilization, and criminal justice involvement) and immeasurable losses (e.g., premature death, child abuse, and relationship strain). Even so, these disorders appear to be amenable to treatment. Based on the wealth of the extant substance abuse treatment literature, when clients receive treatment for substance use problems, they generally achieve positive outcomes (i.e., reduced alcohol and drug use, decreased involvement in crime, improved social functioning). Although time spent in treatment is positively related to more favorable outcomes, clients often are not retained in treatment long enough to attain its benefits. Reported substance abuse treatment dropout rates have varied greatly (20% - 74%) depending on factors such as treatment modality, program philosophy, and clientele served, prompting researchers to examine how these components affect whether or not a client stays in treatment. Diverse methodological techniques have been employed across various programs serving assorted clients to investigate the relationships amongst client, program, and treatment attributes, treatment retention, and eventual outcomes. Unfortunately, no consistent “treatment dropout” profile has been detected, and the generalizability of these findings are often questioned

at the local level because of the stark differences that exist between particular treatment programs and their clientele and those studied.

Purpose of the Study

A primary purpose of this study is to describe the characteristics of clients entering an intensive outpatient chemical dependency treatment program and to examine how these variables differ between clients who complete treatment and clients who drop out of treatment prematurely. Additionally, in an effort to accurately depict this particular treatment program population, this study will explore whether a classification system can be used to categorize individuals into meaningful groups based on important pretreatment characteristics. From a clinical perspective, it is difficult for a program to examine treatment outcomes without first learning about who is entering treatment and who is staying in treatment. The identification of variables that positively and negatively relate to retention will further assist in the creation of an assessment procedure that allows clinicians to quickly and efficiently detect clients who may be at risk for dropout. Ultimately, such knowledge can begin to inform the design of interventions aimed at enhancing treatment retention, which can potentially improve treatment outcomes as the positive relationship between retention and outcomes is well-established in the literature. Furthermore, exploring whether meaningful client subgroups exist in this population is an initial step in determining if and how such information can be useful to the clinical staff. For example, if treatment completion status emerges as a distinguishing variable amongst subgroups, similarity to a particular profile may serve as a more comprehensive means to identify clients at risk of premature treatment dropout, as opposed the presence of one or more discrete variables associated with retention. Additionally, certain combinations of

variables may relate to whether or not a client completes treatment, thus retention-enhancing interventions should target multiple areas to address the inherent complexity of the presenting problems of clients engaging in substance abuse treatment.

From an empirical standpoint, this study will add to the existing literature that aims to describe the characteristics of clients who participate in intensive outpatient chemical dependency treatment programs at nonprofit, freestanding mental health hospitals and elucidate the extent to which current scientific evidence regarding client characteristics and their relationship to treatment retention applies to this particular program and the clients it serves. Moreover, if meaningful subgroups of clients can be identified, this study has the potential to provide insight into the complex relationships amongst the variables of interest and provide evidence in support of or in opposition to the existence of various subtypes of individuals with substance use disorders.

Research Questions

Considering the stated problem and purpose of this investigation, this study will address the following research questions:

(1) How do clients who complete an intensive outpatient chemical dependency treatment program at a nonprofit, freestanding mental health clinic differ from clients who do not complete treatment on pretreatment variables including:

a. Patient attributes: gender, age, ethnicity/race, education, income
b. Substance use severity
c. Psychiatric symptom severity
d. Motivation for treatment
e. General functioning: health, employment, social relationships, legal issues

(2) Can meaningful subgroups of this client population be identified based on important pretreatment characteristics and treatment variables?

Overview of the Remainder of the Study

Chapter II begins with a brief history of substance abuse treatment evaluation in the United States, and is followed by an overview and critique of large-scale drug and alcohol treatment research that has been carried out. Major findings and implications are reviewed, with an emphasis being placed on those related to pretreatment client characteristics, treatment retention, and the relationship between these factors and treatment outcomes. Focus then turns to the application of these large-scale research findings to small-scale settings, and the inherent benefits and challenges of this endeavor. A treatment model (The Texas Christian University Treatment Model) designed to assist researchers and practitioners conceptualize the complex components of substance abuse treatment is then described. Additional research related to this model is outlined according to identified factors related treatment retention and outcomes including patient attributes (e.g., gender, psychiatric symptoms, motivation) and treatment factors. An alternative approach to organizing and analyzing such data, the utilization of taxonomic methods, is then proposed, and then followed up with a review of research on typologies of addiction.

Chapter III describes the methodology of this study including a detailed description of the sample, assessment procedures, assessment instruments, and variables of interest. The proposed statistical analyses for use in this study, including descriptive statistics, comparative analyses, profile analysis, and cluster analysis, are also described. Chapter IV outlines results of the statistical procedures, while Chapter V discusses the

implications of these findings, limitations of the current study, and future research directions.

Definition of Terms

Chemical Dependency – This term is used interchangeably with the diagnostic category of substance dependence.

Dual Diagnosis – The presence of both a psychiatric disorder(s) and a substance use disorders.

Polysubstance Use History –This term will be used to describe the use of more than one substance (e.g., alcohol, illicit drugs). The use of this term in this study diverges from the *DSM-IV* definition: type of substance dependence disorder in which an individual uses at least three different classes of substances indiscriminately and does not have a favorite drug that qualifies for dependence on its own.

Retention – For the purposes of this study, a client was considered retained in treatment if s/he persisted to treatment completion.

Substance Use Disorder (SUD) – This term encompasses substance abuse and substance dependence diagnoses.

Treatment Completion – For the purposes of this study, a participant who is discharged from the treatment program due to the completion of treatment will be considered to have completed treatment. This determination was made by a combination of clinician report and chart review and will be described in detail in Chapter III.

Treatment Dropout – "A client who terminates treatment before it is completed"

(VandenBos, 2007, p. 302). For the purposes of this study, a participant was considered a *dropout* if s/he is discharged from the treatment program before completing treatment. This term is used interchangeably with *attrition*.

Treatment Repeater – For the purposes of this study, a participant was considered a *repeater* if s/he completed the treatment program and was subsequently admitted for at least one inpatient and/or outpatient treatment at the same facility.

Treatment Stopout – For the purposes of this study, a participant was considered a *stopout* if s/he was discharged from the treatment program before completing treatment and was subsequently admitted for at least one inpatient and/or outpatient treatment at the same facility.

Chapter II: Review of the Literature

Overview

This section begins with a brief history of substance abuse treatment research in the United States and descriptions of several large-scale drug and alcohol treatment research studies and meta-analyses. Major findings and implications are reviewed, with an emphasis on the relationship amongst pretreatment client characteristics, treatment retention, and treatment outcomes. The focus then shifts to how this large-scale research pertains to small-scale settings, and the inherent challenges of this endeavor. The Texas Christian University Treatment Model, a model designed to assist researchers and practitioners conceptualize the complex processes involved in substance abuse treatment, is described and evaluated. Research related to this model is outlined according to identified factors related treatment retention and outcomes including patient attributes, gender, psychiatric symptoms, motivation, and treatment factors. Lastly, arguments for more comprehensive descriptive and exploratory investigations regarding the patient attributes that contribute to treatment processes are elucidated.

Brief History of Substance Abuse Treatment Research

The establishment of the National Institute of Health (NIH), and its divisions of alcohol and drug abuse, can be traced back to the alarming rates of psychological disorders that were detected among service men and women and veterans following World War II. By the 1970s, it became apparent that the NIMH and its alcohol and drug divisions were not adequately dealing with the rampant alcohol and drug problems sweeping the nation. Multiple indicators of alcohol abuse and dependence, including

hepatic cirrhosis and violence-related mortality, had been increasing since World War II; moreover, relatively localized abuse of cocaine and heroin abuse transformed into an epidemic in the late 1960s and was followed by the emergence of hallucinogen and stimulant abuse (Westermeyer, 2005). In response, the National Institute of Alcohol Abuse and Alcoholism (NIAAA) and National Institute of Drug Abuse (NIDA) were formed under the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) located within the Department of Health and Human Services. ADAMHA promoted the development of substance abuse research, training, clinical treatment services, and prevention. To a large extent, governmental support for these endeavors stemmed from elected officials who were personally affected by substance use disorders, through either first-hand or familial experiences (Westermeyer, 2005).

Collaborative research efforts of NIDA and NIAAA have addressed critical empirical and clinical questions regarding the treatment of substance use disorders including treatment outcomes and how they relate to program type, client characteristics, treatment received, therapeutic approaches, and aftercare. The components of effective treatment and treatment processes, including factors that engage and retain clients in programs, have also been explored (Fletcher et al., 1997; Project MATCH Research Group, 1997a; The COMBINE Study Research Group, 2003). At the same time, macro-level studies of alcohol and drug use disorders and their treatment have remained relatively separate endeavors, with each faction adopting distinct research programs, modes of inquiries, and questions of interest. Consequently, comprehensive substance abuse treatment research will be reviewed and critiqued separately below.

Comprehensive Substance Abuse Treatment Research

The Drug Abuse Reporting Program

The Drug Abuse Reporting Program (DARP) represented the first evaluation program of the federally-funded, community-based drug abuse treatment system that began to emerge in the late 1960s (Simson & Sells, 1982). Data were collected on nearly 44,000 clients from 52 federally-funded programs representing four modalities of treatment: methadone maintenance (MM), therapeutic community (TC), outpatient drug-free (ODF), and detoxification (DT). The primary data collection period spanned from 1969 to 1974. Information was gathered through intake interviews, during-treatment progress reports, and a series of follow-up interviews at 3 to 12 years posttreatment. The extensive research program consisted of multiple studies that essentially aimed to describe the types of drug users entering treatment in the early 1970s, the types of treatment that were provided to these clients, and what happened to these clients during and after treatment. DARP also moved the field toward a more objective and behaviorally-based orientation and away from a focus on clinical impressions by utilizing a standardized assessment design for data collection and a set of standardized outcome criteria. Furthermore, effective procedures for ensuring high respondent compliance rates and maintaining quality control in the data were established (Simpson, 1993).

DARP findings demonstrated the effectiveness of three of the treatment modalities (MM, TC, and ODF) in reducing the prevalence of daily opiate use and involvement in criminal behavior, and increasing employment levels. Moreover, a significantly higher percentage of clients participating in these programs for longer than 90 days had more favorable outcomes than those who did not stay in treatment this long.

In fact, clients who remained in drug abuse treatment for less than 90 days actually had similar drug use outcomes at the one-year follow-up point than clients who did not attend treatment sessions following DT or only completed an intake session (Simpson, 1981; Simpson & Sells, 1982). Longer-term outcomes were more ambiguous. Simpson, Joe, and Bracy (1982) reported that similar statistically significant differences in outcomes continued to be observed through the first three years following treatment, though these effects were no longer statistically significant by the six-year follow-up point due to the collective effects of subsequent treatments, incarcerations, and other life events.

Fletcher and colleagues (1997) noted the DARP research program contributed much to the field of drug treatment evaluation. It delineated types of treatment; established a well-founded methodology for longitudinal treatment evaluation research; identified outcome patterns related to treatment readmissions, criminality, and employment; and provided data on the natural history of opiate addiction in a population of individuals who received drug treatment. DARP also proved that carrying out methodologically rigorous, longitudinal, field-based research with a challenging population could be accomplished. Consequently, periodic national multi-site evaluations of drug abuse treatment have become part of federal research. Together with initiatives examining changing drug use trends and their effects on the health care and criminal justice systems, such strategies have continued to inform researchers, practitioners, policymakers, and other key stakeholders of patterns, problems, and progress in the study of drug use and the treatment of drug use disorders throughout the past four decades (Fletcher et al., 1997; Simpson, Chatham, & Brown, 1995).

The Treatment Outcome Prospective Study

The Treatment Outcome Prospective Study (TOPS) was the second national study of community-based drug abuse treatment programs undertaken in the United States (Hubbard et al., 1989). Similar to DARP, it was designed to provide longitudinal information on clients entering federally-funded programs in order to allow the evaluation of short- and long-term treatment outcomes. The data collection period spanned from 1979-1981. Information was gathered on more than 11,000 clients admitted to over 40 treatment programs purposely selected to yield a sample of stable, established programs within three main modalities: MM, ODF, and long-term residential (LTR), which included therapeutic communities. TOPS aimed to obtain more data on patient attributes, program environments, and services delivered in treatment as compared to DARP and it was expected that it would also provide a model framework for investigating a variety of emerging topics in the field at that time including changing drug use patterns, psychiatric comorbidity, criminal behavior, the impact of legal involvement on treatment, the effects of posttreatment aftercare, cost-benefit analyses, and overall cost-effectiveness of drug abuse treatment (Fletcher et al., 1997; Hubbard et al., 1989).

As in DARP, results suggested that MM, LTR, and ODF treatment was effective in reducing the use of heroin and other illicit drugs and decreasing levels of predatory crime during and after treatment. Length of time spent in treatment was positively related to favorable posttreatment outcomes, with clients staying in treatment for a minimum of three months faring better than clients participating in detoxification treatment and those who entered, but failed to continue to the three-month point. TOPS researchers also noted that patterns of drug use had changed considerably from DARP, with less daily use of heroin and other opiates and more polysubstance use. It appeared that client legal status,

including pressure to enter treatment, affected the length of treatment stay as clients with legal involvement were more likely to stay longer in treatment than those without legal involvement (Hubbard et al., 1989; Simpson, 1993). Furthermore, pretreatment indicators of poor social compliance and adjustment, such as criminal history, unemployment, marital problems, and psychiatric comorbidity, were also related to higher treatment dropout and drug-use relapse rates. Cost-effectiveness and cost-benefit investigations carried out across modalities showed that when crime-related costs were calculated, treatment was both cost-effective and cost-beneficial. More specifically, in the year before treatment admission, crime-related economic costs to society were an average of $15,262 per client and fell to $14,089, an 8% reduction, in the year after treatment discharge. Costs to law-abiding citizens fell from $9,190 per client to $7,379, an approximate 20% reduction (Harwood, Collins, Hubbard, Marsden, & Rachal, 1988). In most cases, the cost of treatment was regained during treatment and further cost-benefits accrued as a result of decreased posttreatment drug use (Harwood et al., 1988).

The 1980s witnessed several noteworthy changes within the drug abuse treatment community. Drug use patterns eventually shifted to increased use of cocaine, the HIV/AIDS epidemic surfaced along with concern about needle sharing, and major modifications in the organization and structure of the treatment system materialized as federal funding was cut and the bulk of the financial responsibility was turned over to state governments in the form of block grants (Craddock, Rounds-Bryant, Flynn, & Hubbard, 1997; Fletcher et al, 1997). This changeover resulted in a reduction in state financial support and seemed to negatively affect community-based treatment programs as they consequently experienced increased strain from excessive demand, understaffing,

and a persistent lack of adequate resources to address the complex problems of clients entering treatment (Fletcher et al., 1997). Such dynamic shifts within the population of drug users and the treatment programs that served them called into question the applicability of the previous research findings of DARP and TOPS, thus setting the stage for a third national treatment study.

The Drug Abuse Treatment Outcome Study

The Drug Abuse Treatment Outcome Study (DATOS) was initiated by the NIDA in 1989. Similar to its predecessors, a primary objective of this research program was to determine drug abuse treatment effectiveness for contemporary treatment populations and drug use patterns through the collective examination of how client factors, treatment processes, and program structure affect outcomes (Fletcher et al., 1997; Leshner, 1997). Data were collected on 10,010 clients in 99 programs between 1991 and 1993. As was the case in TOPS, programs were purposely selected to represent treatment delivered in established, stable programs across the main modalities: outpatient methadone treatment (OMT), short-term inpatient (STI), LTR, and ODF. Extensive client-level information was obtained in a variety of domains including demographics; alcohol and drug use; mental and physical health; legal status; income and employment; cognitive functioning; motivation and readiness for treatment; and engagement in AIDS risk behaviors. An array of in-treatment variables were also collected along with information regarding program structure and services offered. Data were collected at intake, during treatment (1 and 3 months), and after treatment (12 months) (Fletcher et al., 1997; Leshner, 1997).

In order to fully capitalize upon the wealth of data DATOS produced, a cooperative study was eventually launched in the mid 1990s involving NIDA and three

collaborating grantees: the National Development and Research Institutes (NDRI), the Drug Abuse Research Center of the University of California at Los Angeles (UCLA), and the Institute of Behavioral Research at Texas Christian University (IBR-TCU). Based upon the expertise of the researchers at these respective institutions, each arm of the expanded research program focused on different themes. Fletcher et al. (1997) provides a synopsis of this breakdown. NDRI delved into health services research and investigated issues concerning access to and use of drug treatment services such as need for services by client subtype, access to services, service use by modality and client profile, and factors related to treatment selection and entry. IBR-TCU concentrated their efforts on treatment engagement and retention. This division examined client and program variables related to retention and program adherence and the impact of motivation and treatment readiness indicators on engagement and retention. UCLA explored the addiction and treatment careers of treated individuals via the development and testing of models describing the stages in the process of addiction, the interaction of program and client variables in treatment outcomes across a client's career, and the background and drug history factors that relate to treatment entry and reentry. NIDA assumed responsibility for considering the policy-relevant aspects of such a large-scale evaluation of drug abuse treatment by developing studies that described the evolving treatment system, determined the effectiveness of treatment as it is typically delivered for current treatment populations, and estimated the cost-effectiveness and cost-benefits of treatment.

TOPS to DATOS

Craddock and colleagues (1997) documented the notable changes in pretreatment behaviors and characteristics of clients entering drug abuse treatment during the period of

TOPS data collection as compared to DATOS. The TOPS era had witnessed an increase in the use of multiple drugs, while DATOS findings documented a decrease in the numbers of types of drugs used. Nevertheless, reports of cocaine use since TOPS more than doubled among clients entering LTR and ODF treatment modalities, and increased one and one-half times among OMT clients. DATOS clients were generally older, had higher educational attainment, less full-time employment, and more dependence on public assistance than TOPS clients. Although there was evidence of a decrease in involvement in predatory crime, significantly greater proportions of DATOS clients were involved in the criminal justice system and had reported engaging in illegal activity in the year prior to treatment to get money for drugs than TOPS clients. Additional evidence that the clients of DATOS presented with new and difficult combinations of problems to treat included the salience of health problems, histories of physical and sexual abuse, needle injection practices, sexual risk behaviors, and child custody concerns. "The changing nature of the drug treatment client population – from sociodemographics to drug use and multiple treatment problem severities – highlights the complexity of issues and difficulties encountered by those attempting to treat clients or plan treatment strategies" (Craddock et al., 1997, p. 44). Such dynamic shifts underscored the importance of continuous examination and assessment of the drug treatment-seeking population.

Treatment Outcomes

In addition to documenting such notable changes in treatment clientele, DATOS investigations proffered a wealth of information in an array of areas. In accordance with its predecessors, DATOS outcome data indicated that treatment was generally effective in

reducing drug use across all four modalities (Hubbard et al., 1997). For OMT clients, those still engaged in treatment at the one-year follow-up point reported significantly less weekly or daily heroin and marijuana use than clients who left treatment prior to the one-year marker; this difference was statistically significant. A 20% reduction in weekly cocaine use during the follow-up year was also noted for OMT treatment clients. LTR, ODF, and STI clients reported 50% less weekly or more frequent cocaine use in the follow-up year as compared to the year prior to admission. The overall percentage of clients reporting weekly or more frequent use of alcohol, marijuana, and heroin during the year prior to admission was also reduced by at least half at one-year follow-up. Long-term outcomes for a subsample of cocaine-dependent clients demonstrate sustained treatment effects (Simpson, Joe, & Broome, 2002). Weekly cocaine use and daily alcohol use were significantly reduced during the fifth year of follow-up as compared to the pretreatment year and were comparable to figures reported for the year following treatment.

Treatment duration appeared to be an important factor in producing positive outcomes as reductions in cocaine and alcohol use were significantly greater for clients treated for at least three months in LTR and ODF. Significant declines in marijuana use were also noted for clients remaining in LTR for three months or more. Further logistic regression analyses that controlled for 10 independent predictor variables chosen because of known associations with important outcomes (e.g., gender, ethnicity, age, education) demonstrated that a treatment stay of at least six months in LTR and ODF treatment was associated with statistically significant reductions in cocaine, marijuana, and alcohol use for these modalities. Hubbard et al. (1997) noted that the time-in-treatment effect related

to reduced cocaine and marijuana use for clients enrolled in LTR programs mirrored results obtained in TOPS. However, the additional findings of a significant decline in alcohol use for LTR clients and substantial reductions in cocaine, marijuana, and alcohol for ODF clients provide strong evidence for a treatment duration effect for various types of substance use that was not identified in the TOPS research.

Measures of behavioral outcome results were more mixed (Hubbard et al., 1997). Percentages of engagement in predatory illegal activity and high risk sexual behaviors at follow-up were one-half the rate as compared to the preadmission year for OMT clients (28.6% to 13.7% and 25.2% to 12.9%, respectively); however, little change was noted in the endorsement of suicidal ideation, less than full-time employment, and health limitations. For LTR, ODF, and STI clients, percentages in the follow-up year were typically lower than in the preadmission year for suicidal thoughts or attempts, predatory illegal activity, and sexual risk behavior, but little change was reported for employment and health outcomes (Hubbard et al., 1997). Upon further examination, LTR clients remaining in treatment for at least six months exhibited a statistically significant reduction in illegal activity (50%) and increase in full-time employment (10%). ODF clients staying in treatment for at least six months also displayed a small, but statistically significant increase in full-time employment and reduction in suicidal ideation. No statistically significant effects of stays longer than two weeks in STI were found for any of the behaviors measured. Generally speaking, DATOS behavioral outcomes appeared to only replicate TOPS findings within the LTR modality, as there was not a statistically significant reduction in illegal activity for clients enrolled in OMT and ODF treatments. Hubbard and colleagues (1997) noted that these findings were not a surprise given the

decline in comprehensive services offered within OMT and ODF programs since TOPS was conducted.

Programmatic Differences

Taken as a whole, the DATOS outcome data suggested that longer treatment stays are associated with more favorable outcomes, a finding that is consistent with previous large-scale treatment evaluation studies despite considerable changes in drug use patterns and characteristics of clients entering treatment over time (Craddock et al., 1997; Hubbard et al., 1997). However, multi-site treatment outcomes studies are accompanied by a variety of complexities associated with aggregating data across a broad range of treatment settings and clientele (Simpson, Brown, Joe, 1997; Simpson, Joe et al., 1997). "Wide program variation may mask clinically meaningful treatment effects in large-scale outcome studies such as DATOS and offers methodological challenges in identifying meaningful strategies for clustering programs to account for potential impacts at the client level" (Etheridge et al., 1997, p. 259). Thus, a comprehensive review of program data was undertaken before programmatic differences in treatment outcome and retention were examined. This appraisal aimed to describe the varying structures and characteristics of the treatment programs included in DATOS and to examine treatment and programmatic changes over time as this information compared to TOPS data (Etheridge et al., 1997). The program-level data were derived from a self-administered questionnaire completed by the program director or a senior counselor assessing a variety of domains including program structure, client characteristics, staffing, job preparation, treatment structure, treatment content, available services, treatment planning, program policies, and indicators of success in treatment.

Results indicated that DATOS programs typically emphasized supportive therapy delivered in group and individual sessions, with a notable increase in the percentage of counseling delivered in the group format as compared to TOPS. LTR and ODF programs also tended to incorporate problem solving techniques while OMT and STF integrated more case management approaches (Etheridge et al., 1997). Secondary treatment foci diverged across modalities, reflecting the uniqueness of each modality. LTR programs often included milieu therapy and 12-step strategies. STI also integrated milieu therapy along with problem solving. In addition to 12-step approaches, ODF programs tended to incorporate psychotherapy and cognitive-behavioral techniques into their treatment. Treatment goals across modalities and programs focused primarily on abstinence from illicit substances and alcohol. Consistent with these objectives, nearly all programs employed urine monitoring and incorporated some type of relapse prevention component into treatment, although relapse prevention was emphasized less strongly in OMT programs (Etheridge et al., 1997). In terms of physical make-up, STI and LTR programs were generally smaller in capacity and staff carried smaller client caseloads than OMT and ODF programs, allowing for longer and more frequent contact with clients. The ODF modality varied the most with regards to treatment intensity as some programs scheduled a single one to two-hour session per week (“regular”) while others scheduled at least two three-hour sessions per week (“intensive”).

Nearly all DATOS programs indicated that individualized treatment was provided, at least to some clients, based on client needs. The majority of programs also aimed to match clients to particular types of treatment or counselors, with many of these decisions based mainly on counselor style and expertise as opposed to client

characteristics (Etheridge et al., 1997). Almost 86% of the participating programs reported they utilized either a general program-developed assessment or a widely used standardized assessment to assess client needs across a variety of domains. Considering that state and federal regulations and accrediting and licensing bodies require written treatment plans, such plans were common across programs, and the majority of programs involved the client in treatment plan development process (Etheridge et al., 1997). Many programs also faced cuts in funding and resources, resulting in programmatic reorganization and downsizing during the DATOS data collection period. Of the eight primary services areas assessed (medical, psychological, educational, vocational, financial, legal, family, and aftercare), nearly three-fourths of the programs were “very much” in need of aftercare and about two-thirds were ”very much” in need of medical services. Some of the DATOS programs appeared to be relying primarily on 12-step groups as the continuing-care component of treatment as a trend of increased and more widespread posttreatment 12-step participation was observed. Even though the majority of programs reported that they referred clients for such services, the number of actual referrals made was generally low, especially in OMT and ODF programs (Etheridge et al., 1997). Overall, less than 10% of clients in these programs received psychological, family, legal, educational, vocational, or financial services.

These data brought attention to an obvious reduction in number of resources and types of services provided and accessible to clients entering drug treatment from the TOPS era to the DATOS era. Etheridge and colleagues (1997) suggested that possible factors that may have offset the potential negative effects of such a decline included increased client involvement in the treatment planning process, a rise in 12-step

participation during the posttreatment follow-up year, and higher levels of client satisfaction with treatment. At the same time, the majority of programs had only begun to experience the effects of cost containment strategies and managed care policies. Most change during the DATOS data collection period was reported by STI and ODF programs. ODF program directors accentuated challenges related to decreased lengths of stay, the third-party authorization process, and the ability to secure appropriate levels of care as many clients were being referred to ODF programs after being denied LTR and STI treatment by third-party reimbursement plans (Etheridge et al., 1997). Moreover, some programs reported feeling pressure to develop and implement brief treatment interventions and other resource-saving strategies (e.g., substituting individual sessions with structured, topic-oriented groups) in order to better fit with abbreviated treatment durations. The primary concern raised by Etheridge et al. (1997) at this time related to the apparent contradiction between research and managed care policies. In particular, third party payers were shortening treatment stays and making it difficult for providers to obtain authorization to secure additional sessions, while research studies continued to generate empirical support that suggested treatment stays of at least 90 days resulted in more positive outcomes.

Treatment Retention

Upon describing the general differences across programs within each treatment modality, DATOS researchers proceeded to examine how these discrepancies affected treatment retention rates. Although retention rates varied from program to program, a consistent finding across programs was that clients regularly dropped out of treatment long before reaching the planned length of stay. OMT programs expected clients to stay

for least two years, though the actual median length of stay was only one year. Recommended lengths of stay for LTR programs hovered around a minimum of nine months and at six months for ODF programs, though actual median treatment stays for both of these modalities was only three months (Simpson, Joe et al., 1997). Both client-level variables (sex, age, previous treatment, psychological problems, cocaine dependence, alcohol dependence, legal status, and needle-sharing) and program characteristics (counseling frequency and use of ancillary services) were examined to further elucidate how they relate to the observed variations in treatment retention across modalities and programs. Results indicated that LTR, ODF, and OMT programs that treated a higher percentage of clients who met criteria for cocaine dependence tended to have poorer retention rates, while a higher percentage of clients diagnosed with alcohol dependence was related to higher retention rates in LTR programs and lower retention rates in ODF and OMT programs (Simpson, Joe et al., 1997). LTR and OMT programs with lower retention rates were also more likely to serve clients younger than 35 years of age, while ODF programs with lower retention rates had more clients with significant legal histories. Furthermore, OMT programs with poorer retention rates tended to have more female clients, more previous treatment episodes, and more clients with psychological problems (Simpson, Joe et al., 1997).

Further analyses considered whether diversity in client composition was a sufficient explanation for the observed differences in program retention rates (Simpson, Joe et al., 1997). Results implied that retention rates would still vary even if all programs within the same modality would treat highly similar clientele. Thus, focus turned toward possible program-level characteristics and treatment process variables that may account

for the observed variations in retention, and ultimately treatment outcomes (Simpson, Brown et al., 1997; Simpson, Joe et al., 1997). Frequency of client use of additional treatment services was not related to retention for any of the modalities, nor was counseling frequency in LTR and OMT programs. However, ODF programs with higher frequency of counseling (three or more sessions per week) had significantly lower 90-day retention rates than ODF programs that had two or fewer sessions per week (Simpson, Joe et al., 1997). A possible explanation for this finding is that clients enrolled in ODF programs with a high level of treatment contact may interpret this intensity as too demanding or restrictive. Consequently, such programs may be more susceptible to dropout, especially if clients have the option to seek treatment with a less stringent commitment (Simpson, Joe et al., 1997). The relationship between treatment process variables, as described by the client, and key retention thresholds – 360 days for OMT and 90 days for LTR and ODF – (Hubbard et al., 1989; Simpson, 1981; Simpson & Sells, 1982) was also explored in a series of analyses (Simpson, Brown et al., 1997). In line with prior research, staying in LTR treatment for at least 90 days was associated with a constructive counselor-client relationship, client satisfaction with treatment, attendance in education classes during treatment, and participation in continuing care programming (e.g., 12-step meetings, other support groups). For clients enrolled in ODF programs, 90-day retention was positively related to compliance with program requirements; referral for ancillary services (e.g., vocational instruction, social services, and alcohol treatment); and engagement in continuing care programming. For OMT, remaining in treatment beyond the 360-day threshold was associated with treatment satisfaction, referral for

medical or mental health services, and compliance with program policies (Simpson, Brown et al., 1997).

Upon further examination of retention and its relationship to treatment outcome, evidence suggested that clients remaining in LTR treatment beyond 90 days had significantly better outcomes (e.g., reduced cocaine use and alcohol use; improved legal status, and more employment) than those who stayed less than 90 days. In particular, reported cocaine use dropped from 82% to 3%, daily alcohol use decreased from 23% to 1%, the arrest rate was reduced from 53% to 32%, and the employment rate increased from 54% to 68%. Outcome comparisons for ODF clients were inconclusive due to vast variation in pretreatment drug use between clients who continued in treatment to the 90-day threshold and those who discontinued prior to this point. Simpson, Brown, et al. (1997) noted that clients who were not retained in treatment for 90 days had more extensive pretreatment drug use; however, the relationship between severity of drug use and retention could not be ascertained because of program-specific disparities in client attributes and retention rates across subsamples that could not be controlled for. Furthermore, though results were in the predicted direction, no statistically significant differences were found between short- and long-term retention OMT clients (Simpson, Brown et al., 1997).

Despite these mixed findings across modalities, the identification of key client characteristics, program attributes, and treatment process elements that relate to retention remain imperative within drug treatment evaluation as this information can improve our understanding of what impacts the length of stay in drug treatment, which can potentially affect treatment outcomes. Moreover, drug use trends and the drug abuse treatment

milieu continue to change over time and such transformations need to be documented in order to ascertain whether prior empirical findings are applicable to contemporary conditions.

Summary of Large-Scale Drug Treatment Research

A considerable amount of empirical evidence related to drug treatment outcomes has been derived from large-scale, national evaluations of community-based treatment programs representing the four main modalities of drug treatment. Over the course of nearly four decades, DARP, TOPS, and DATOS research teams were able to develop and refine research methodologies and quasi-experimental techniques that demonstrated the feasibility of studying drug treatment in field settings and ultimately generated a wealth of scientific knowledge regarding drug abuse treatment and its outcomes. More specifically, these investigations described the characteristics of clients entering drug abuse treatment during their respective eras and explored the features of the assorted treatment programs included in the sample. Moreover, DARP, TOPS, and DATOS established that drug abuse treatment is effective in reducing drug use and improving social functioning and detected the positive relationship between length of time spent in treatment and the achievement of positive treatment outcomes (Simpson, 1993, 2004).

At the same time, such research is not without limitations. When examining its usefulness and applicability in the treatment of drug abuse and the programs that deliver such services, methodological aspects of this work must be considered carefully. For example, although the samples in DARP, TOPS, and DATOS were gathered from actual treatment programs, they were relatively confined to individuals with a drug use disorder, which affects the generalizability of findings (i.e., if and/or how these results pertain to

those who abuse both alcohol and drugs or alcohol only?). Similarly, since participants were extracted from publicly-funded drug abuse treatment programs, it is not known if similar result patterns emerge for privately-funded agencies. Data from these large-scale, federally-funded research projects was also collapsed across programs within the respective treatment modalities, which can potentially conceal notable between-program differences that might be of value to a specific treatment program that shares certain commonalities (e.g., clientele, services offered) with a subgroup of study programs. At a broader level, aggregating data across treatment programs and trying to detect trends amongst the various treatment modalities has produced a myriad of results. The task of interpreting and deciphering significance of such findings is saturated with layers of complexity and generates innumerable additional questions. Ultimately though, DARP, TOPS, and DATOS "comprise only part of the large body of evidence from natural and experimental studies…that supports the general effectiveness of drug treatment" (Simpson, 2004, p. 100). In order to maximize the value of these findings, they need to be integrated with additional drug treatment effectiveness research.

Meta-Analytic Studies of Drug Abuse Treatment

Appraising an expanded evidence base for drug treatment effectiveness and quantifying the diverse findings obtained via varied research methods have been possible through the application of meta-analytic review strategies (Rosenthal, 1995). Meta-analyses conducted in the past decade have provided empirical support for the effectiveness of particular types of drug abuse treatment including methadone maintenance (Brewer, Catalano, Haggerty, Gainey, & Fleming, 1998; Marsch, 1998), contingency management (Griffith, Rowan-Szal, Roark, & Simpson, 2000) and family-

couples therapy (Stanton & Shadish, 1997). Additionally, researchers have opted to examine variables that may influence the magnitude of effects detected. Prendergast, Podus, Chang and Urada (2002) conducted a meta-analysis of 78 drug treatment studies carried out between 1965 and 1996 that employed a treatment-comparison group design where one group received an intervention and the other(s) received minimal treatment or none at all. To calculate, combine, and analyze effect sizes, the authors utilized the statistical methods outlined by Hedges and Olkin and Cooper and Hedges (as cited in Prendergast et al., 2002). The overall results were first summarized in terms of descriptive statistics using inverse-weighted techniques for combining effect sizes. Subsequently, moderators of effect size were examined using multivariate modeling of client characteristics and program characteristics, with effect sizes adjusted for methodological differences across studies. Statistically significant and clinically meaningful positive effect sizes were detected utilizing a fixed-effects model for drug use outcomes (fixed effects weighted mean = .30) and criminal activity outcomes (fixed effects weighted mean = .13). These figures actually increased after adjustments were made for variations in methodological features using a random-effects model amongst the studies (random-effects weighted means = .34 and .16, respectively). In other words, results indicated that on average, clients who participated in drug treatment had more favorable outcomes than those who did not receive treatment or only received nominal treatment (Prendergast et al., 2002). Nevertheless, treatment effect sizes ranged across individual studies, prompting further examination of methodological, client, program, and treatment variables that may influence treatment effect sizes.

Four methodological characteristics emerged as statistically significant predictors of larger effect sizes. Larger effect sizes were associated with studies that had smaller numbers of dependent variables; that detected statistically significant differences between treatment groups at baseline; had low levels of attrition in the treatment group; and measured drug use by means of urinalysis screens (Prendergast et al., 2002). Upon controlling for these methodological differences, the only demographic variable that was related to outcome was age: studies with older participants reduced crime involvement to a greater degree than those consisting of younger adults (Prendergast, Podus, Chang, & Urada, 2006). Consistent with previous research, there were no statistically significant differences detected for effect size based on treatment modality, suggesting that no one treatment modality is clearly superior to others (Prendergast et al., 2002). In examining treatment characteristics, more favorable drug use outcomes tended to be found in studies in which treatment was rated to be well-implemented and allegiance to the treatment procedures was high. Surprisingly, better drug use outcomes were negatively related to theoretical development of the treatment, drawing attention to the existence of a possible rift between theory and practice. In this case, it could be argued that "theoretically based interventions may not have been adequately developed for the realities of practical application, or the application of these interventions may have diverged from what was theoretically intended" (Prendergast et al., 2002, p. 63).

Meta-analytic studies of drug abuse treatment provide additional evidence that treatment is effective in reducing drug use and other problematic behaviors. Such techniques have been successful in identifying possible variables that moderate and mediate drug treatment effects that complement the findings of the large-scale, federally-

funded projects undertaken in the United States (Prendergast et al., 2002). Nevertheless, the aforementioned research has concentrated on only a fraction of the available scientific evidence within the substance abuse treatment field as the treatment of alcohol use disorders has largely remained a separate and distinct mode of inquiry. Focus will now shift to the concurrent national comprehensive alcohol treatment research programs that have been undertaken.

Expansion of Alcohol Treatment Studies

In contrast to the quasi-experimental methodological approaches notably associated with the DARP, TOPS, and DATOS initiatives, large-scale research in the alcohol field has increasingly utilized randomized clinical trials (RCTs) in the evaluation of alcohol treatment. Widely acknowledged as the most rigorous method to evaluate comparative efficacy of treatments (Chambless & Hollon, 1998), RCTs employ randomization and other procedures to assign participants to treatment conditions in order to equate treatment groups on pretreatment characteristics that might influence outcome (Institute of Medicine, 1990; Moyer & Finney, 2002). When properly executed, RCTs are able to elucidate what treatment is best for a particular disorder and can consequently assist practitioners in deciding amongst alternative treatments (Persons & Silberschatz, 1998). However, following a comprehensive review of alcohol treatment outcome research, the Institute of Medicine (1990) proposed that basic inquiries concerning whether or not treatment for alcohol use disorders works and which treatment(s) works the best may not be as pertinent to the field as the expanded question: “Which kinds of individuals, with what kinds of alcohol problems, are likely to respond to what kinds of treatments by achieving which kinds of goals when delivered by which kinds of

practitioners?" (p. 143). More specifically, considering the array of alcohol treatments available, might prescribing particular types of treatment for clients possessing a certain profile of background variables and treatment needs produce better treatment outcomes, increase cost-effectiveness, and reduce therapeutic mismatches that may affect treatment response or treatment dropout? (Allen & Kadden, 1995; Donovan & Mattson, 1994; Institute of Medicine, 1990; Project MATCH Research Group, 1997a). By the late 1980s, empirical research in support of this "matching hypothesis" was promising, though not entirely convincing or fully understood (Longabaugh, Wirtz, DiClemente, & Litt, 1994; Mattson et al., 1994). In response the National Institute on Alcohol Abuse and Alcoholism (NIAAA) launched a large-scale, RCT investigation named Matching Alcoholism Treatment to Client Heterogeneity (Project MATCH).

Project MATCH

Project MATCH aimed to test the most promising matching hypotheses to date by determining if various subgroups of alcohol dependent clients would respond differently to three manual-guided, individually-delivered treatments: Cognitive Behavioral Coping Skills Therapy (CBT), Twelve-Step Facilitation Therapy (TSF) and Motivational Enhancement Therapy (MET; Project MATCH Research Group, 1997a). In addition to improving upon the methodological limitations of its predecessors, DiClemente (2003) notes that Project MATCH aspired to understand treatment processes and behavioral change components as well as drinking outcomes in its evaluation of matching hypotheses. The three study treatments were chosen because of their diverging conceptualizations of behavior change and the techniques they employed to influence this process (DiClemente, 2003). CBT consisted of 12 sessions over the 12-week treatment

period. It was derived from social learning theory wherein the focus was on the development of coping skills that would enable clients to deal with situations that commonly precipitate relapse. TSF was also delivered on a weekly basis throughout the treatment period. It viewed alcoholism as a spiritual and medical disease, fostered client acceptance of this disease, encouraged the development of a commitment to participate in Alcoholics Anonymous (AA), and promoted the working of the 12 steps associated with the AA paradigm. MET consisted of four treatment sessions held during the first, second, sixth, and twelfth weeks of treatment. It employed techniques aimed at increasing intrinsic motivation and initiating change through the mobilization of the client's own assets and coping resources (Project Match Research Group, 1997a; 1997b).

Project MATCH was actually comprised of two parallel, though independent, examinations of clients recruited at nine clinical research units that were affiliated with multiple treatment facilities. Clients were solicited directly from outpatient treatment clinics and the community through advertisements (outpatient arm) and via inpatient or intensive day hospital treatment programs who referred clients for aftercare (aftercare arm). Randomization procedures, assessment instruments, treatment protocols, follow-up evaluations, matching hypotheses, and data analyses were identical in both branches of the study (Project MATCH Research Group, 1997a). Participants were recruited over a two-year period using strategies to maximize sample heterogeneity. To be included in the study, potential participants had to meet the following criteria: current diagnosis of alcohol abuse or dependence; alcohol as the primary drug of abuse; active drinking during the three months prior to entrance into the study; minimum age of 18; and a minimum sixth-grade reading level. Additionally, aftercare participants had to complete

an inpatient or intensive day hospital treatment program lasting at least seven days and be referred for aftercare treatment. Exclusion criteria included a concurrent diagnosis of dependence on sedatives/hypnotics, stimulants, cocaine, or opiates; intravenous drug use in the previous six months; presently being a danger to self or others; probation/parole requirements that may interfere with study participation; lack of clear possibilities for stable residency; inability to identify at least one "locator" person to assist in follow-up tracking; acute psychosis; severe organic impairment; or planned or current involvement in alternative treatments for alcohol problems. Further general requirements were willingness to accept randomization to any treatment condition, residence within reasonable commuting distance with available transportation, and completion of prior detoxification when medically advised (Project MATCH Research Group, 1997a).

The research protocol involved an initial screening to determine if a person was eligible, followed by completion of informed consent documentation. Participants then underwent a series of three comprehensive intake sessions that lasted a total of approximately eight hours. These sessions consisted of personal interviews, computer-assisted assessments, and self-administered questionnaires assessing an array of domains: demographic information, alcohol and drug use history, legal status, family and social relationships, psychological history, cognitive functioning, and motivation for treatment (Project MATCH Research Group, 1997a). Participants were then randomly assigned to a treatment condition and participated in treatment for 12 weeks. Follow-up assessments were carried out at 3 (end of treatment), 6, 9, 12, and 15 months after the first therapy session. Collateral information was collected from identified informants and laboratory tests were carried out to substantiate the participants' self-report of alcohol use. A

number of procedures (e.g., standardized therapist certification, session monitoring, blind videotape ratings of sessions) were utilized to evaluate treatment fidelity and prevent therapist variation from the protocol (Project MATCH Research Group, 1997a). With regards to treatment retention and compliance, outpatient participants completed 68% of their scheduled visits while aftercare participants competed 66%. For both arms of the study, data for over 90% of the participants were collected at all five follow-up points during the posttreatment year (Project MATCH Research Group, 1997a).

The selection of primary and secondary a priori matching variables was based on strength of empirical support and theoretical justification (Project MATCH Research Group, 1997a; 1997c). Primary client-level variables utilized to test the matching hypotheses included: severity of alcohol involvement; cognitive impairment; conceptual level; gender; meaning seeking; motivation; psychiatric severity; social support for drinking; sociopathy; and alcoholic typology (Project MATCH Research Group, 1997a). Secondary variables, though they had less backing in the scientific literature, were included to test matching hypotheses that appeared promising: severity of alcohol dependence, anger, antisocial personality disorder, assertion of autonomy, diagnosis of an Axis I disorder, prior engagement in AA, religiosity, self-efficacy, social functioning, and readiness to change. The main outcome measures were percentage of abstinent days per month and average number of drinks per drinking day, while secondary outcome measures encompassed negative alcohol-related consequences, psychiatric status, social behavior, days paid for working, and a category-based composite measure of client functioning during treatment (e.g., abstinent, moderate drinking without recurrent

problems, heaving drinking or recurrent problems, and heavy drinking and recurrent problems) (Project MATCH Research Group, 1997a).

Treatment Outcomes

Treatment outcomes were assessed during treatment, throughout the first year following treatment, and again three years after treatment completion. In the outpatient arm of the study, both the CBT and TSF conditions resulted in a higher frequency of abstinent days than MET during the 12-week treatment phase, and CBT was also associated with fewer drinks per drinking day in the final month of treatment as compared to MET. Furthermore, participants in the MET-condition experienced more alcohol-related negative consequences and were more likely to be classified as drinking heavily and/or having recurrent alcohol problems during treatment than participants in the other treatment conditions (Project MATCH Research Group, 1997b). No treatment main effects during treatment materialized for the aftercare arm, which may have been the result of these participants being exposed to an intensive initial treatment (e.g., detoxification or day hospital) before Project MATCH randomization occurred. An alternative explanation of this observation relates to the fact that treatment may have been geared more towards relapse prevention in the aftercare arm because clients commenced the study with a sustained period of abstinence, whereas more outpatient clients were likely working to establish initial clean time. Thus, the more intensive CBT and TSF treatments (i.e., 12 sessions over 12 weeks) may have a greater influence on the initiation of abstinence as opposed to the maintenance of abstinence than the less intensive MET condition (i.e., 4 sessions over 12 weeks) (Project Match Research Group, 1997b). Taken together, it was suggested that when there is a need to quickly reduce heavy drinking and

negative alcohol-related consequences, as is often the case in outpatient settings, there appears to be a temporary advantage to recommending CBT or TSF over MET (Project MATCH Research Group, 1997b).

This indication proved to be provisional because the outpatient treatment differences initially detected faded soon after the end of treatment and were not maintained during the follow-up year (Project MATCH Research Group 1997a; 1997b). The three treatments had favorable and fairly similar effects on treatment outcome as minimal discrepancies were found for drinking and related outcome measures across the follow-up period. Consequently, the Project MATCH Research Group (1997a; 1998a) concluded that these variations were not clinically significant and alcohol-dependent clients appeared to respond equally well to the three treatment methods. Overall, outcome results indicated that the percentage of abstinent days per month significantly increased for both aftercare and outpatient participants from intake through each of the follow-up periods. More specifically, clients were abstinent around 20% of the days in the three months prior to participating in the study, while this rate climbed to over 85% during the month immediately treatment. These results were sustained over the course of the year following the completion of treatment as only a slight deterioration in abstinence rates were reported for all participants (Project MATCH Research Group 1997a; 1998a). Even participants who continued to drink exhibited a considerable decline in the frequency and quantity of drinking. Prior to treatment, these clients averaged nearly 25 drinking days per month and would usually consume approximately 15 drinks per drinking day. These figures were reduced to 6 and 3 drinks, respectively, during the month after treatment and were reasonably maintained throughout the one-year follow-up period (Project MATCH

Research Group, 1997a; 1998a). In addition to improved drinking outcomes, participants showed significant reductions in depression, use of other drugs, and alcohol-related problems. Improvements in social functioning and liver function tests were also noted (Project MATCH Research Group, 1997a; 1998a).

Similar drinking outcome patterns were noted at the three-year follow-up point for the outpatients in the study. Abstinence rates paralleled those found in other long-term treatment follow-up studies with nearly 30% of outpatient participants remaining totally abstinent in the three months prior to the three-year follow-up assessment (Project MATCH Research Group, 1998a; 1998b). Even participants who reported drinking remained abstinent nearly 66% of the time at three years posttreatment, which is a 150% improvement from baseline estimates. Furthermore, when these participants drank, they reported consuming an average of between 6 and 7 drinks, which had decreased from a baseline average of about 11 drinks (Project MATCH Research Group, 1998a; 1998b).

Prognostic Indicators of Outcomes

Separate analyses were conducted to examine the effects of primary and secondary client matching attributes on drinking outcomes, regardless of the type of treatment received. For aftercare participants, gender was associated with abstinence rates throughout the one-year posttreatment phase with males having significantly fewer abstinent days than females. Psychological severity also interacted with time to predict abstinence. Near the end of the one-year follow-up phase, aftercare clients with more severe psychological problems at intake had fewer abstinent days than those who reported less severe psychological problems (Project MATCH Research Group, 1997a). Primary client attributes seemed to have a greater influence on the amount of alcohol

consumed on drinking days. Results indicated that being male, having a higher level of alcohol involvement, reporting more severe psychological problems, and possessing more social support for drinking was associated with more drinks per drinking during the one-year follow-up period. Furthermore, the effects for gender (male) and psychological severity (greater) became more pronounced over time during this posttreatment phase (Project MATCH Research Group, 1997a). When examining secondary variables, a self-efficacy measure (i.e., difference between temptation to drink and confidence to remain abstinent) and religiosity were related to drinking outcome. A higher discrepancy between temptation and confidence was associated with lower abstinence rates and higher levels of consumption, whereas a stronger religious background was positively related to increased abstinence (Project MATCH Research Group, 1997c).

A slightly different prognostic profile emerged for outpatient participants. The more motivated a client was prior to treatment and the less social support s/he had for drinking, the better the drinking outcomes (i.e., higher abstinence rate and lower consumption level) during the year following treatment. Sociopathy was also a predictor of outcome, though it interacted with time: higher levels of sociopathy were associated with poorer outcomes early in the follow-up phase but not in the latter stages (Project MATCH Research Group, 1997a). In analysis of secondary attributes, two self-efficacy measures (i.e., confidence to maintain abstinence, difference between temptation to drink and confidence to remain abstinent) and readiness to change were related to better overall outcomes. As in the aftercare arm, a larger gap between temptation and confidence was associated with more frequent and larger amounts of drinking; whereas, when confidence was considered alone, the higher the client's confidence, the greater the amount of

abstinence and the less alcohol consumed on drinking days (Project MATCH Research Group, 1997c). Other prognostic indicators suggested that greater readiness to change and higher levels of alcohol dependence were associated with increased abstinent days, while stronger religious background was related to less heavy consumption (Project MATCH Research Group, 1997c).

By the three-year follow-up point, several of these relationships were sustained and a total of 11 of the 21 client matching attributes had prognostic value for the outpatient arm of the study. It should be noted that the aftercare sample was not assessed at three years posttreatment. The most consistent finding across these intervals was that motivation and readiness to change continued to have a favorable main effect on both drinking outcomes (Project MATCH Research Group, 1998b). Though the self-efficacy variables had been related to both abstinence rates and consumption levels at the one-year follow-up point, they remained predictive of consumption levels three years posttreatment. The alcohol dependence and religiosity findings were sustained as well. Additionally, outpatient participants who experienced more severe alcohol-related problems (i.e., greater alcohol involvement, greater dependence, and type B alcoholic) or had poorer social functioning before treatment actually had better drinking outcomes at the three-year follow-up point (Project MATCH Research Group, 1998b). In summary, the authors noted that these findings suggest that "the most successful predictors are 'state' variables (e.g., motivation, self-efficacy) that are thought to be changeable, thus holding out the hope that treatment focusing on them can change drinking behavior" (Project MATCH Research Group, 1998b, p. 1309).

Treatment Matching Effects

None of the ten a priori primary matching hypotheses garnered irrefutable support for effect on drinking outcomes during treatment and throughout the follow-up period, though trends were detected. In the first month of treatment, outpatients who had social networks that were more supportive of drinking prior to treatment consumed significantly less alcohol when treated in the TSF condition as opposed to MET, though this effect dissipated in the latter months of treatment (Project MATCH Research Group, 1997b). It was suggested that this observation may have occurred because an initial focus in TSF is helping clients separate themselves from the social network that supports drinking and begin forming a new network that reinforces abstinence (Project MATCH Research Group, 1997b). Throughout the one-year posttreatment follow-up, only three primary matching hypotheses found support in the data, though only one of these had an effect that was not time dependent (Project MATCH Research Group, 1997a). Outpatients who did not report concurrent psychological problems had significantly higher rates of abstinence when treated in TSF than those treated in CBT in 7 of the 12 follow-up months. This divergence peaked at nine months posttreatment where TSF participants had approximately 87% days abstinent versus 73% for CBT participants. However, as the severity of concurrent psychological problems increased, the observed TSF advantage disappeared. Since only a small proportion of outpatient participants fell at the high end of the psychological severity spectrum, it was not possible to fully evaluate whether the observed matching trend reversed itself (i.e., if CBT, as compared to TSF, led to significantly more abstinent days for outpatients reporting more severe psychological problems) (Project MATCH Research Group, 1997a).

The other client attributes that interacted with treatment types as hypothesized were meaning seeking and motivation, although statistical support was meager and was only detected in one arm of the study. For motivation, the interaction effect changed over time and emerged as significant only during the last month of the posttreatment period (Project MATCH Research Group, 1997a). Outpatient MET clients who had low in motivation to change eventually reported significantly higher abstinence rates than their CBT counterparts one year after treatment. However, this trend had reversed itself over time as CBT initially appeared to be superior to MET for clients low in motivation immediately following treatment, suggesting that MET may have a delayed effect (Project MATCH Research Group, 1997a). In the aftercare arm, the meaning seeking hypothesis acquired some support. Participants who aspired to experience greater meaning and felt less purpose in life at intake (i.e., high meaning seeking) were somewhat more responsive to TSF than to other treatments as evidenced by significantly higher rates of abstinence. However, this effect did not emerge until the latter six months of the follow-up period (Project MATCH Research Group, 1997a).

Of the secondary matching variables selected, two results of note emerged (Project MATCH Research Group, 1997c). Outpatient participants with greater levels of anger who were treated in the MET condition had a significantly higher percentage of days abstinent and consumed significantly less alcohol on drinking days than CBT participants throughout the follow-up period. In the after care arm, degree of alcohol dependence affected outcomes in the CBT and TSF conditions (Project MATCH Research Group, 1997c). Clients classified as low in alcohol dependence severity had significantly better abstinence rates when treated in CBT as opposed to TSF during the

follow-up phase. As level of client alcohol dependence increased though, the advantage shifted to TSF treatment. TSF clients at the high end of the dependence severity range were abstinent significantly more days and drank significantly less amounts on drinking days than their CBT counterparts (Project MATCH Research Group, 1997c).

In the outpatient follow-up study, only one of the initial primary and secondary matching effects detected was sustained three years after treatment. Findings suggested that outpatients who rated higher in anger and were treated in the MET condition sustained superior outcome effects (i.e., higher abstinence rates and lower consumption amounts) at the three-year follow-up than high anger clients who participated in CBT or TSF treatment (Project MATCH Research Group, 1998b). The initial psychological problem severity matching effect (i.e., advantage of TSF over CBT in clients without concurrent psychological problems) found at the one-year point had disappeared by three years posttreatment. At the same time, a primary matching hypothesis that was not confirmed during the one-year follow-up period gained support at the three-year point. It was originally predicted that clients whose social network was supportive of drinking would have better outcomes if they were treated in the CBT or TSF condition as opposed to MET because MET does emphasize coping skills or the building of a sober network like the other treatments (Project MATCH Research Group, 1998b). Three years following treatment, TSF clients who had greater support for drinking prior to treatment had significantly higher abstinence and lower consumption rates than their MET counterparts.

Project MATCH Conclusions

The principal aim of the Project MATCH undertaking was to determine if patients possessing particular attributes would respond differentially to three alcohol treatments. When primary and secondary matching analyses are integrated, even though several statistically significant results emerged, no strong evidence in support of or in opposition to the general treatment matching hypothesis could be deduced (Project MATCH Research Group, 1997c; 1998a). “What can be concluded with some confidence is that matching clients on the basis of any single attribute hypothesized and tested in Project MATCH is unlikely to markedly enhance the effectiveness of any of these three treatments” (Project MATCH Research Group, 1998a, p. 1690). The clinical significance and robustness of the findings are challenged by discrepancies between findings from the outpatient and aftercare arms of the study and failure to find effects for both primary drinking outcomes for the identified attributes. Furthermore, the Project MATCH Research Group (1998a) reported that when comparing the difference between the top and bottom decile of an attribute, the strongest of the hypothesized effects accounted for no more than a 12% difference in abstinent days per month, which equates to about three to four days, and a reduction of two drinks per drinking day. Lastly, Project MATCH did not employ any comparison group procedures in their investigation, likely because of the ethical dilemma of withholding beneficial treatment from participants. This limitation introduces the possibility that just because participants demonstrated positive outcomes across the three treatments, does not necessarily imply that the treatments “work” equally as well; alternatively, they may not “work” at all because these outcomes were not compared to the outcomes of a group of individuals who did not receive any of these treatments.

Nevertheless, the overall picture of treatment outcome was positive for participants across the treatment conditions. High rates of compliance were documented for both the research protocol and therapy, which preserved treatment integrity and enhanced the quality of the data (Mattson et al., 1998). Furthermore, high rates of participant compliance were identified (i.e., overall session attendance rate above 65% and the completion rate of the one-year posttreatment data collection at around 90%) and were positively related to favorable treatment outcomes. Ultimately, the Project MATCH Research Group (1997c) purported:

> Single attribute by treatment interactions alone cannot account for the complexity of the matching findings. Further research will be needed to put the results into a clinically useful formula that will also provide a theoretical basis for understanding how a given treatment benefits a given client. Research is needed to identify the common and unique active ingredients of treatments, as well as provide a better understanding of how these treatment variables lead to different client outcomes. Discovery of the variables and processes that mediate treatment outcomes will enhance treatment effectiveness substantially. (p. 1695)

Project COMBINE

In accordance with the aforementioned philosophy of identifying the complex aspects of alcohol treatment that may enhance effectiveness, NIAAA launched another multi-center, RCT at the turn of the century entitled Combining Medications and Behavioral Interventions (Project COMBINE). Primary aims were to examine the efficacy of pharmacological treatments, behavioral therapies, and their combinations in the treatment of alcohol dependence and to evaluate the placebo effects on overall outcomes (The COMBINE Study Research Group, 2003). Study medications included naltrexone and acomprosate. Selected behavioral treatments were medical management (MMT), a manualized 9-session intervention that concentrated on enhancing adherence to mediation regime and maintaining abstinence that could be adapted for primary care

settings, and cognitive behavioral intervention (CBI), a manual-guided, individual outpatient specialized alcohol treatment that merges a variety of methods and techniques (The COMBINE Study Research Group, 2003). Treatment groups were comprised of various combinations of these interventions, and participants were randomly assigned by a stratified random block design. Eight groups (n = 1226) received MMT, while four of these groups (n = 619) also received CBI. All of these participants were also assigned to a medication condition (e.g., placebo, acamprosate, naltrexone, or acamprosate plus naltrexone), yielding four medication conditions within each behavioral level (e.g., MMT or MMT plus CBI). A ninth group (n = 157) who only received CBI was included to assess placebo effects. The data collection period spanned from January 2001 through January 2004 (Anton et al., 2006).

Participants were recruited from inpatient and outpatient referrals within the study sites and from the community through media announcements. Screening assessments were completed to determine study eligibility. Inclusion criteria included: age 18 years or older; current diagnosis of alcohol dependence; completion of informed consent procedures; minimum levels of drinking during the 90-day period prior to treatment entry; at least 4 consecutive days, but no more than 21 consecutive days, of abstinence prior to randomization; ability to identify a “locator” person; and ability to speak and understand English. Exclusion criteria included: concurrent diagnosis of bipolar disorder, schizophrenia, bulimia, anorexia, dementia, or another psychological disorder requiring medication; medication regime that would pose safety issues with study medications; concurrent diagnosis of dependence on another drug except nicotine, cannabis, and caffeine; diagnosis of opiate dependence or abuse within the past six months; chronic

treatment with any opiate-containing medications during the previous month; positive urine screens for exclusionary drugs; abnormal laboratory tests; being pregnant and nursing or potential to become pregnant; intention to engage in additional formal alcohol treatment; more than 7 days of inpatient treatment during the 30 days prior to randomization; and use of study medications in previous 30 days (The COMBINE Study Research Group, 2003). Primary comprehensive assessments were conducted at intake and then at various points following randomization: 8 weeks (during treatment), 16 weeks (conclusion of treatment), 26 weeks, 52 weeks, and 68 weeks (one-year follow-up). Measures of drinking and craving were also collected weekly or at each MMT appointment. Primary drinking outcomes were percentage of abstinent days and time to first heavy drinking day, though drinks per drinking day was also examined (The COMBINE Study Research Group, 2003).

Treatment Outcomes

Overall, all pill-taking treatment groups exhibited significant reductions in drinking, with percentage of abstinent days increasing from 25% during the pretreatment period to 73% during treatment and drinks per drinking day declining from 12.6 to 7.1. Participants in the naltrexone plus MMT; placebo plus MMT and CBI; or naltrexone plus MMT and CBI conditions had significantly higher rates of abstinence (81%, 79%, and 77%, respectively) during the treatment phase than participants receiving placebo plus MMT (75%). Furthermore, over time, naltrexone reduced the risk of experiencing a heavy drinking day, an effect that was more pronounced in those also receiving MMT but not CBI (Anton et al, 2006). Contrary to the positive findings of previous trials, acomprosate demonstrated no significant effects on drinking as compared to placebo,

either by itself or when combined with naltrexone, CBI, or both. Placebo effect results indicated that participants receiving placebo plus MMT or placebo plus MMT and CBI had significantly higher percentages of abstinent days (74% and 80%, respectively) than their counterparts in the CBI only condition (67%). Although comparable between-group differences were detected at the one-year follow-up point, none of them reached a level of statistical significance, which challenges the sustainability of these treatment effects over time (Anton et al., 2006).

Taken together, Project COMBINE results suggested that participants who received MMT with any combination of naltrexone and CBI had more favorable drinking outcomes than participants in other conditions. A lack of evidence was found for the efficacy of acamprosate with or without a behavioral adjunct (CBI). With regards to questions of comparative efficacy, MMT combined with naltrexone or CBI, but not both, were the only treatment combinations that garnered incremental efficacy support. Surprisingly, a placebo effect was also detected: meeting with a health care practitioner and taking placebo pills during treatment had a positive effect on drinking outcomes above those found for participants who only engaged in CBI (Anton et al., 2006). These findings provide additional evidence for the general effectiveness of alcohol treatment and delineate two combinations of pharmacological and behavioral therapies that may produce more or less favorable results. Although the comparative efficacy results were not as robust as researchers had hoped for, the methodological precision introduced by Project COMBINE allowed for the investigation of both independent and combination testing of medications with differentially intensive behavioral interventions, a new level of design complexity that is essential to the proper evaluation of the multimodal alcohol

treatment that is currently being delivered in treatment programs (Anton et al., 2006; The COMBINE Study Research Group, 2003).

Despite its methodological rigor, a glaring omission from Project COMBINE publications is a discussion of study findings as they relate to the study's theoretical underpinnings and hypotheses that were not supported by the results. Additionally, aside from mentioning that naltrexone treatment delivered in a primary care setting could extend patient access to effective alcohol dependence treatment and suggesting that the usefulness of continued or intermittent care over the longer-term should be evaluated, implications for clinical practice and future research directions are absent (Anton et al., 2006). As Bergmark (2008) notes, researchers could have elaborated on potential treatment mechanisms that could have generated improvement in the participants' drinking practices, including participant attributes, treatment context factors, intervention characteristics.

Meta-Analytic Reviews of Alcohol Treatment

Although RCTs are a critical source of empirical evidence regarding the effectiveness of alcohol treatment, the value of smaller-scale randomized studies and nonrandomized investigations cannot be discounted. Fortunately, the inception of meta-analytic techniques has made it possible for investigators to integrate alcohol treatment research across diverse methodologies and assess the magnitude, direction, and consistency of their respective findings (Rosenthal, 1995). Miller and Wilbourne (2002) aimed to summarize the existing empirical support for various treatment approaches for alcohol use disorders by evaluating controlled studies via a differential weighting system based on the methodological precision of each study (i.e., randomization to conditions,

quality control of treatments, follow-up length, collateral interviews, replication of findings at multiple sites). The review included 361 investigations and 72,052 clients and was the most recent installment in a series of three reviews. Results indicated that the overall methodological quality of a study was significantly correlated with the reporting of a specific effect of treatment, though this relationship was modest at best (Miller & Wilbourne, 2002). With regard to treatment approaches, the strongest evidence of efficacy was found for brief interventions, social skills training, the community reinforcement approach, behavior contracting, behavioral marital therapy, and case management. Miller and Wilbourne (2002) drew attention to the fact that it appeared that the common themes interwoven throughout these particular approaches included self-efficacy related to stopping or reducing drinking, motivation for change, and attention to the social context and support systems. Two pharmacotherapies, opiate antagonists (naltrexone and nalmefene) and acamprosate, ranked fairly high on the list (3 and 4, respectively) and did so for the first time since the inception of this methodological review. Treatment techniques that generated the least support included those designed to create, confront, shock or foster insight regarding the nature and causes of alcoholism (Miller & Wilbourne, 2002).

Moyer and Finney (2002) set out to compare and contrast the participants, methodological features, and posttreatment functioning in both randomized and nonrandomized alcohol treatment studies conducted between 1970 and 1998. The sample yielded an analysis of 232 randomized and 92 nonrandomized trials. Results indicated that randomized investigations were significantly more likely to employ participant inclusion and exclusion selection criteria, to use established diagnostic criteria to

characterize participants, and to employ more rigorous treatment delivery and assessment procedures (e.g., training for providers, treatment manuals, supervision) (Moyer & Finney, 2002). Nonrandomized studies were significantly more likely to measure outcomes in a greater proportion of participants over longer follow-up periods and to include enough participants to ensure adequate statistical power to detect medium-sized (p = .05) treatment effects. Types of treatments examined also diverged between the methodologies. Randomized trials were significantly more likely to explore the effects of behavioral or pharmacological treatment whereas nonrandomized trials tended to examine broad or unspecified inpatient and/or outpatient treatments (Moyer & Finney, 2002). Aside from education, no evidence was detected of baseline differences in primary demographic characteristics including sex, ethnicity, marital status, employment status, history of alcohol use, and education. Participants in randomized studies completed significantly more years of education than their nonrandomized counterparts. With regards to treatment outcomes, even when differences in study features was controlled for, abstinence rates and the proportion of participants who improved following treatment were similar for both types of investigations. Despite the contrasting strengths and weaknesses of randomized and nonrandomized trials, Moyer and Finney (2002) advise that it would behoove the field to consider them as complementary forms of treatment evaluation.

Descriptive review approaches have also been utilized to examine the nature of alcohol treatment research itself and provide more qualitative information about what types of studies have been undertaken in the field and what changes have occurred over time. Swearington, Moyer, and Finney (2003) reviewed 701 multiple-group (n=404) and

single-group alcohol (*n*=297) treatment outcomes studies reported between 1970 and 1998. Findings indicated that males continued to make up the majority of research participants, with the percentage of women included in research (15%) not corresponding to the actual approximate percentage of female clients in alcohol treatment programs (31%) (Swearington et al., 2003). Although single- and multiple-group studies were fairly similar with respect to participant characteristics, there were observed differences in terms of treatment type, setting, and outcome assessment. Multiple-group studies investigated behavioral (33%) and pharmacological (23%) treatments more often than single-group studies (7% and 6%, respectively). On the other hand, single-group studies tended to focus more on multimodal or unspecified treatment (61%) as compared to their multiple-group counterparts (23%) (Swearington et al., 2003). Multi-group research was more often evaluated in outpatient settings (52% vs. 31%), while single-group research was more concentrated in inpatient and residential centers (53% vs. 32%). Single-group investigations also tended to track participants for a longer period of time for follow-up, nearly 20 months, as compared to just over 12 months for multiple-group investigations (Swearington et al., 2003). The observed methodological differences between multiple- and single-group designs are not surprising considering the divergent purposes of each:

> Whereas single-group studies tend to be conducted by treatment practitioners within existing treatment programs in an effort to discover how patients fare following a particular treatment program, multiple-group studies are typically undertaken by academic researchers interested in exploring theory-driven models of alcohol treatment to identify efficacious treatments and the relative effects of different treatment approaches. These findings point to a schism between research conducted in real-world settings and research-based investigations. Closing the gap will require comparative investigations of the effects of theory-based treatments in more “real-world” settings as a follow-up to efficacy studies.” (Swearington et al., 2003, p.432)

Regardless of this divide, researchers have refined statistical techniques to combine data from both randomized and nonrandomized investigations to determine average outcomes for a person who is treated for an alcohol use disorder. Miller, Walters, and Bennett (2001) examined over 8000 clients who participated in four RCTs (e.g., the VA collaborative trial of lithium, the VA collaborative study of disulfiram, two Project MATCH studies) and three uncontrolled studies (e.g., the Relapse Replication and Extension Project, the VA study of treatment for substance use disorders, the Rand corporation reports) of treatment as usual and converted outcome findings to derive estimates of average effectiveness for alcohol treatment.

Results indicated that after a single treatment episode, approximately one in four clients will maintain abstinence from alcohol during the year following treatment; moreover, another one in ten clients will moderate the frequency and quantity of their drinking to a point where no alcohol-related problems are experienced in the posttreatment year. Taken together, approximately one third of clients have relatively clear-cut positive outcomes following treatment (Miller et al., 2001). Substantial improvements are also noted for the remaining two thirds of treated clients who continue to have some periods of heavy drinking during the year after treatment. Findings indicated that the frequency of drinking is reduced, as prior to treatment they were drinking about two out of three days whereas after treatment they drink approximately one out of four days (Miller et al., 2001). The amount of consumption also decreases. The average number of drinks per drinking day is less than half what it was prior to treatment, and the average number of drinks per week is reduced by more than 87% (i.e., 77 standard drinks per week to 10). Moreover, the number of alcohol-related problems

decreases by 60% following treatment for these clients (Miller et al., 2001). Overall, these results highlight the substantial improvements made by treatment clients who do not necessarily maintain complete abstinence or moderation following treatment. Unfortunately, such progress is often masked by simplistic, dichotomous posttreatment classification of "successful" (i.e., complete abstinence) or "relapsed" (Miller et al., 2001, p. 218). Ultimately, the execution of such an investigation provides additional empirical support for the effectiveness of alcohol treatment and a unique perspective on the assessment of treatment outcomes.

Summary of Large-Scale Alcohol Treatment Research

Despite embedded limitations including the recruitment of homogeneous treatment samples and utilization of tightly-controlled treatment conditions, which both affect the generalizability of results to actual treatment settings characterized by complex clientele and variability in treatment delivery, a substantial amount of empirical evidence related to alcohol treatment outcomes has been derived from large-scale, RCTs. Studies such as Project MATCH and COMBINE aimed to determine absolute and relative efficacy of assorted alcohol abuse treatment approaches, and in accomplishing this feat, produced manualized treatment protocols that can be used in the field and demonstrated the cost-effectiveness of treatment. Meta-analyses of specific interventions and reviews of the nature of the study of alcohol treatment effectiveness have bolstered this scientific research base as well. Consequently, simple questions such as "Is treatment effective?" and "Which treatment is the best?" have often been answered with a relatively convincing, "yes, and they all work about equally as well" (Miller, 1992, p. 99). Similar responses to such questions would likely be proffered in the drug abuse treatment field as

well, because positive outcomes continue to be detected across a multitude of modalities and programs. At the same time, diversity across treatment programs with regards to clientele, approaches, and services offered necessitates a further examination of these rather broad sweeping generalizations regarding treatment efficacy and effectiveness, with a particular focus on attending to the inherent complexities of studying substance abuse treatment at a micro-level.

Translating Large-Scale Treatment Research to Small-Scale Settings

The Gap Between Research and Practice in Substance Abuse Treatment

Generally speaking, despite the strong scientific underpinnings of psychotherapy outcome research, the discrepancy between clinical practice and research continues to be large (Godfried & Wolfe, 1996). This gap also exists within substance abuse treatment field as the integration of science-based treatment into clinical practice remains the exception, not the rule, even though pressure from a variety of sources (e.g., increased consumer demand for treatment options, greater accountability for expenditures, high value placed on the scientific method as the basis for developing effective treatments) continues to mount in favor of enhanced integration (Lamb, Greenlick, & McCarty, 1998; Marinelli-Casey, Domier, & Rawson, 2002). Explanations for this rift have often been attributed to a lack of communication and cooperation between clinicians and researchers; divergent perspectives on the relevance and utilization of each other's knowledge and methods of dissemination of this knowledge; and a lack of emphasis on the transfer and implementation stages initiatives designed to blend research and practice (Marinelli-Casey, Domier, & Rawson, 2002). In examining how the exchange of science

and information between drug abuse treatment providers and researchers can be more bidirectional, Bowser (1998) outlines a number of conditions that must be met:

> First, treatment research has to be produced for practitioners and must be useful to them. Second, practitioners must want to work with and provide information to researchers. Third, researchers must be interested in what practitioners know and want to know. And fourth, we assume that better information exchanges between practitioners and researchers will improve client outcomes. (p. 136)

Clinicians and researchers who choose to engage in efforts to narrow the science-practice gap through collaborative endeavors need to acknowledge that these circumstances are met to varying degrees across research and treatment programs and should incorporate assessment procedures to appraise these aspects of the partnership. The need for collaborations amongst researchers and treatment programs within the field of substance use disorders is great and the potential value of these ventures is yet to be fully realized. One step individual substance abuse treatment programs can take in an effort to strengthen their scientific foundation is to evaluate the utility of extant substance abuse treatment literature as it relates to their particular program and the clients they serve.

Impetus for Applying Large-Scale Research Findings to Individual Programs

Why is it not only important, but critical to the advancement of the field, to determine whether or not the aforementioned substance abuse treatment outcome and retention findings can be applied at the local level of individual treatment programs? The reasons are three-fold. Such knowledge is critical for the sake of treatment itself. Treatment programs ultimately aim to serve clients and help them achieve favorable results as defined by both the treatment program and the individual client. Learning more about behavioral change processes and the variables related to “successes” (i.e., reduced frequency of use, decreases problems related to substance use, improved relationships)

and “failures” (i.e., inability to maintain abstinence, treatment dropout, increased substance use-related problems) within a particular treatment program will enhance the general knowledge base regarding the treatment of substance use disorders through the substantiation or refutation of existing empirical evidence. Moreover, “treatment practices are best driven by the cumulative evidence from a variety of studies over time” (Project MATCH Research Group, 1998a, p. 599). Thus, such program-level investigations are necessary to inform and shape general treatment practices, which will contribute to diminishing the observed science-practice gap that exists within the field.

The study of substance abuse treatment and treatment processes at the local level is also critical for the sake of the treatment program itself. Such findings can inform programs and their providers about the particular aspects of their services and practices that may facilitate or impede treatment progress and eventual outcomes. In essence, being equipped with this information can assist programs and providers in making decisions related to the allocation of resources, including time and money, in order to become more efficient and cost-effective (Etheridge et al., 1997). In a similar vein, program-level evaluation is critical for the sake of managed care policy. Providing data regarding treatment retention and treatment outcomes and their relationship to client variables is essential to informing managed care guidelines. As third-party payers continue shaping the treatment delivery system and enforcing policies that may not be in the best interest of the client, empirical evidence will be a key factor in effectively countering such practices and providing education about what factors should be considered when such decisions are made (Etheridge et al., 1997; Godfried & Wolfe, 1996). More specifically, despite the fact that one of the most consistent findings in the drug abuse treatment

literature is that length of treatment stay is a reliable predictor of favorable outcomes (Hubbard et al., 1989; Hubbard et al., 1997; Simpson & Sells, 1982), it is this aspect of treatment that is often been impinged upon by managed care and third-party payers. From a structural standpoint, Etheridge and colleagues (1997) underscore why substance abuse treatment programs need to attend to empirical evidence and critically evaluate how it pertains to their respective programs:

> A necessary ingredient for efficiency of program operation and for program stability, treatment quality, and effectiveness is program-level control and regulatory authority over the types and volume of clients coming to treatment and control over the type of treatment delivered. This control seems essential for program planning, resource allocation, staffing, and, ultimately, treatment effectiveness. Larger system-level factors such as changes in treatment financing and other system-level policy changes appear to be eroding program control over the types of clients served, length of stay, treatment and services provided, and other clinically relevant dimensions of treatment. In the absence of research-informed treatment policy development, there is a danger that these system-level forces will limit the options available for matching treatment intensity and type of counseling and services to the nature and severity of clients' presenting conditions. (p. 259)

These motives for examining research findings and determining their applicability at the local level are bolstered by the Stage Model of Behavioral Therapies Research put forth by Onken, Blaine, and Battjes (1997) and later revised by Rounsaville, Carroll, and Onken (2001). In this model, Stage Ia consists of the preliminary work that needs to be carried out prior to the execution of a well-designed, controlled clinical trial: identifying potential behavioral and psychosocial research and clinical findings related to treatment, devising new therapies, operationally defining therapies in treatment manuals, developing reliable and valid competence and adherence measures, and refining therapies based on clinician and client feedback. Stage Ib is where this work undergoes pilot testing (Onken et al., 1997; Rounsaville et al., 1997). Stage II involves establishing the efficacy of

therapies and its components and has historically been the phase that has received the majority of federal funding. It encompasses clinical trials examining the promising therapies identified in Stage I, investigations to determine the mechanism(s) of action of such therapies, and replication studies. It is Stage III that closely coincides with the impetus for carrying out program-level research, as it aims to determine the transferability and usefulness of the established efficacious treatment. It is at this juncture, between research and practice, where a range of questions are examined and evaluated: will the treatment work with real clients, therapists, and treatment settings; what kind of training is required for practitioners to execute the new treatment skillfully and safely; how should such training be delivered; and what are the costs and benefits of employing such a treatment for a particular program(s) (Rounsaville & Carroll, 2001). Such investigations are crucial to maintaining a sound scientific basis within the substance abuse treatment delivery system, but are often accompanied by assorted challenges in determining if an efficacious treatment is indeed effective in a real-world setting.

Inherent Challenges of Applying Large-Scale Research Findings to Individual Programs

A noteworthy debate within the field of psychological treatment is if and how results from RCTs are useful to practitioners. RCT proponents argue that clinicians cannot truly provide the best quality care to patients if they disregard the findings of research that determines the absolute and comparative efficacy of interventions. Moreover, clinicians have an ethical responsibility to inform patients about treatment options, make treatment recommendations, and eventually carry out treatment interventions based on the best available scientific evidence, which ought to encompass

RCTs (Persons & Silberschatz, 1998). On the contrary, there are numerous reasons why RCT findings may not generalize to typical treatment settings. In order to establish efficacy and detect "true" effects of an intervention, RCTs require a high level of experimental control to curb the number of confounding variables and the extent of their impact on outcomes. However, the maximization of internal validity comes at a price: reduced external validity. Randomization procedures, strict inclusion and exclusion criteria to ensure homogeneity within samples, and manualized treatment interventions restrict the ability of RCT findings to inform science-practice linkages because these conditions do not reflect "real world" clients and treatment delivery systems (Borkovec, 1997; Carroll & Rounsaville, 2003; Persons & Silberschatz, 1998; Tucker & Roth, 2006). "While such speculative concerns do not diminish the unique strengths of randomized trials, it is reasonable to ask (and study) whether patterns of outcomes observed in ordinary practice settings parallel those from carefully controlled clinical research" (Miller & Wilbourne, 2002, p. 276).

Although the DARP, TOPS, and DATOS research programs aimed to evaluate how drug treatment was typically delivered and utilized a naturalistic methodology, they too restricted participants to primarily drug users and carried out comprehensive assessment procedures that may not be feasible for an individual treatment program. Particularly in substance abuse treatment settings, the case mix is highly diverse, and clients often present with multiple problems and/or diagnoses, including concurrent alcohol and drug abuse or dependence (Carroll & Rounsaville, 2003; Persons & Silberschatz, 1998; Tucker & Roth, 2006). In light of the merged substance abuse treatment systems predominantly found in the U.S. private sector, which drew more from the alcohol treatment field

(Institute of Medicine, 1990), combined alcohol and drug treatment may not provide specific enough treatment for the range of substance use diagnoses present amongst clientele in any given treatment program. This observation may suggest that different factors may affect dropout and various corresponding approaches may be needed to improve retention and, ultimately, outcomes for those who meet criteria for only an alcohol use disorder, only a drug use disorder, or a polysubstance use disorder (Mertens & Weisner, 2000).

At the same time, diversity in client composition alone is not an adequate explanation for observed differences in treatment program retention rates. As a subset of DATOS analyses implied, retention rates would still vary even if all programs within the same modality would treat highly similar clientele (Simpson, Joe et al., 1997). Shifting focus to the programs themselves, treatment interventions often markedly differ from the randomized and highly specified interventions (i.e., certain number of sessions, particular techniques used, timing of interventions, emphasis on uniformity and fidelity to the protocol) evaluated in RCTs as clinicians tend to favor flexibility and attempt to tailor interventions to meet the individual treatment needs of each client. Generally speaking, substance abuse treatment is becoming more multi-modal and integrative, making it increasingly difficult to operationalize within the confines of RCT investigations and quasiexperimental or single group research designs (Persons & Silberschatz, 1998; Tucker & Roth, 2006).

At a broader level, RCT and other large-scale research (e.g., DATOS) often combine data across modalities and sites, which can ultimately conceal clinically significant programmatic disparities that may be of value to individual treatment programs that are

fairly comparable to certain study programs but not to others or not to the “typical” one upon which results represent (Etheridge et al., 1997). Likewise, since DARP, TOPS, and DATOS were carried out in community-based, publicly-funded treatment programs, privately-funded agencies likely encounter difficulties in determining the applicability of such research findings because disparities likely exist in clientele served, services offered, and structure of treatment entry and delivery. The diversity within the research itself, including varied questions of interest, methodologies, population(s) studied, and variables examined, also makes it difficult for programs to determine the extent of applicability of empirical findings because the likelihood that all of these characteristics will match up with a particular program is highly unlikely. Plus, the dynamic quality of clientele, treatment delivery processes, and managed care policies necessitates constant evaluation as prior findings may become obsolete or less germane to a particular program as it evolves and changes. Despite the aforementioned challenges associated with ascertaining if and how empirical treatment findings filter down to the individual program level, the ability of a program to answer these questions can impact the treatment delivery system and ultimately improve treatment outcomes. Fortunately, a constructive offshoot from the wealth of evidence derived from large-scale treatment efficacy and effectiveness studies and specialized treatment evaluations is that this information has been organized into a variety of comprehensive treatment models designed to assist researchers and practitioners conceptualize the complex processes of substance abuse treatment, describe how it works, and effectively evaluate it. Attention will now shift to one such model.

A Conceptual Framework for Substance Abuse Treatment Processes and Outcomes

The Texas Christian University Treatment Model

As Simpson (2004) noted, "psychotherapy, counseling psychology, and drug treatment research has identified important therapeutic issues and domains, but these finding have not been integrated efficiently into a conceptual scheme to guide clinical application and improvements" (p. 102). Hence, Simpson's drug treatment process and outcome research program at Texas Christian University (TCU) aimed to incorporate contributions from psychology and other addiction treatment and adopt both conceptual and methodological approaches designed to capture the dynamic, complex, and sequential nature of the treatment process over time (Simpson, 2001, 2004). TCU studies over the past 20 years have spanned various populations and settings, though they adopted corresponding assessment procedures and longitudinal data collection strategies in both experimental and naturalistic investigations to allow for the compilation of findings across projects to form a general treatment model (Simpson, 2001, 2004). The TCU Treatment Model "focuses attention on sequential phases of the recovery process and how therapeutic interventions link together over time to help sustain engagement and retention, thereby improving patient functioning during treatment and after discharge" (Simpson, 2004, p. 102). The primary features of the TCU Treatment Model are illustrated in Figure 1.

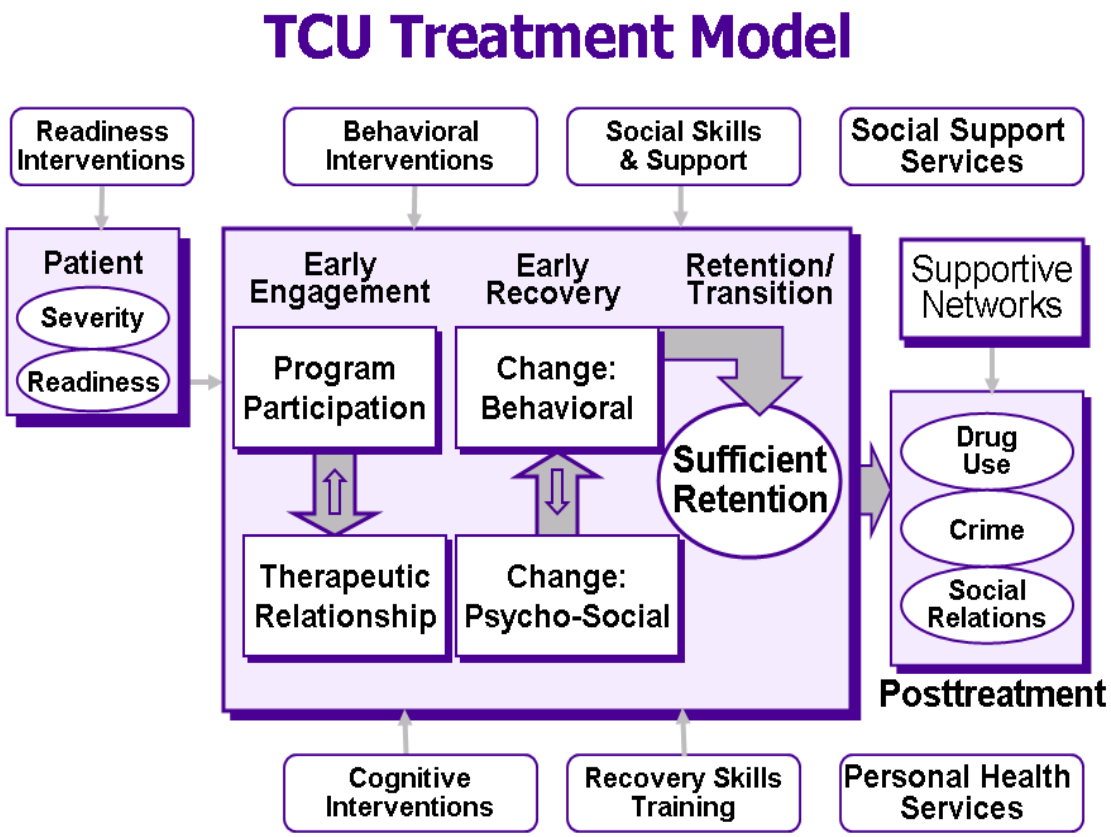

Figure 1. The TCU Treatment Model, representing sequential influences of patient attributes, stages of treatment, and evidence-based interventions on post-treatment outcomes. From "A Conceptual Framework for Drug Treatment Process and Outcomes," by D. D. Simpson, 2004, *Journal of Substance Abuse Treatment, 27,* p. 103.

The leftmost portion of the diagram identifies contextual influences on treatment outcomes. Patient attributes including background characteristics, problem severity at intake, motivation for change, and readiness for treatment are all factors deemed important in making treatment placement and planning decisions. Historically, patient sociodemographic variables have been fairly weak, inconsistent predictors of posttreatment outcomes. Although the amount of variance accounted for by any one client attribute tends to be fairly small, to the extent that a substance use disorder is "viewed as a multidimensional dysfunction, no single variable should be expected to

account for a large portion of variance" (Project MATCH Research Group, 1998b, p. 1309). Consequently, more empirical attention has been paid to exploring the complex sociodemographic profiles of clients entering substance abuse treatment. With increased measurement precision and better analytic techniques, investigators are better able to identify the extent to which patient factors and their combinations mediate and moderate treatment processes, retention, and eventual outcomes (Simpson, 2004). Indicators of problem severity such as substance use history, legal status, social resources, and psychological dysfunction, also affect early treatment experiences (i.e., program participation, the development of rapport, satisfaction with treatment) and may serve as gauges for identifying clients with specific treatment needs and others who may be at a greater risk for disengaging and dropping out of treatment.

Simpson (2004) further elucidates two complementary, yet distinct, patient attributes that contribute to early treatment processes: motivation for change and readiness for change. The motivation for change concept is grounded in Prochaska and DiClemente's Transtheoretical Model, wherein the client's position along the behavioral change continuum is examined (Prochaska & DiClemente, 1992; Prochaska, DiClemente, & Norcross, 1992), and Miller and Rollnick's (2002) corresponding Motivational Interviewing method, wherein the client's intrinsic motivation to change is enhanced through the exploration and resolution of ambivalence. On the other hand, readiness for change refers to both a global readiness for personal change and a more specific readiness for commencing a treatment program that involves particular treatment interventions. It encompasses patient attributes such as motivation level, skills/resources, and confidence/self-efficacy (Simpson 2001, 2004). Considering the dynamic quality of these

motivational concepts, along with the fluctuating nature of treatment needs, the aforementioned patient attributes need to be evaluated at the outset of treatment, periodically during treatment, and following treatment. “Patient assessment is crucial not only for the purposes of understanding treatment effectiveness, but also for developing and maintaining treatment plans and measuring progress” (Joe, Broome, Rowan-Szal, & Simpson, 2002, p. 183). Information regarding how pretreatment characteristics, psychosocial functioning, and motivation factors affect one another and change over time to impact treatment engagement, participation, rapport, satisfaction, and retention is critical to deconstructing substance abuse treatment, understanding how treatment enhances outcomes, and ultimately improving treatment delivery systems (Joe et al., 2002; Simpson, 2004).

Simpson (2001, 2004) acknowledges the fact that client elements are only one piece of the therapeutic puzzle as specific programs also possess preexisting characteristics that impact how substance abuse treatment unfolds for their clients. Although not depicted in Figure1, program attributes such as resources, staff skills, climate, and clinical and program information management procedures have been identified as factors to consider when examining treatment experiences and therapeutic effectiveness, and thus need to be documented and evaluated regularly. Furthermore, client characteristics and treatment retention rates vary widely across modalities and therapeutic orientations. Even after controlling for these client differences, similar types of programs still exhibit differential effectiveness, necessitating a closer examination of how client attributes and program features interact at the individual program level to influence treatment processes and outcomes (Broome, Simpson, & Joe, 1999; Simpson,

Joe et al., 1997). In particular, Simpson (2004) outlines evidence-based interventions designed to enhance specific aspects of treatment and recovery processes such as improving patient readiness for treatment, program participation, therapeutic relationships, early recovery, retention, and transition out of treatment, and posttreatment outcomes. These interventions vary depending on the targeted action and are sequential in nature (Figure 1).

Empirical Examination of the TCU Treatment Model

A critical component in evaluating the TCU Treatment Model's potential utility at the individual program level is to examine the findings of scientific evidence across modalities, programs, treatment approaches, and client populations. The early engagement portion of the hypothesized treatment model was tested with a subset of DATOS data from clients enrolled in LTR (*n*=1,362), ODF (*n*=866), and OMT (*n*=981) treatment programs (Joe et al., 1999). The structural equation modeling analyses consisted of two stages. The first phase examined the relationships among treatment readiness and three treatment process components: session attributes (i.e., frequency of counseling session attendance, number of health topics discussed in session, and number of other topics discussed); therapeutic involvement (counsel-patient rapport, patient ratings of confidence in treatment that is effective, and patient feelings of commitment to treatment); and time in treatment (i.e., 90 days for LTR and ODF clients and 360 days for OMT clients). The model proposed that a reciprocal relationship between session attributes and therapeutic involvement would emerge, with both of these components positively influencing treatment retention. Moreover, treatment readiness was hypothesized to positively impact therapeutic involvement (Joe et al., 1999). As

expected, all of the hypothesized paths were statistically significant, and treatment readiness was a strong positive predictor of therapeutic involvement for the LTR and ODF modalities. For the OMT modality, all paths were significant except for the path from session attributes to retention. However, the overall amount of variance in retention explained by the hypothesized model was low across modalities: LTR (2%), ODF (6%), and OMT (2%) (Joe et al., 1999).

The second phase of the analyses incorporated the impact of additional patient pretreatment characteristics on both retention and the treatment process components. The reciprocal relationship between session attributes and therapeutic involvement was detected again, with both of these components having significant positive effects on treatment retention for LTR, ODF, and OMT clients. Treatment readiness was also positively related to therapeutic involvement across modalities (Joe et al., 1999). Discrepancies emerged among client characteristics, however. For LTR clients, depressive symptoms were positively related to session attributes and retention, while hostility negatively impacted therapeutic involvement and retention. Other factors positively related to treatment retention were alcohol dependence, legal pressure, and being a minority, while cocaine use had a negative impact on retention. Furthermore, being female and a minority was positively related to therapeutic involvement, suggesting that such clients may have fared better in the LTR modality. Approximately 6% of the overall variance in LTR retention could be explained by the model (Joe et al., 1999). Some similar relationships emerged for ODF clients. Depression was positively related to session attributes, while hostility negatively affected both therapeutic involvement and retention. Males, Caucasians, and those who used cocaine also did not stay as long in

ODF treatment as their respective counterparts. In contrast to LTR clients, alcohol dependence was negatively related to treatment retention, and legal pressure had a positive effect on session attributes and retention, but a negative effect on therapeutic involvement. Approximately 12% of the overall variance in ODF retention could be explained by the model (Joe et al., 1999). Negative influences on OMT tenure included crack use and legal pressure. White clients also tended to have lower therapeutic involvement. Approximately 4% of total retention variance in the OMT modality could be explained by the model. Overall, these findings reinforce the hypothesized relationships amongst session attributes, therapeutic involvement, treatment readiness, and treatment retention and provide general support for the early engagement components of the TCU Treatment Model.

Simpson and Joe (2004) employed more advanced structural equation modeling techniques to examine the TCU Treatment Model from a new perspective. Specifically, this investigation explored the sequential relationships of the early engagement treatment process components (i.e., participation and therapeutic relationship) and the early recovery treatment process components (i.e., psychosocial and behavioral changes) that contribute to treatment retention and posttreatment outcomes (Simpson & Joe, 2004). Participants were patients (n=711) admitted to three not-for-profit, community-based OMT programs. Assessments were conducted at intake, throughout treatment, and one year after intake. According to the model, it was expected that higher treatment readiness would positively affect session attendance and that the cognitive mapping technique would positively impact counseling rapport. Reciprocal positive relationships would likely be detected between session attendance and counseling rapport (measured at month

2), which would be related to lower opiate and cocaine use (measured at month 3). Furthermore, it was hypothesized that greater counseling rapport would have direct effects on lowered drug use during treatment and indirect effects on in treatment drug use via improved psychological and social functioning (Simpson & Joe, 2004). With regards to treatment retention, the model suggested that lower drug use during treatment and treatment session attendance would positively impact 360-day treatment retention. Increased time in treatment and lower in treatment drug use would reduce drug use at the one-year follow-up point. Results provided support for the core components and suggested sequential pathways of the TCU Treatment Model as all hypothesized relationships were statistically significant and in the expected directions (Simpson & Joe, 2004).

> Drug use following treatment was predicted not only by the time in treatment but more importantly by a more detailed picture of dynamic elements that define treatment process…Systematic measurement of these elements therefore offers a way to monitor patient needs and progress in treatment, including responses to interventions and better treatment management. (Simpson & Joe, 2004, p. 94)

Additional empirical investigations have directly and indirectly evaluated the TCU Treatment Model and its respective components. Treatment retention, completion, and outcomes have been examined in light of client attributes including various sociodemographic characteristics (e.g., gender, age, race/ethnicity, education, income), substance use severity variables, psychiatric symptoms, motivational factors, and social support indicators. Treatment factors such as the therapeutic relationship and service delivery elements have also been explored. Please refer to Tables 1 and 2 for a review of the empirical findings pertaining to the features of the TCU Treatment Model and their relationship to treatment retention/completion and treatment outcomes.

Table 1.

TCU Treatment Model Factors Related to Substance Abuse Treatment Retention/Completion Identified in the Empirical Literature

Author(s)	Sample	Major Finding(s)
		Patient Attributes
Arfken et al. (2001)	2,471 individuals referred to publicly funded treatment: LTR, IOP, or standard outpatient	Women comprised 27% of the sample and had sig. greater problem severity at intake (lower income, more previous treatments, more primary crack use, and higher ASI composite scores in all domains except legal); women also had sig. lower 30-day retention and treatment completion rates across drugs of use and treatment settings
Bride (2001)	305 men and 102 women treated in either a mixed- or single-gender treatment settings	Treatment provided in single-gender settings did not significantly increase treatment retention or completion rates for either men or women.
Chou et al. (1998)	Subset of 907 in MM, 673 clients in LTR, and 2,184 in ODF treatment programs from the California Alcohol and Drug Data System	Program funding source interacted with gender for the ODF modality: female clients had sig. lower retention rates in programs only accepting public funding than those that accepted both public and private funding; male clients remained in treatment an average of 25 fewer days than female clients in programs that only accepted public funding, though had roughly the same length of stay in programs receiving both public and private funding
Claus & Kindleberger (2002)	260 clients referred for residential or outpatient treatment following an central intake unit assessment	Probation status and a history of physical or sexual abuse predicted treatment dropout after 1 or 2 sessions, as clients who were on probation were three times more likely to drop out of treatment than those not on probation; likewise, clients with an abuse history were also three times more likely to drop out

Author(s)	Sample	Major Finding(s)
		Patient Attributes
Hser et al. (2005)	1,073 methamphetamine-abusing individuals in community-based residential and outpatient treatment programs	Treatment retention and completion rates were similar for women and men across modalities; improvements from baseline to 9-month follow-up were observed across ASI domains for both women and men across modalities (with only one exception, there was no change observed in medical severity for men); women demonstrated sig. greater improvements in family relationships and medical problems than men, despite the fact that more of them were unemployed, had childcare responsibilities, were living with someone who used alcohol or drugs, had been abused, and reported more psychological symptoms
McCaul et al. (2001)	268 individuals in a publicly-funded substance abuse treatment clinic with residential, IOP, and standard outpatient services	Sig. predictors of more session attendance and longer treatment duration included being Caucasian, being male, and having a high employment ASI composite score; substance use status (alcohol-only, drug-only, or alcohol + drug) was not predictive of session attendance or treatment duration
McKellar et al. (2006)	3,649 male patients entering a 28-day VA residential treatment program	Individuals who were younger, reported more frequent drug use, reported fewer symptoms of alcohol dependence, and had poorer cognitive functioning were at sig. greater risk for treatment drop-out; treatment environment variables including perceiving less support and more staff control sig. increased the odds of drop-out
Maglione et al. (2000a)	2,337 methamphetamine users in publicly-funded outpatient treatment programs in California	Sig. predictors of 180-day treatment retention include age (being 40+ years old), gender (female), a criminal justice referral, and less severe drug use (used less than daily and did not inject)
Maglione et al. (2000b)	2,570 methamphetamine users in publicly-funded residential treatment	Sig. predictors of 90-day treatment retention include age (being 25+ years old), gender (female), a criminal justice referral, prior drug treatment, and less severe drug use (used less than daily and did not inject)

Author(s)	Sample	Major Finding(s)
		Patient Attributes
Mammo & Weinbaum (1993)	12,697 outpatients and intensive outpatient admissions for the state of New Jersey	Likelihood of not completing treatment was sig. higher for females, those who are less educated, those employed in less-skilled occupations, and the young
Mertens & Weisner (2000)	317 women and 599 men in an HMO's outpatient alcohol and drug treatment program	Fewer and less severe drug problems were sig. predictors of retention for both men and women; for women, higher retention was also predicted by having higher incomes ($20,000+), belonging to ethnic categories other than African American, being unemployed, and having lower levels of psychiatric severity; for men, predictors, higher retention was also predicted by being older (40+ years old), receiving employer suggestion to enter treatment, and having abstinence goals
Mulligan et al. (2004)	111 individuals from each of two trials randomly assigned to different behavioral and pharmacotherapies	Few differences were found between African American and White participants in terms of demographic characteristics and cocaine use outcomes; African Americans completed sig. fewer days of treatment than Whites; African Americans who received disulfiram remained in treatment sig. longer than African Americans who did not receive disulfiram
Roffman et al. (1993)	212 marijuana-dependent individuals engaged in outpatient treatment consisting of 10 2-hour group sessions spaced over 12 weeks and "booster" sessions at 3- and 6-months	Early dropouts (did not attend treatment after fourth session) were younger, earned less income, and had a higher level of psychological distress at intake than completers (attended at least 7 sessions, including one of the last two); late dropouts (attended treatment past the fourth session but did not meet completion criteria) and completers were of similar age, income, psychological stress level, and confidence in maintaining future abstinence; completers had sig. higher abstinence rates at 1-, 3-, and 6-month follow-up than the dropout groups

Author(s)	Sample	Major Finding(s)
		Patient Attributes
Satre et al. (2004)	65 patients aged 55-77, 296 patients aged 40-54, and 564 patients aged 18-39 who participated in a managed care outpatient treatment program	Older adults (55+ group) had sig. longer retention in treatment than younger adults (18-39 group); older adults were sig. more likely than younger adults to report abstinence from alcohol and drugs during the preceding month and preceding year at the 5-year follow-up point; sig. predictors of abstinence for the preceding month at the 5-year follow-up were female gender, greater treatment retention, and having no close family or friends who encouraged alcohol or drug use at 5 years (age was not significant)
Sayre et al. (2002)	165 individuals enrolled in a 12-week/20-session outpatient treatment study of Relapse Prevention for the treatment of cocaine dependence	Classified as completers – attended all 20 sessions (35%), late dropouts – attended 10-19 sessions (15%), or early dropouts – attended less than 10 sessions (50%); sig. predictors of dropout were being separated from spouse, having less education, having more family/social problems, and having a less extensive legal history; late dropouts had sig. more years of education and poorer psychiatric functioning as compared to early dropouts
Siqueland et al. (2002)	487 cocaine dependent patients randomized to 4 psychosocial treatments spanning across 9 months	Younger, African American, unemployed, and less educated patients stayed in treatment for less time; higher psychiatric severity kept men in treatment longer but put women at risk for dropping out; unemployed males had higher retention than unemployed females; employed females had higher retention than employed males
White et al. (1998)	138 patients in an outpatient substance abuse program	Discriminant function analyses suggested that ASI composite scores and severity ratings were not useful predictors of treatment attrition, though individual items identified as sig. predictors included: Hispanic ethnicity, absence of a professional skill, shorter time since last hospitalization, cocaine or cannabis use in the previous 30 days, total number of family members with drug problems, presence of emotional abuse in previous 30 days, and concern with family problems

Author(s)	Sample	Major Finding(s)
		Patient Attributes
Wickizer et al. (1994)	5,827 client records from state-funded alcohol and drug treatment programs in 4 treatment modalities	Completion rates were highest for intensive inpatient alcohol treatment (75%) and lowest for intensive outpatient drug programs (18%); variables most consistently related to treatment completion were age and education, as older clients and clients with more education were more likely to complete inpatient as well as outpatient treatment
		Substance Use Severity
Alterman et al. (1996)	95 low SES cocaine-dependent veteran men from a 4-week day hospital treatment program	Cocaine use in 30 days prior to treatment and a positive initial cocaine toxicology screen were sig. predictors of dropout; recent and lifetime ASI indices were not sig. predictors of dropout
De Leon et al. (1997)	1,398 primarily African American (66%) men (70%) entering an LTR treatment program	30-day and 10-month retention rates for groups based on primary drug of use (cocaine, opiate, marijuana, and alcohol) are similar, except the primary alcohol group had sig. higher retention rates than the primary opiate and marijuana users;
Heil et al. (2001)	302 cocaine-dependent individuals admitted to a university-based, outpatient research clinic for the treatment of cocaine dependence via one of two treatment conditions	No sig. differences emerged for average number of weeks retained in treatment between clients with concurrent alcohol dependence (alcoholics) and those without (nonalcoholics), despite the fact that alcoholics had greater problem severity in several domains at intake; a sig. interaction was noted between alcohol-dependence status and type of treatment received – alcoholics tended to remain in treatment longer than nonalcoholics when treated with intensive behavioral counseling plus incentives, but the reverse was true when treated in control conditions

Author(s)	Sample	Major Finding(s)
		Substance Use Severity
Patkar et al. (2004)	140 substance-dependent volunteers recruited from a publicly-funded 12-week outpatient substance abuse treatment program	Participants were categorized based on primary substance(s) o f use: alcohol, cocaine, or multisubstance; multisubstance group reported sig. greater drug, alcohol, and psychiatric problems on the ASI, displayed sig. higher impulsivity and anxiety scores, and provided a sig. higher proportion of dirty urines at admission than other groups; overall, 3 groups had equivalent improvements on the majority of the during treatment and follow-up outcomes at 9 months – substance use, dirty urines, days in treatment, session attendance, dropout, symptom reduction, benefit ratings
Rawson et al. (2000)	Stimulant users (500 methamphetamine, 224 cocaine) entering outpatient an treatment clinic	No sig. differences in retention rates between methamphetamine and cocaine users, despite sig. differences in pretreatment characteristics including gender, ethnicity, age, education, marital status, employment status, and legal history; most sig. predictor of retention was reported years of heavy drug use, with each year of use resulting in a longer stay
Rowan-Szal et al. (2000)	900 cocaine-dependent clients from DATOS in LTR treatment	Clients who preferred crack cocaine were sig. more likely to be female and African American and sig. less likely to have a legal history and use alcohol or marijuana on a weekly basis; crack preference was a sig. predictor of 90-day retention as crack users were only about 2/3 as likely to stay in treatment for 90 days as were non-crack users
Veach et al. (2000)	509 individuals admitted to an outpatient substance abuse treatment program	Those retained in treatment, as compared to those who dropped out, were more likely to be alcohol-dependent, were less likely to be cocaine-dependent, were more likely to be employed, and had sig. more problems on their treatment plans

Author(s)	Sample	Major Finding(s)
		Psychiatric Symptom Severity
Broome et al. (1999)	DATOS subset of 2,362 LTR clients, 1,896 ODF clients, and 1,011 OMT clients	LTR clients with current depressive symptoms were sig. more likely to stay in treatment for at least 90 days, while those with more hostility were more likely to drop out prior to this point; OMT clients with a lifetime Axis I depression or anxiety disorder diagnosis were sig. more likely to drop out of treatment prior to 360 days; in ODF, no consistent or statistically significant predictive pattern emerged across programs
Castel et al. (2006)	2,784 clients of the outpatient programs at a comprehensive addictions treatment facility in Canada	Overall, 69% of clients screened positive for at least one cluster of psychiatric symptoms (depression, anxiety, mania, schizophrenia-like, eating, conduct disorder) – 27% scored positive for one cluster, 19% were positive for two clusters, and 22% were positive for three or more clusters; multimorbidity (2+ clusters and 2+ substance use disorders) was positively associated with being female, unemployment, fewer legal problems, less social support, and drug use; these clients also attended more visits and had a lower attrition rate
Curran et al. (2002)	126 consecutively admitted males to a 3-week VA IOP treatment program	BDI scores emerged as a sig. predictor of early attrition (within first 5 days/visits); clients scoring 33+ were more likely to drop out of treatment early as compared to those who scored < 22; polysubstance users had the highest mean BDIs; age, race, education, marital status, number of prior treatments, severity of use, employment status, PTSD symptoms, and a dichotomous measure of meeting *DSM-IV* criteria for major depression were not sig. predictors of attrition
Daughters et al. (2005)	122 primarily African-American (95%) men (71%) entering an LTR treatment facility	Early dropouts (completed < 30 days) were sig. less likely to persist on psychological stressors than 30-day completers; no differences between these groups were noted for persistence on physical stressors; lower levels of psychological distress tolerance were predictive of dropping out prior to 30 days, though were not predictive after this point; no sig. differences were noted between 30-day completers and dropouts on demographic variables, legal status, psychiatric status including previous diagnoses and current symptomology

Author(s)	Sample	Major Finding(s)
		Psychiatric Symptom Severity
Haller et al. (2002)	78 drug-dependent women in a gender-specific day treatment program categorized into 3 groups based on cluster analysis of MCMI-II scores	Group 2 (*n* = 28) evidenced severe addiction, psychiatric (Axis I), and personality (Axis II) problems and had the worst treatment completion rate (26%); Group 3 (*n* = 29) was characterized by fewer Axis I problems and prominent addiction and externalizing (Cluster B) personality deficits and had the highest completion rate (76%); Group 1 (*n* = 21) presented with less severe addiction and personality problems and minimal distress had an attrition rate between the other two groups (56%)
Justus et al. (2006)	596 primarily male (96%) veterans enrolled in a homeless rehabilitation program	Clients who were younger, female, and currently diagnosed with a depressive disorder demonstrated sig. higher rates of treatment retention and completion; diagnosis of a current personality disorder or history of psychiatric treatment was related to sig. poorer rates of retention and completion
Ross et al. (1997)	308 male and 106 female with moderate-severe substance dependence referred for outpatient and inpatient treatment programs	Somatization scale scores on the SCL-90-R emerged as the only sig. predictor of treatment completion, with higher levels of somatization being associated with a poorer completion rate; tendency noted for clients reported more severe symptomatology to not start treatment programs to which they had been referred, though once clients entered treatment, there was a modest positive correlation between length of stay and symptom severity
		Motivation/Readiness
Ball et al. (2006)	24 individuals who reported reasons for prematurely dropping out of outpatient treatment	Loss of motivation/hope and interpersonal problems with staff were most common reasons cited for dropping out; problem severity and logistical conflicts with treatments were least often reported

Author(s)	Sample	Major Finding(s)
		Motivation/Readiness
Carrol et al. (2006)	423 substance abusers entering outpatient treatment in 5 community-based settings	Participants were randomized to receive either the standard intake session or the same session in which motivational interviewing (MI) techniques were integrated; MI group had sig. better retention and attended more sessions at the 28-day follow-up point, though sig. differences had dissipated by the 84-day follow-up; no sig. differences were found between groups on substance use outcomes at either follow-up point
Carroll et al. (2001)	60 adults referred for substance abuse evaluation by a child welfare worker	Participants were randomized to receive either the standard intake session or the same session in which MI techniques were integrated; rate of participants attending at least one treatment session following the evaluation was sig. higher for the MI group; no sig. differences were detected between groups for percentage of participants attending 3+ sessions
De Leon et al. (1997)	1,398 primarily African American (66%) men (70%) entering an LTR treatment program	Motivation scores were the most consistent predictors of short-term (30-day) and long-term (10-month) retention for primary cocaine users and opiate users, less consistent among primary marijuana users, and not apparent for primary alcohol users; demographic variables (age, gender, race/ethnicity, legal status) were inconsistently related to retention depending on primary drug use category and retention length
Demmel et al. (2004)	51 patients who started a 6-week, CBT-focused IOP alcohol treatment program	Patients were randomly assigned to a motivational (*n*=24) or educational (*n*=27) procedure at the outset of treatment; motivational group had sig. higher Recognition and Taking Steps and lower Ambivalence (on the SOCRATES) after the intervention (2 weeks) and sig. higher Recognition at the end of treatment than the education group; no sig. between-group differences were noted between for engagement in treatment (attendance) or dropout; for the entire sample, low Ambivalence was associated with dropout

Author(s)	Sample	Major Finding(s)
		Motivation/Readiness
Donovan et al. (2001)	654 individuals awaiting publicly funded drug treatment	Motivational attrition prevention intervention designed to increase commitment to and motivation for treatment while awaiting treatment admission did not have a differential effect on treatment entry, completion, or outcomes compared to the standard waiting list
Joe et al. (1998)	DATOS subset of 2,265 LTR clients, 1,791 ODF clients, and 981 OMT clients	Treatment readiness (i.e., degree of commitment to active change process through participation in a treatment program) was a sig. predictor of 90-day retention for LTR clients and 360-day retention for OMT clients; problem recognition (i.e., level of personal acknowledgement of drug use problems) was a sig. predictor of 90-day retention for ODF clients; these motivation factors were more important than socio-demographic, drug use, and other background variables
Mullins et al. (2004)	71 pregnant women referred for outpatient drug treatment by child welfare due to prenatal drug use	Participants were randomly assigned to receive 3 MI sessions or watch two educational videos and have a home visit in addition to treatment as usual; treatment retention, group attendance (weekly psychoeducational and substance abuse groups), and urinalysis results were not sig. different amongst these groups during 8 weeks of treatment
Simpson, Joe, & Rowan-Szal (1997)	435 OMT patients who completed an interview 12 months after treatment discharge	Sig. predictors of more favorable outcomes (i.e., reduced drug use, alcohol use, and criminal involvement) included being over 35, having lower injection frequency prior to admission, having higher motivation for treatment (i.e., desire for help), and being retained in treatment for at least 360 days; length of treatment stay was predicted by higher patient motivation at intake and early program involvement (i.e., greater session attendance and higher counselor ratings of performance during treatment)

Author(s)	Sample	Major Finding(s)
		Social Support
Broome et al. (2002)	748 patients from DATOS in short-term inpatient programs	After controlling for pretreatment use, posttreatment social support networks were the most consistent correlates of outcomes; patients in a deviant peer network or who lived with a drug or alcohol user during the follow-up year had 3 times the odds of weekly cocaine use and 2 ½ times the odds of frequent (3+ times per week) drinking
Dobkin et al. (2002)	Consecutive admissions to a Canadian outpatient substance abuse treatment program assessed at intake (*n*=206) and at 6-month follow-up (*n*=172)	High and low social support groups demonstrated sig. declines in negative affect and severity of substance abuse, though symptoms of depression and psychological stress were sig. higher at intake and at follow-up for the low social support group; low social support patients reported sig. higher alcohol and drug abuse severity at follow-up; after controlling for time in treatment, higher levels of social support were a modest predictor (6% of variance) of more favorable alcohol-related outcomes (not drug),; drop-out rates were sig. higher for patients with low social support
Griffith et al. (1998)	960 opiod drug users admitted to three publicly funded methadone clinics participating in the DATAR project	Hypothesized model examining how perceived family and peer relationships are related to specific treatment process variables (motivation and engagement) found support; a history of poor family relations was related to perceived family dysfunction and peer deviance at treatment entry; these 2 factors in turn predicted poor psychosocial function, whish was related to higher levels of motivation; higher motivation was associated with greater treatment engagement, which was associated with reduced opiod use and criminality at follow-up (12 months after leaving treatment)
Westreich et al. (1997)	66 patients enrolled in a 21-day, inpatient program	Homeless status and low initial perceived social support from family scores were sig. predictors of completion

Author(s)	Sample	Major Finding(s)
		Treatment Factors
Hser et al. (2004)	1,939 patients from community-based residential and outpatient treatment programs	Path analysis results indicated that greater service intensity and satisfaction were positively related to either treatment completion or longer treatment retention, which in turn was related to favorable treatment outcomes (30-day abstinence period, ASI drug score of 0, no criminal activity, and lived in the community) at the 9-month follow-up point
Meier et al. (2005)	Review of the impact of the therapeutic alliance on drug treatment retention and outcomes	Early therapeutic alliance appears to be a consistent predictor of engagement (session attendance) and retention in drug treatment and seems to influence early improvements during treatment, though is an inconsistent predictor of posttreatment drug use and other outcomes
Simpson et al. (1995)	557 clients from DATAR who completed at least 3 months of outpatient MM treatment and attended at least one session per month	Higher session attendance was sig. related to less frequent drug use and positive perceptions of therapeutic interactions by both counselors and clients; being white, being perceived by counselors as having higher treatment motivation and better rapport in month 1, and receiving counseling that emphasized problem-solving applications in month 1 were sig. predictors of higher overall session attendance in the first 3 months of treatment
Simpson, Joe, Rowan-Szal, & Greener (1997)	527 daily opiod users who remained in outpatient MM treatment for a minimum of 3 months	Participants were randomly assigned to a cognitively enhanced (i.e., utilized node-link mapping, a tool for improving communication and problem solving) or standard treatment condition; counseling enhancement was positively related to a stronger therapeutic relationship between counselor and patient, which had a positive reciprocal relationship with session attendance; better therapeutic relationships and higher session attendance were sig. predictors of longer retention; better treatment relationships was also related to less drug use during treatment, which in turn was also a sig. predictor of longer retention

Table 2.

TCU Treatment Model Factors Related to Substance Abuse Treatment Outcomes Identified in the Empirical Literature

Author(s)	Sample	Major Finding(s)
		Patient Attributes
Fiorentine et al. (1999)	302 clients who entered outpatient drug treatment programs in the Los Angeles metropolitan area	For female clients, 9% of variance in treatment engagement (average weekly sessions X weeks in treatment) was related to client variables with increased engagement related to more pretreatment arrests, higher pretreatment alcohol use, and less problems with memory and concentration; 21% of this variance was attributable to treatment experiences including perceived helpfulness of life skills and medical services and belief that counselors "cared a lot about them"; for men, no pretreatment characteristics were associated with engagement while 27% of the variance could be accounted for by perceived helpfulness of medical and transportation services and relapse prevention training
Hser et al. (2003)	511 patients enrolled in MM, residential, inpatient, and outpatient treatment programs	No sig. differences between men and women in measures of drug and alcohol use at the 1-year follow-up point; sig. positive predictors of drug abstinence for women included greater readiness for treatment and longer time in treatment, and sig. negative predictors included being in MM programs and multiple drug use; for men, positive predictors included being in residential programs (as opposed to outpatient) and longer treatment retention, and negative predictors included being in MM programs and having a spouse who also used drugs
Jarvis (1992)	Meta-analysis examining the magnitude and direction of trends of sex difference in outcomes	Women appear to have better results in the first year of follow-up, while men have better results after the first follow-up year; however, estimated differences were small and derived from a heterogeneous sample of studies

Author(s)	Sample	Major Finding(s)
		Substance Use Severity
Booth et al. (1991)	255 consecutive admissions to a 21-day inpatient VA alcohol treatment program	For 98 patients readmitted at least once for alcohol-related problems within 15 months of discharge, variables related to chronicity and severity of alcohol use were positively related to time to readmission, while polysubstance use and other psychiatric variables (depression, antisocial personality traits) were not predictive
Flannery et al. (2004)	Symposium examining differences in demographic characteristics and treatment outcomes in alcohol and cocaine dependent individuals	Individuals with primary cocaine-dependence (CD) are more likely to be younger, African American, and have experienced more negative consequences than those with alcohol-only dependence (AD); CD persons responded as well as AD persons to a community 12-step oriented outpatient treatment, a standardized CBT approach, and a less standardized CBT program; individuals dependent on both alcohol and cocaine (CAD) experienced more psychological, interpersonal, and social problems than those with CD only; CAD individuals who participated in an aftercare program following 1 month of IOP treatment had similar drinking outcomes during the aftercare program and at follow-up (9 months) than those with AD only, despite seeming more impaired before treatment
		Psychiatric Symptom Severity
Charney et al. (2005)	326 consecutively recruited patients entering outpatient addiction treatment in Canada	Majority of the sample (63%) presented with comorbid psychiatric symptoms – 15% depressive, 16% anxiety, and 32% combined depressive and anxiety; these 3 groups were more likely to abuse alcohol and other drugs, than the no psychopathology group, who was more likely to abuse alcohol only; depression-anxiety group had lowest rate of abstinence (40%) at 6 month follow-up; concurrent depression-anxiety symptoms at intake had a sig. but small effect on outcomes beyond factors that known to influence outcome: days in treatment, primary drug of abuse, and frequency of use

Author(s)	Sample	Major Finding(s)
		Psychiatric Symptom Severity
Chen et al. (2006)	230 mostly male patients (97%) with dual substance use and psychiatric disorders who received high or low service-intensity care at a residential substance abuse program	43% rated in high-severity category (baseline substance use and psychiatric symptoms) while 57% were classified as moderate severity; high-severity patients treated in high-intensity programs had sig. better alcohol use, drug use, and psychiatric outcomes, higher service utilization, and greater costs by the 1-year follow-up than counterparts treated in low-intensity programs; for moderate-severity patients, high-intensity programs improved outcomes for drug use only and exhibited higher service utilization, but did not have greater health care costs
McKay & Weiss (2001)	Review of alcohol and drug treatment studies with follow-ups of 2+ years	Psychiatric severity at baseline was a sig. predictor of substance use outcomes in the highest percentage of studies, although the nature of the relationship varied; stronger motivation and coping at baseline consistently predicted better drinking outcomes
Pirard et al. (2005)	700 uninsured or Medicaid insured substance abusers in residential or day treatment	Abused participants were sig. more likely to be women and were more impaired at baseline on ASI family/social and psychiatric severity; abuse group used heroin and cocaine sig. less frequently in favor of alcohol or polydrug abuse: abuse history was not a sig. predictor of completion of the intake session; at 1-year follow-up, abuse group had sig. worse psychiatric status and more psychiatric hospitalizations and outpatient treatments than the nonabused group, though similar alcohol and drug severity

Author(s)	Sample	Major Finding(s)
		Motivation/Readiness
Demmel et al. (2004)	350 alcohol-dependent German inpatients	Readiness to change, as measured by the Taking Steps and Recognition SOCRATES subscales, were significant predictors of whether a client relapsed within the 3-month follow-up period; these measures accounted for 9.4% of the variance while background variables and severity of use explained only 6%; Taking Steps was also positively related to pretreatment self-efficacy
Hewes & Janikowski (1998)	Nonrandom sample of 31 individuals with primary alcohol problems who completed treatment at an inpatient or outpatient program	Participants were categorized into 3 stages of readiness for change (Recognition, Ambivalence, Taking Steps); all participants showed sig. reductions in alcohol use problem severity across a range of ASI domains at the 30-day follow-up; no sig. differences were noted between these groups for any outcome measure
		Social Support
Booth et al. (1992)	61 consecutive admissions to a 21-day inpatient VA alcohol treatment program	Patients who received high levels of "Reassurance of Worth" from family and friends while in treatment were less likely to be readmitted (20%) in the subsequent year than patients reporting moderate (25%) or low levels (61%)
		Treatment Factors
Dearing et al. (2005)	208 clients voluntarily seeking outpatient treatment for alcohol problems	Positive expectations about therapy, greater session attendance, and positive perception of the working alliance appeared to predict greater client satisfaction and, in turn, more positive 6-month posttreatment drinking-related outcomes: abstinent days, drinks per drinking day, and drinking-related consequences

Author(s)	Sample	Major Finding(s)
		Treatment Factors
Fiorentine & Anglin (1996)	330 clients who entered outpatient drug treatment programs in the Los Angeles metropolitan area	Counseling frequency predicts relapse above what is predicted by treatment completion status, with more frequent group and individual sessions (as opposed to family sessions or 12-step meetings) being associated with lower levels of posttreatment relapse (drug use during the 6 months prior to follow-up interview); frequent participants of group and individual counseling in treatment who continued to be frequent participants in 12-step meetings posttreatment had the lowest rates of relapse
Joe et al. (2001)	2 cohorts of outpatients being treated for methadone (354 patients in community-based nonprofit programs and 223 patients from a private for-profit program)	During treatment ratings made by counselors of therapeutic involvement and relationships with patients (i.e., counseling rapport) was a more consistent predictor of 1-year treatment outcomes; a lower level of rapport was a sig. predictor of more cocaine use and criminality, both by itself and after adjusting for treatment retention, satisfaction with treatment, and post-treatment self-report of drug use, illegal activity, and arrests during the prior 6 months
Long et al. (2000)	188 consecutive admissions to a cognitive behavioral addiction unit therapy program	Classification of drinking outcomes included remitted drinking (abstinent or nonproblem drinking) and relapsed drinking (drinking but improved or unimproved); sig. predictors of more favorable outcome included higher self-efficacy in positive social situations, reduction in psychological symptoms during treatment, greater program involvement, lower perception of staff control, and a greater perception of treatment as helpful

Utilizing Taxonomic Methods to Narrow the Research-Practice Gap

Value of Taxonomic Methods

Despite the range of research questions and methodologies targeting assorted treatment modalities and clientele outlined in Tables 1 and 2, results of these inquiries have not produced consistent, reliable profiles of clients who are retained in substance abuse treatment and achieve a positive treatment outcome and profiles for those who drop out of treatment prematurely (McClellan & McKay, 1998; Stark, 1992). As Carise and Gurel (2003) note:

> There is no ongoing, generalizable, descriptive information on such basic characteristics as demographics; types and amounts of substances used prior to treatment entry; or the nature and severity of addiction-related problems in the areas of medical health, employment, criminal activity, family relationships, or psychiatric status. The gaps created by this lack of information on the population of substance abusing or dependent individuals in our nation's treatment system, as well as limited information at state and local levels on the treatment provided, has been recognized as a problem by the Office of National Drug Control Policy. (p. 181)

Instead, substance abuse treatment research results often merely delineate lists of differences between men and women, between older clients and younger clients, between clients who primarily use alcohol and those who primarily use other drugs, between those who are motivated for treatment and those who are less motivated for treatment, and the list can go on (Luke et al., 1996). Consequently, there is a clear need for more comprehensive descriptions of clients and their respective attributes, particularly at the individual program level, in order for researchers, clinicians, and other key stakeholders gain a better understanding of who is participating in substance abuse treatment programs across the country. Questions remain regarding what methods would be most suitable and valuable for such an endeavor. Particularly in the behavioral health field, where pressure exists to individually tailor treatment depending on the distinct needs of clients, clinicians often aim to identify groups of individuals that will respond well to similar treatment

modalities, approaches, and interventions (Rapkin & Dumont, 2000). Likewise, research methods that seek to ascertain the group composition of a heterogeneous sample based on the characteristics of the individual cases that comprise it (i.e., taxonomic methods) could potentially assist treatment programs in determining if retention rates and outcomes systematically vary amongst clients, while also expanding the descriptive knowledge base about the characteristics of those presenting for treatment. “The goal is to form meaningful systems of classification that can be used to distinguish members of a population on important features” (Rapkin & Dumont, 2000, p. S404). In this instance, the “important features” would consist of the dimensions of identity and behavior that have been linked to substance abuse treatment retention and outcomes.

There are several reasons why taxonomic methods are appropriate tools to utilize in the study of heterogeneous groups, such as clients in a particular substance abuse treatment program. Instead of emphasizing relatively linear associations among variables within an aggregated dataset, such methods focus more on the prevalence of occurrence of different patterns of variables, which can potentially provide insight into and deeper exploration of the complex relationships among these variables (Rapkin & Dumont, 2000). Additional questions and hypotheses about these groups and the connections among variables (i.e., identifying which ones are predictors, covariates, and/or mediators) within them may also be raised and tested after the groups are detected. “Ideally, taxonomic research may involve a complementary relationship between theory and empirical description” (Rapkin & Dumont, 2000, p. S406). Through the application of taxonomic methods within theoretical frameworks, the value of such research is enhanced because a direct link between science and practice is created.

Consequently, in addition to exploring how clients who complete an intensive outpatient chemical dependency treatment program at a nonprofit, freestanding mental health clinic differ from clients who do not complete treatment on pretreatment variables (e.g., sociodemographic characteristics, substance use history, psychiatric symptoms, motivation for treatment, social functioning), this study will determine if meaningful subgroups of this client population be identified. Such analyses are better able to accurately capture and describe the composition of a sample because they do not merely determine the presence distinct variables, but rather detect the prevalence of patterns of variables, which are more representative of the complexity of individuals that comprise the sample. Moreover, it is critical for treatment programs to understand how group characteristics may relate to successful completion of programs because "group composition may play a role in determining participation and treatment outcomes, especially if members who are in some regard 'outsiders' prove to be more likely to drop out (Rapkin & Dumont, 2000, p. S413). At the micro-level, such information regarding the presence of a certain pattern(s) of pretreatment characteristics could be used to quickly identify clients that may be at risk for dropout, so the treatment team can intervene to reduce this risk. At the macro-level, identifying groups of clients that share certain commonalities (e.g., sociodemographic characteristics, substance use history, motivation for treatment) may help programs identify clientele who may be more or less suitable for their program based upon the treatment program's values, approaches, and interventions.

Taxonomic Research in Alcohol Use Disorders

Research has been undertaken examining potential subtypes of substance abusing or dependent individuals, with much work being focused on alcoholism and based upon a wide range of dimensions, symptoms, and characteristics. Babor (1997) noted:

> The search for alcoholic subtypes has had a long and varied history, with little to guide its progress but clinical intuition during the pre-Jellinek years leading up to the modern era of alcohol studies. With the development of multivariate techniques and improvement in clinical assessment technology, typology research has experienced a renaissance. (pg. 1665-1666).

Characteristics that have been examined include drinking history, pattern(s) of drinking, severity of dependence, gender, personality traits, comorbid psychiatric symptoms, cognitive impairment, sociopathy, and familial history (Bohn & Meyer, 1999). From these inquiries have emerged a variety of subclassifications of individuals with alcohol problems.

Early typology investigations of individuals with alcohol use disorders tended to focus on a single, defining characteristic. Babor, Dolinsky, and associates (1992) reviewed five unidimensional typologies that had received the majority of attention in the empirical literature up to that point in time: gender comparisons, *primary* vs. *secondary* psychopathology associated with alcoholism, the *gamma-delta* distinction, familial alcoholism, and subtyping by various personality factors. Cumulative gender research suggested that female alcoholics tended to have a later onset of alcohol dependence and a more rapid course of symptom development as compared to their male counterparts. Female alcoholics also generally had a higher prevalence of comorbid psychiatric disorders, particularly depression, while male alcoholics were more likely to exhibit antisocial personality traits. Additional classification efforts suggested categorizing female alcoholics based on if and when comorbid psychopathology developed. *Primary*

alcoholism was a term used to describe individuals who did not experience comorbid psychopathology or who began to experience psychiatric symptoms following the onset of alcohol dependence, whereas individuals who fall into the *secondary alcoholism* category were persons who experienced psychiatric symptoms prior to the onset of alcohol dependence (Schuckit, Pitts, Reich, King, & Winokur, 1969).

Babor, Dolinsky, et al. (1992) also described Jellinek's *gamma-delta* distinction which was based on three delineating characteristics in alcohol dependent individuals: etiological elements, dependence process, and types of drinking consequences. Psychological vulnerability was an underlying factor in the development of dependence in *gamma* alcoholics. Even though *gamma* alcoholics were generally abstinent between drinking episodes, their drinking was characterized by a loss of control and inability to stop drinking and often resulted in severe damage to their health and interpersonal relationships. On the contrary, *delta* alcoholics were able to generally limit their consumption, but were unable to abstain for even short periods of time. Sociocultural elements including ease of access to alcohol and societal encouragement to drink regularly were purported as the etiological factors in *delta* alcohol dependence.

Familial/genetic theories and personality influences were also reviewed by Babor, Dolinsky, and colleagues (1992). In general, alcohol-dependent individuals with a family history of alcoholism in first-degree relatives tended to have an earlier onset of problem drinking, more intrapersonal and interpersonal problems associated with their drinking, a faster course of symptom development, and higher degree of physiological dependence than alcohol-dependent individuals without a family history of alcohol problems in first-degree relatives. Antisocial personality disorder has been considered a cardinal trait of a

certain subtype of alcoholic and is associated with earlier age of onset, quicker progression to problem drinking, and more severe problems stemming from drinking. Poorer treatment prognosis and outcomes have also been linked to antisocial behavioral traits. The Minnesota Multiphasic Personality Inventory (MMPI) has also been used to classify alcoholics into three subgroups: neurotic, psychotic, and psychopathic.

Babor, Dolinsky, et al. (1992) subsequently evaluated the discriminative power and predictive validity of these five classification schemes with a heterogeneous sample of inpatients in three different residential treatment programs. Multiple classification analysis, survival analysis, and discriminant function analysis were employed to compare the relative discriminative power and predictive validity of these typologies. Results encapsulated the shortcomings of unidimensional categorical systems. There was a high degree of overlap among certain subtypes across models (i.e., familial alcoholism, antisocial personality traits, and impulsivity tended to cluster in men). When significant discriminations were detected for a particular typology, they were generally limited to areas closely related to the defining characteristics of that particular typology (i.e., the *gamma-delta* typology differentiated significantly on measures of alcohol consumption and consequences of drinking). Ultimately, none of the single factors emerged as a strong predictor of treatment outcomes including future alcohol consumption, psychological functioning, alcohol dependence, and medical status, which is the missing link in the study of alcohol typologies that can have the largest impact clinical practice and treatment policy. The authors also advocated for the use of empirical grouping strategies to explore naturally occurring commonalities, as opposed to theoretically-constructed ones, in samples of alcoholics and to identify homogeneous subgroups of this population.

Armed with progressively more sophisticated methodological techniques, newer generation typology studies of persons with alcohol use disorders have moved beyond examining a single defining dimension, such as personality or gender, to exploring multifaceted schemes comprised of pluralistic characteristics (Babor, Dolinsky et al., 1992). Cloninger and his associates (1987, 1988, 1989, as cited in Bohn & Meyer, 1999) utilized methods of genetic epidemiology to identify subtypes of alcoholics and long-term alcohol-related outcomes with a group of Swedish adoptees. *Type 1* or *milieu-limited alcoholism* affected both men and women, had an onset after the age of 25 years, and had a variable course of alcohol-related symptoms and problems. Environmental factors, including the atmosphere in which one was raised, usually affected the severity of the alcoholism in *Type 1* alcoholics. On the other hand, *Type 2* or *male-limited* alcoholism transpired only in men, commenced before age 25 years, appeared highly heritable, and was characterized by heavy amounts of consumption, an inability to abstain from alcohol, and recurrent experience of negative medical and social consequences. Cloninger also explored personality features of these individuals, with *Type 1* alcoholics tending to score high on reward dependence and harm avoidance and low on novelty seeking, whereas *Type 2* alcoholics generally had low levels of reward dependence and harm avoidance and high levels of novelty seeking.

Similarly, von Knorring and colleagues (von Knorring, Palm, & Anderson, 1985) examined a sample comprised of male alcoholics currently in treatment and those in remission and classified them into groups based on the age of alcohol onset. Clients with onset prior to age 25 were categorized as *Type II* alcoholics and those whose age of onset was after age 25 were classified as *Type I* alcoholics. Results paralleled Clonginger's

findings in many ways. *Type II*, or early onset, alcoholics had higher rates of aggressiveness, criminality, drug abuse, and familial alcoholism than their *Type I* counterparts. In terms of personality functioning (von Knorring et al., 1987, although *Type II* individuals were more extraverted and tended to score higher on impulsiveness and adventure-seeking measures, they also endorsed a greater degree of guilt and anxiety as compared to *Type I* individuals.

Adding to the girth of empirical evidence related to alcoholism typologies, Babor, Hofmann, and colleagues (1992) examined 17 characteristics across 4 domains (e.g., premorbid risk factors, use of alcohol and other substances, chronicity and consequences of drinking, and psychiatric symptoms) in a sample of alcohol-dependent individuals. The clustering solution produced two categories. The *Type A* cluster was characterized by fewer childhood risk factors, later age of onset, less severe dependence, and fewer previous treatment episodes. Members of this cluster also exhibited fewer alcohol-related physical and social problems, less psychopathological dysfunction, and lower levels of distress in the areas of work and family, and responded better to standard treatment. On the other hand, *Type B* alcoholics had more familial risk factors, an earlier age of onset, greater severity of dependence, increased levels of polydrug use, and more treatment episodes. This group also experienced more serious consequences, a greater level of psychopathological dysfunction, and more life stress. Not surprisingly, these clients demonstrated poorer treatment outcomes.

At the same time some researchers were describing and defining two subtypes of alcoholism, others were questioning if two subtypes sufficiently captured the heterogeneity of alcoholics. In an early study, Morey, Skinner, and Blashfield (1984)

proposed an alternative classification scheme in a large sample of individuals seeking treatment for alcohol problems. Three types of drinkers were identified and were distinguishable on measures related to alcohol use, as well as on measures of personality, psychopathology, intellectual functioning, and demographic variables. *Type A* or *early-stage problem drinkers* represented a fairly heterogeneous group who showed evidence of drinking problems but did not exhibit major symptoms of alcohol dependence. *Type B* or *affiliative* drinkers were more socially-oriented, tended to drink on a daily basis, and displayed moderate levels of alcohol dependence. *Type C* or *schizoid* drinkers were more socially isolative, tended to drink in binges, and reported the most severe symptoms of alcohol dependence. There were consistent differences in symptom severity among the three types on measures of psychopathology, cognitive functioning, and social adjustment, with *Type C* exhibiting the highest levels of dysfunction. In the end, the authors propose a hybrid model of alcohol abuse that integrates both categorical and dimensional elements and superimposes the three identified subtypes of clients on an underlying continuum of alcohol dependence.

Del Boca & Hesselbrock (1996) were particularly interested in gender differences and proceeded to reanalyze the data reported by Babor, Hofmann, and colleagues (1992) to see if gender-related subtype would emerge. Results suggested that although the two-cluster solution (i.e., *Type A – Type B*) effectively represented the sample in terms of risk and severity, a functional four-cluster solution could also be derived: *low risk–low severity* (few problems at low levels), *internalizing* (moderate risk, high depression and anxiety), *externalizing* (moderate risk, high antisocial behavior), and *high risk–high severity* (multiple problems at high levels). In terms of gender dispersion, the low and the

high risk subgroups had a relative balance in gender composition, while the two intermediate, moderate risk subgroups appeared to be more gender-specific. The *internalizing* group was comprised of 32% of the women in the study and only 11% of the men, whereas the *externalizing* group included 38% of the men versus 7% of the women. Etiological implications of these findings suggest that the development and the expression of alcohol problems in the two moderate risk, gender-related groups, likely is more strongly influenced by sociocultural factors (i.e., differing behavioral expectations and emotional expressions), as opposed to an inherited disposition.

More recently, Windle and Scheidt (2004) evaluated the adequacy of a range of cluster analytical solutions in a large, heterogeneous in terms of gender and ethnicity, group of inpatients from five alcohol treatment centers in both rural and urban areas. Based on comparison across the two-, three-, and four-cluster solutions, the four-cluster solution appeared to represent the data most effectively. The *mild course* typology was characterized by a later age of onset; fewer years of drinking; lower levels of consumption, impairment, and withdrawal symptoms; few childhood conduct problems; and low rates of familial history of alcoholism. High levels of polydrug use and benzodiazepine use demarcated the *polydrug* subtype, while the *negative affect* subgroup was distinguished by symptoms of depression and anxiety and high characterological vulnerability to a substance use disorder. The *chronic/antisocial* typology was distinguished by high levels of alcohol consumption and impairment, a longer duration of drinking, and high levels of adult antisocial behaviors. Generally speaking, this four-solution model is consistent with Del Boca and Hesselbrock's (1996) classification

scheme and provides further evidence that two-solution typologies may not fully the capture the diversity of behavior observed in alcohol use disorders.

In addition to cluster analytic techniques, other statistical grouping methods have been used in alcohol typology research. Peters (1997) employed non-metric multi-dimensional scaling to explore 102 symptoms linked to various aspects of alcoholism to classify individuals voluntarily seeking in- and outpatient alcohol abuse treatment in the Netherlands. Results indicated the presence of a three-dimensional spatial solution. The first dimension represented the alcohol dependence syndrome and consisted of symptoms related to withdrawal, drinking throughout the day, irresistible urges to drink, and drinking to avoid withdrawal symptoms. At one end of the spectrum of the second dimension detected was the male-dominated, early onset, antisocial drinker and at the other end of the spectrum of this dimension was the female-dominated, isolated home drinker. The main pole of the third dimension was comprised of symptoms indicative of chronic alcoholism, while the antipole referred to "young persons raised in troubled families" (p. 1658). Taken together, these results suggest that severity, gender, and age seem to be principal continuums clients seeking treatment for alcohol problems can be positioned along.

Taxonomic Research in Drug Use Disorders

Substance use history, pattern of use, familial traits, personality factors, psychosocial characteristics, and sociocultural backgrounds have also been examined to identify subtypes of drug users. Ball and colleagues (1997) were interested in determining whether individuals with a cocaine use disorder could be subtyped according to the important characteristics that had already gained empirical support in alcoholism

typology research. In particular, this study examined the evidence for the *Type A – Type B* distinction (Babor, Hofmann, et al., 1992) that had emerged with persons with alcohol use disorders in a diverse sample of cocaine users (i.e., inpatients, outpatients, and non-treatment-seeking individuals). Results supported this classification scheme as participants in the *Type B* category exhibited higher heritability, more childhood behavior problems, an earlier age of onset, more severe drug and alcohol dependence, a higher degree of addiction-related functional impairment, more antisocial behavior, higher sensation seeking, and more comorbid psychiatric problems than their *Type A* counterparts. *Type B* individuals also had poorer treatment outcomes. Adequate construct, concurrent, and predictive validity of the *Type A – Type B* distinction in this sample was also demonstrated. However, the authors noted that this typology model seemed to portray the inpatient sample more effectively than the outpatient and non-treatment seeking participants, suggesting the existence of variability in typology schemes among subpopulations of individuals who use cocaine. It should also be noted that the inpatient sample had a relatively equal number of participants fall into each subtype, whereas the outpatient and community samples had a majority of participants classified as *Type A* (75%).

Garcia and colleagues (2006) outlined commonalities of *Type A* and *Type B* drug addicts in a sample of participants receiving outpatient treatment. *Type A* individuals, or *functional drug-addicts*, tended to report using drugs for fewer years, having more alcohol-related problems, and having higher employment rates than their counterparts. Conversely, *Type B* individuals or *chronic drug-addicts*, tended to report being older,

consuming drugs more frequently, and having more medical, employment, legal, family, and psychiatric problems than *Type A* persons.

Fals-Stewart (1992) examined the personality characteristics of recreational drug users treated in a long-term, inpatient, drug-free therapeutic community and how they relate to length of stay in treatment and one-year posttreatment outcomes. A hierarchical agglomerative cluster analysis was performed on the scale scores of the Millon Multiaxial Clinical Inventory (MCMI). Five cluster types cluster emerged, and although this investigation neglected to fully describe cluster the characteristics of cluster membership, it noted that clusters distinguished by elevations on the avoidant, schizoid, and antisocial scales were associated with fewer days in treatment, less abstinence during the one-year follow-up period, and earlier time to relapse. Antisocial tendencies were also positively related to more major rule violations and avoidant and schizoid tendencies were associated with leaving treatment against medical advice. These major findings confirmed the hypotheses that suggested that clients who exhibited higher interpersonal discomfort and difficulties with authority would likely fare the worst in a therapeutic community as this modality of treatment place emphasizes interpersonal interactions and a high degree of structure. Along the same lines, forms of antisociality were explored in a sample of clients engaged in methadone maintenance treatment (Alterman et al., 1998). Results yielded six replicable and temporally stable cluster groups comprised of varied degrees of antisociality, configuration of antisociality, and associated psychiatric, psychological, and criminal characteristics. Types included *early onset, high antisociality; late onset, high antisociality; emotionally unstable, moderate antisociality; nonantisocial, drug-related antisocial behavior; psychopathic criminal, moderate*

antisociality, and *low antisociality*. The diversity in the expression of antisocial tendencies in this study further exemplifies the complexity of investigating personality traits in substance abusing populations.

Taxonomic Research in Dual Diagnosis

The heterogeneity of a dual diagnosis population (i.e., persons diagnosed with a substance use disorder and a comorbid Axis I psychological disorder) has been explored using cluster analysis (Luke et al., 1996). With hopes of facilitating the planning and implementation of individualized treatment programs, this project examined the Addiction Severity Index (ASI) severity ratings of dually-diagnosed persons admitted to a state psychiatric hospital. The ASI assesses a client's status in seven domains: medical, employment, alcohol, drug, legal, family/social, and psychiatric. Severity ratings are subjective ratings given by the interviewer that are based on both objective and subjective self-report information provider by the participant. They range from 0 to 9 and reflect the degree of the problem and as well as the perceived need for treatment (i.e., no real problem, treatment not indicated; extreme problem, treatment absolutely necessary). Cluster analysis results produced seven subgroups that were labeled and interpreted based on the pattern of severity rating means across ASI domains. It should be noted that these subgroups were reliable and had adequate concurrent and predictive validity according to longitudinal measures of clinical and community functioning.

The *best functioning* cluster had low to moderate severity for each of the ASI domains and appeared to have relatively adequate levels of functioning compared to the remaining groups. The *unhealthy* and *functioning alcohol abuse* groups exhibited high alcohol and low drug ratings; however, the *unhealthy alcohol abuse* cluster demonstrated

higher severity ratings in the medical, employment, legal, and social relationship areas than those in the *functioning alcohol abuse* group. The *drug abuse* cluster showed a high drug severity and low alcohol severity pattern, with considerable psychiatric, employment, and family problems. Members of the remaining three clusters demonstrated high levels of both alcohol and drug problems, but levels of severity varied across the remaining domains. The *functioning polyabuse* group had relatively few medical and legal problems. Members of the *criminal polyabuse* cluster showed the highest level of legal problems amongst all clusters and had high problems ratings in all of the remaining domains except for medical. The *unhealthy polyabuse* group had the highest psychiatric problem rating, with substantial problems in the medical and employment domains and moderate legal and social difficulties. In addition to delineating the seven clusters of dually diagnosed individuals, Luke and colleagues (1996) noted that the identified groups could be arranged, at a broader level, along the dimensions of level of functioning (e.g., good, moderate, poor) and pattern of substance use (alcohol, drug, alcohol and drug). Based on where a client exists along these continuums, the authors suggest more effective individualized treatment services can be designed and delivered to homogeneous subgroups of substance abuse treatment-seeking populations.

Summary of Taxonomic Research in Substance Use Disorders

The range of typology studies carried out with substance abusing populations is quite broad, as are the classification schemes deduced from these investigations. Extensive lists of subgroup attributes and correlates, as opposed to more cohesive depictions, often comprise the results sections and are in stark contrast to the fundamental goal of these studies: delineating parsimonious subgroups within a certain sample. Such

variability in findings can be attributed to diversity in sample characteristics, variables of interest, operational definitions of these variables, and the statistical analyses employed. At the same time, there exists substantial overlap in much of the research reviewed here. Barring the exact label attached (i.e., *Type I* vs. *Type II; Type A* vs. *Type B*; *low risk-low severity* vs. *high risk-high severity*; *functioning* vs. *unhealthy*), individuals with a substance use disorder appear to travel different developmental paths that lead to a diagnosis of abuse and/or dependence, to engage in different patterns of substance use, and to exhibit different types and degrees of consequences related to their substance use. There also appears to be some empirical typology evidence that suggests particular individuals with a substance use disorder commonly experience symptoms of both Axis I (e.g., major depression, anxiety) and Axis II (e.g., antisocial personality disorder) psychopathology. At the same time, this apparent redundancy has not been adequately investigated and the overlap in the various typologies is unclear – "do these schemas represent different methods and labels of describing the (alcohol and drug abusing) population in an essentially similar fashion, or do the schemas truly break up the universe of (substance abusers) differently" (Epstein, Labouvie, McCrady, Jensen, & Hayaki, 2002). The answer to this question not only has potential theoretical value in further illuminating the etiology and expression of substance abuse disorders, but it also has prospective value in refining and tailoring assessment and treatment techniques to align with the different types of clients presenting to treatment.

Applied Utility of Taxonomic Methods

Essentially, such typology research within the substance abuse field aims to not only accurately describe the individuals under study, but to fuse science and practice and

identify potential treatment implications. “Regardless of our ability to replicate subtypes, the real test of a typological classification lies within its external validity and its usefulness for theory development and clinical practice” (Babor, 1997, p. 1666). At the individual treatment program level, clients share at least one fundamental commonality: they are seeking treatment at the same facility. However, these clients enter treatment with divergent backgrounds and possess assorted characteristics that can influence how they respond to treatment and how well the treatment program can meet their needs. It should be the goal of the treatment program to gain knowledge about their clientele and, when possible, detect similarities across clients that may positively or negatively impact treatment. With this information, clinicians and researchers alike can begin to postulate why certain individuals, or groups of individuals, tend to fare better or worse in their particular treatment program. These assumptions can then be empirically tested and results can ultimately provide a framework for organizing service delivery and inform programmatic decisions regarding admission criteria, treatment planning, interventions, and resource allocation, all crucial aspects of improving substance abuse treatment outcomes and helping to alleviate the societal strain that substance use disorders engender.

Chapter III: Method

Overview

The primary purpose of this chapter is to describe the methodology employed in this study of characteristics of clients entering an intensive outpatient chemical dependency treatment program and their relationship to treatment retention. Descriptions of the participants, assessment procedures, assessment instruments, variables of interest, and the data analysis plan are provided. This project was retrospective in nature as data collection has been completed. It was carried out as part of research collaboration with a local substance abuse treatment program that was interested in implementing a standardized assessment battery into their intake procedures for a variety of reasons. Firstly, as proposed by the TCU Treatment Model, gathering detailed information regarding pretreatment client characteristics including problem severity at intake, motivation for change, and readiness for treatment is critical for clinicians and clients in identifying and clarifying problems, determining treatment needs, making treatment planning decisions, and measuring treatment effectiveness as these data serve as a baseline measurement of functioning (Simpson 2001; 2004). Secondly, it was anticipated that the comprehensive nature of this evaluation process would facilitate the exploration of how patient factors and their combinations mediate and moderate treatment processes, retention, and eventual outcomes in this particular treatment program (Simpson, 2004). Thirdly, standardizing the intake data collection process provided clinicians and researchers with a "common language" to speak about and compare clients entering this particular program.

Participants

Participants (N = 273) were a sample of clients who entered the intensive outpatient chemical dependency program at Rogers Memorial Hospital, a nonprofit, freestanding mental health hospital in West Allis, Wisconsin. The assessment protocol aimed to evaluate all new clients to the program. However, a variety of practicalities, which are detailed later, interfered with the successful accomplishment of this endeavor and ultimately produced a sample of convenience. The data collection period spanned from January 2005 – November 2006. All participants were 18 years of age or older and competent to give consent.

Program

The intensive outpatient chemical dependency program at Rogers Memorial Hospital – West Allis utilizes a Minnesota treatment model (Owen, 2003) and incorporates components of the 12-step philosophy to provide a framework for clients to learn about the nature of substance use disorders and to begin or recommence their recovery process. It primarily serves clients who are insured or able to pay out of pocket for services. Maintaining abstinence is a chief treatment objective, thus the program performs random urine screens for drugs and/or breathalyzer tests for alcohol. Clients are expected to comply with these screens, as missed screens are considered "positive" screens and refusals could result in discharge from the program. Group therapy is the primary method of treatment, which allows clients to receive feedback from both their peers and clinicians. Group sessions are held daily from 9:00-12:00, and on Monday, Tuesday, and Thursday evenings from 6:00-9:00. Group sessions are augmented with weekly individual sessions with a clinician as well as a separate session with the

attending physician. Ancillary contact with family members, employers, and others may be scheduled. The treatment team consists of a physician/addictionologist, a manager, and two primary clinicians. Decisions regarding treatment frequency and duration are made collaboratively between the treatment team and the client depending on a variety of factors including recommended level of care, treatment goals, scheduling availability, and insurance benefits.

Assessment Procedures

Assessment Training

Approximately 14 masters and 2 doctoral students (i.e., this author and a fellow senior assessor familiar with the assessment instruments and related procedures) from the Department of Counseling and Educational Psychology at Marquette University comprised the primary assessment team and administered the standardized assessment battery over the course of the data collection period. All assessors received training in basic counseling skills, ethical and professional issues, and instruction on the assessment battery. More specifically, assessor trainees were provided with reading materials about specific policies and procedures related to conducting the intake sessions and the assessment battery instruments (i.e., general overview, administration procedures, and scoring instructions). Subsequently, trainees attended a minimum of eight hours of formal training and completed at least one practice administration and observation. These activities were coordinated by this author and the fellow senior assessor under the supervision of Todd C. Campbell, Ph.D., licensed psychologist, chair of this project. The initial training session presented an overview of the purpose of the intake assessment project, reviewed policies and procedures, and discussed ethical issues (i.e.,

confidentiality, informed consent, suicide protocol, and supervision). The second training session focused on the assessment instruments. Administration and scoring procedures of each measure were explained and demonstrated, and trainees had the opportunity to ask questions and carry out practice administrations.

Upon completion of these formal training sessions, trainees administered the entire assessment battery to this author or the fellow senior assessor and received feedback. Prior to having contact with clients, assessors were required to attend a Rogers Memorial Hospital orientation that familiarized them with the organization and its policies and provided CPR and self-defense training. Following orientation completion, the trainee observed this author or the fellow senior assessor conduct the assessment battery with an actual participant. Then, the trainee administered a minimum of two assessment batteries with actual participants under the live supervision of this author or the fellow senior assessor. A discussion about the trainee's comfort level and proficiency in administering the assessments was then undertaken to determine if s/he was ready to administer the battery on her/his own. This process was repeated until the trainee, this author and the fellow senior assessor, and Todd C. Campbell were in agreement about the trainee's readiness to perform the assessments without live supervision. Ongoing individual and group supervision was provided for the assessors by this author and the fellow senior assessor under the direction of Todd C. Campbell. In addition to the administration-specific training, the Institutional Review Board at Marquette University required trainees to complete an online tutorial about conducting research with human participants.

Administration of Assessment Battery

Both treatment providers and researchers are concerned about the appropriate timing for the administration of assessment measures. “Demands for quick turnaround to aid in triage and treatment planning compete with the clients’ ability to provide accurate and reliable information after detoxification. Drastic reductions in clients’ length of stay imposed by managed care decisions further complicate the dilemma” (Allen, 2003, p. 9). Considering the scant amount of research examining optimal assessment administration times (Allen, 2003), the primary investigators consulted with the treatment program and determined that the assessment battery was to be administered to the participants within 48 hours of being admitted to the program. Upon entry into the intensive outpatient program, clients should have completed a sufficient amount of detoxification to provide reliable information. Thus, immediate assessment completion would not be problematic for this reason and would actually aid in the treatment planning process if done at the outset. It was also decided that the assessment session would take place during the group session time, as potential participants were easily accessed during this period and additional scheduling conflicts would not interfere with data collection. Notification and referral procedures were as follows. When a new client entered the program, the primary clinician called the assessment office and left a message providing the client’s name and admission date. This referral information was subsequently recorded on a cumulative admissions log kept in a locked filing cabinet. When assessors reported to the research office, they consulted the admissions log to see there was a client to be tested. In the event that there were numerous clients to be tested, the client with the oldest admission date was given precedence. Prior to the beginning of the group treatment session, assessors reported to the clinician to inquire whether or not the preferred testing client

was in attendance. If the preferred client was available, the clinician introduced the assessor to the client, and the assessor proceeded to briefly explain the purpose of the assessment session. In the event that the preferred client was not in attendance, the assessor inquired about the subsequent client(s) on the admission log until a client was available for testing.

Despite the aforementioned notification and referral procedures, a range of practical difficulties interfered with the assessment team's ability to evaluate each client entering the program. Space constraints allowed for the testing of only one individual per group session. In particular, intermittent census increases in the program reduced the ability of the assessment team to efficiently (i.e., within the target 48 hours following admission) complete testing procedures on all clients. Additionally, the assessment team was comprised of graduate student volunteers; thus, unforeseen circumstances occasionally prevented them from covering for their scheduled assessment slots and impeded evaluation efficiency. Timely notification was also an area of concern at various points during the data collection period, as clinicians failed to inform the assessment team of new clients entering the program. Moreover, poor client attendance and early attrition from the program limited access to clients who needed to be tested, further hindering the assessment team's ability to complete all intake evaluations. Such obstacles are not unusual when carrying research in applied treatment settings (Joe et al., 1999; Simpson, Brown et a, 1997). In recognition of the fact that the obtained sample may not be representative of the actual substance abuse treatment-seeking population at Rogers Memorial Hospital – West Allis, demographics (e.g., sex, race, and age) and treatment information (e.g., treatment completion status, treatment duration, number of treatment

days) were obtained for those clients who were not assessed at intake and subsequently excluded from the study (N = 171). Comparative analyses were conducted in order to determine the equivalency of the obtained sample to the overall population from which it was drawn. These results will help determine the external validity or generalizability of study findings.

The treatment program required that all new clients admitted to the program complete the assessment battery for clinical purposes, though the client could decide whether or not her/his data would be further deidentified and utilized for research purposes. An informed consent document outlining these dual objectives was created to explicate the procedures (Appendix A). Prior to the administration of the assessment battery, a copy of the informed consent was provided to each participant. It contained an explanation about why the information was being collected and how it was going to be collected. Furthermore, it assured participants that they had the right to refuse participation and doing so would not affect their treatment. The informed consent document was read to the participants verbatim, and participants were given the opportunity to have their questions answered. They initialed the bottom of every page and signed the final page to indicate they agreed to participate in the study. They were given a copy of the informed consent for their reference.

The length of the assessment session generally ranged from 90 to 150 minutes. Assessors read both the instructions and individual items to the participant and recorded all responses on her/his behalf. Data were collected in a variety of mediums as more sophisticated methods became available. The computer-assisted Addiction Severity Index (ASI) was utilized throughout the data collection period. These data were directly

exported from the program into an SPSS file where all identifying client information was removed and replaced with an arbitrary client identification number. The paper-pencil version of the Mini-International Neuropsychiatric Interview (M.I.N.I.) was used until a computerized version of this instrument became available and was purchased (February 2006). Since the computerized version of the M.I.N.I. did not have a fully-functioning export option, this information, along with the paper-pencil data, was de-identified and manually entered into an SPSS file by the senior assessors. Paper-pencil versions of the Form 90 Drinking Assessment Interview (Form 90), Inventory of Drug Use Consequences (InDUC), and Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) were initially utilized, though electronic forms of these assessments were eventually created and implemented (February 2006). The electronic versions allowed assessors to access the password-protected forms via the Center for Addiction and Behavioral Health Research website. Assessors proceeded to input client answers during the interview, which were subsequently directly exported into an SPSS file. Paper-pencil Form 90, InDUC, and SOCRATES data were retrospectively entered into the electronic forms, as opposed to manually being entered in SPSS, to expedite the data entry process. The assessment battery also contained the Alcohol Abstinence Self-Efficacy Scale, though data from this measure will not be included in further analyses as it was incorporated into the protocol in the middle of the data collection period and data were only collected for clients who primarily used alcohol.

Upon completion of the assessment battery, the assessor filled out a personalized feedback report for the client (Appendix B) containing summary assessment information. This report was given to the primary clinician, along with a computer-generated ASI

narrative report, for clinical use and became part of the treatment record. All hard copies of paper-pencil instruments, scoring sheets, ASI narrative report copies, and personalized feedback report copies were deidentified and placed in separate folders arranged by client identification number. These files are being kept in a locked filing cabinet at Rogers Memorial Hospital in the assessment office. Informed consent documents are being kept in a locked filing cabinet at Marquette University. All data will be kept for approximately seven years and will then be destroyed.

Assessment Instruments

Accurate client assessment is essential to both treatment of and research on substance use disorders. As Allen (2003) notes:

> Although each of these activities is advanced by informed use of psychometric instruments, the needs of professionals in the two endeavors differ. Most notably, the practitioner is primarily concerned with the clinical utility of the measure, particularly how well it identifies the needs of a given client and guides treatment planning. The researcher is likely to explore a broader range of variables that may quantify and explain the overall impact of an intervention. (p. 1)

These perspectives, along with the administration ease and acceptability of the measures to clients, were taken into account in the selection of the instruments that would comprise the assessment battery. Efforts were made to maximize both clinical and research utility through the use of reliable and valid assessment tools. In the end, a comprehensive battery with a variety of measures evaluating symptoms, diagnosis, risk behaviors (e.g., suicidal ideation), functional impairment, problem severity, subjective distress, motivation, and self-efficacy was selected. Psychometric properties of each instrument are evaluated and reported below.

Unfortunately, there is a lack of consensus on what constitutes acceptable reliability standards within research and practice settings, and such guidelines often differ

depending upon what the instrument is being used for. For instance, Nunnally and Bernstein (1994) purport that increasing reliabilities beyond .80 in basic research (i.e., exploring the difference between groups) may waste valuable resources including time and money. In contrast, they indicate that when making important decisions based upon a particular test score(s), a reliability of .80 is likely not rigorous enough, since much weight is placed on the specific score that is obtained (e.g., determining if a child should be placed in special education classes based on IQ). In such instances, Nunnally and Bernstein (1994) advise that the reliability should be at least .90, though .95 would be considered ideal. Along the same lines, Aiken (2003) and Rosenthal and Rosnow (2008) recommended reliability estimates of .85 or higher when scores are used in making clinical decisions, while Sternberg (1994) asserted that reliability estimates above .80 are desirable and above .90 are preferred when using a tool for screening or diagnostic purposes. Assuming a more liberal stance, Cicchetti (1994) suggested that reliability coefficients (*r*) below .70 were unacceptable, between .70 and .79 were fair, between .80 and .89 were good, and those equal to or greater than .90 were excellent. At the same time, his interrater reliability standards have been criticized as far too lenient (i.e., $\kappa < .40$ = poor; $.40 \leq \kappa \leq .59$ = fair; $.60 \leq \kappa \leq .74$ = good; $.75 \leq \kappa \leq 1.00$ = excellent).

Fairly consistent with the suggested guidelines, when selecting instruments to be included in this particular assessment battery, efforts were made to choose measures with reliability estimates of .80 or higher, though values of .70 or higher were considered acceptable. Nonetheless, such decisions were impacted by additional factors (i.e., the ability of the instrument to provide clinically useful information; administration time),

thus there were instances where a measure was selected, despite reliability estimates that fell below the preferred level ($r < .70$).

Addiction Severity Index, Fifth Edition (ASI)

The ASI was developed over 25 years ago by a team of researchers lead by A. Thomas McLellan at the University of Pennsylvania's Center for the Studies of Addiction. It is currently in its fifth revision and has emerged as one of the most frequently used measures in the substance abuse treatment field due to its usefulness in identifying areas of treatment need and measuring treatment outcomes within a multidimensional framework (McLellan et al., 1992; McLellan, Luborsky, Woody, & O'Brien, 1980; Donovan, 2003). The ASI is a semi-structured interview that can be administered in about 50-60 minutes by a trained assessor. Two-day, intensive training sessions on administration and scoring procedures are offered by the Treatment Research Institute (TRI). These workshops are supplemented with manuals, practice materials, quizzes, scripted role plays, videotapes, and vignettes to assist interviewers derive more accurate interviewer severity ratings, reduce errors, and improve overall consistency in administration and scoring (McLellan et al., 2006; TRI, n.d.). For this project, the fellow senior assessor attended the TRI training sessions and subsequently provided training to the remaining assessors based on the instruction she received. It is critical that the ASI interviewer is able to rephrase questions, adequately summarize responses, and probe for more complete information to ensure that the client understands all of the questions and provides answers that correspond to the intent of the questions; thus, the ASI training employed in this study tended to focus on these particular areas (McLellan et al., 1992).

The ASI was designed to measure patient functioning in seven domains: alcohol and drug use, medical and psychiatric health, employment and self support, family and social relationships, and illegal activity. Within each of these areas, two time frames are examined. Lifetime information aims to assess the duration and severity of each problem, while knowledge about the frequency and intensity of problems within the past 30 days supplements this data and assists in the identification of current treatment needs (McLellan, Cacciola, Alterman, Rikoon, & Carise, 2006). Structurally, the ASI is comprised of separate modules of domain-related questions. At the end of each module, clients are asked to rate how troubled or bothered they have been by problems in a particular area and then indicate how important treatment for these problems is to them at the present time. Responses are chosen from a 5-point Likert scale ranging from "not at all" to "extremely." The interviewer also has a chance to rate severity of problems in each domain on a 10-point scale ranging from "no real problem, treatment not needed" to "extreme problem, treatment absolutely necessary" and indicate his or her level of confidence that the client has understood and answered the questions truthfully. In addition to these subjective ratings, domain-specific composite scores representing weighted mathematical combinations of a defined set of items in each area are computed to provide a more objective measure of problem severity in the past 30 days. Composite scores are only made up of items that are subject to change, making them an ideal method for examining change over time (i.e., pretreatment versus posttreatment scores) (Donovan, 2003; McLellan et al., 1980; 1992). According to McLellan and colleagues (1992) it is often advantageous to create summary measures (i.e., composite scores) to aggregate multiple indicators of patient characteristics when conducting research and

evaluating treatment outcomes because such scores offer distinct statistical advantages such as greater reliability of measurement and increased statistical power when measuring change.

ASI Psychometrics

The ASI has been utilized across a range of substance abuse treatment-seeking populations including different gender and ethnic groups (Brown, Alterman, Rutherford, Cacciola, & Zaballero, 1993), clients with various primary substances of use across treatment settings (McLellan, Luborsky, Cacciola, & Griffin, 1985; McLellan et al. 1994), clients with psychiatric disorders (Appleby, Dyson, Altman, & Luchins, 1997; Carey, Cocco, & Correia, 1997; Zanis, McLellan, & Corse, 1997), and homeless individuals with a substance use disorder (Zanis, McLellan, Cnaan, & Randall, 1994). Considering the diversity within the population being examined for this project and a lack of descriptive information documented about it, a review of such studies involving assorted treatment-seeking subgroups is pertinent. Psychometric properties have varied considerably depending on the population tested, variables examined, and statistical tests executed, making it difficult at times to compare values across studies and determine if adequate reliability and validity evidence exists (Makela, 2004).

All new items that were added to the Fifth Edition of the ASI exhibited satisfactory test-retest reliabilities as Cohen's kappa values were .83 or higher (McLellan et al., 1992). These results were consistent with similar studies conducted with previous editions of the ASI (McLellan et al. 1985) and another longer-term investigation of the test-retest reliability of the ASI lifetime items (Cacciola, Kippenhaver, McKay, & Alterman, 1999). In a review of studies examining the test-retest reliability of composite

scores, Makela (2004) reported that values ranged from satisfactory to unsatisfactory, with most of the deficient values emerging from studies of special subpopulations like those who are homeless, in prison, or have comorbid disorders.

Interrater reliability coefficients for severity ratings were fairly high (above .80) in initial and subsequent investigations among clients entering substance abuse treatment (McLellan et al., 1980, 1985; Stoffelmayr, Bertram, Mavis, Brian, & Kasim, 1994). Lower levels of interrater consistency have been found in clients with concurrent severe and persistent mental illness and substance use disorders; ICCs for severity ratings in this sample averaged .66 and ranged from .55 (employment) to .91 (legal) (Zanis et al., 1997). In reference to interrater reliability of composite scores, Makela (2004) indicated that they have been consistently higher than those found for severity ratings, likely due to the fact that they involve less subjective judgment and more objective recording of reported information. This observation is corroborated by higher average interrater reliability coefficients for composite score as compared to severity ratings in various studies (Carey et al., 1997; McLellan et al., 1985; Zanis et al., 1997).

According to Makela (2004), composite scores for medical status, alcohol use, and psychiatric status generally have acceptable internal consistencies ($\alpha > .70$), whereas the composite scores for employment status, drug use, legal status, and family/social relationships tend to have lower consistencies ($.60 < \alpha < .70$). As with test-retest and interrater reliability, it is not unusual to detect low internal consistency estimates with particular subpopulations such as those with primary psychiatric disorders (Carey et al., 1997) and homeless individuals with a substance use disorder (Zanis et al., 1994). In this study, the seven ASI composite scores showed generally acceptable internal consistency:

medical (α = .85); employment (α = .67); alcohol (α = .89); drug (α = .77); legal (α = .68); family/social (α = .75); and psychiatric (α = .83). However, consistent with previous research, the internal consistency estimates in the employment and legal domains fellow below the desired value of α > .70.

ASI validity studies have also examined multiple populations and used diverse methodologies to decipher how well the ASI measures what it intends to measure. The first independent validation study of the ASI found that within a sample of opiate users, the ASI psychiatric, family/social relationships, legal, and employment severity ratings had poor to fair concurrent validity with self-report measures of psychological problems, social adjustment difficulties, legal trouble, and employment problems (r = .39 – 59, p < .001). Furthermore, the combined alcohol and drug severity rating showed limited concurrent validity (r = .17, p = .02) and no measures of physical health were available for comparison with the medical severity rating (Kosten, Rounsaville, & Kleber, 1983). Subsequent comparisons of ASI severity ratings and composite scores among a substance abuse treatment-seeking population exhibited evidence of adequate concurrent and discriminant validity with a battery of previously validated tests (McLellan et al, 1985). The concurrent and discriminant validity of the alcohol, drug, and psychiatric composite scores has also been studied in a sample of homeless substance users. Satisfactory evidence was detected as these scores were correlated with the Michigan Alcohol Screening Test (r = .31), Risk for AIDS Behavior (r = .54), and the Symptom Checklist-90 (r = .66), respectively, and did not display significant relationships with unrelated measures (Zanis et al., 1994). Furthermore, in a sample of persons with severe and persistent mental illness and a low degree of current comorbidity, combined validity

evidence for both severity ratings and composite scores was acceptable for the alcohol and drug domains, weak for the employment and family/social domains, and mixed for the psychiatric, medical, and legal domains (Carey et al., 1997).

Criterion validity has also been explored. Appleby and colleagues (1997) found strong relationships between the alcohol and drug composite scores and related measures (r = .50 - .73) among substance abusing clients with comorbid psychiatric disorders. Sensitivity and specificity analyses have provided further evidence for the predictive utility of the ASI as results have compared favorably with related measures. A minimum alcohol severity rating of one (i.e., mere recognition of a problem) had a sensitivity of 93% and corresponding specificity of 59% with respect to a current alcohol use disorder as measured by the Structured Clinical Interview for the *DSM-III-R* (SCID). Similar results were found for the drug severity rating, which had a sensitivity of 93% and specificity of 55% with respect to a current drug use disorder (Appleby et al., 1997). More recently, Rikoon, Cacciola, Carise, Alterman, and McLellan (2006) investigated if ASI composite scores could serve as an effective screening tool for *DSM-IV* substance dependence in two separate samples utilizing different diagnostic tools (i.e., ASI including the *DSM-IV* questions and the SCID-*DSM-IV*). Results indicated that ASI alcohol and drug composite scores identified dependent clients with approximately 85% sensitivity and 80% specificity. The psychiatric subscale has also been explored. Kosten et al. (1983) found that a psychiatric status severity rating of three or greater had a sensitivity of 89% and specificity of 67% when identifying depression by research diagnostic criteria (RDC), which compared favorably to the Beck Depression Inventory.

Considering the breadth of psychometric studies carried out on the ASI, there is sufficient evidence to suggest that it is a reliable and valid instrument for the evaluation of general populations entering substance abuse treatment. It should be noted though that it appears that caution needs to be exercised when using the ASI with other subpopulations, as the reliability and validity evidence has not been as strong in such investigations. For this particular project, the sample was drawn from a population of clients entering an outpatient chemical dependency program, making the ASI an appropriate measure for inclusion. Furthermore, in providing reliable and valid information across a range of domains that assisted in the identification of treatment needs at the outset of treatment, it met the needs of both practitioners and researchers, another aim in the construction of this assessment battery.

Mini-International Neuropsychiatric Interview (M.I.N.I.)\

The M.I.N.I. was developed by psychiatrists and clinicians in the United States and Europe in response to the need for a brief, structured diagnostic interview that primarily assessed for Axis I psychiatric disorders in the *DSM-IV* and *International Classification of Diseases (ICD-10)*. More specifically, it was designed as a short, but accurate psychiatric interview for use in multi-center clinical trials and epidemiology studies and as an initial outcome tracking measure in nonresearch clinical settings (Sheehan et al., 1998). From the outset, the M.I.N.I.'s creators "wanted an instrument to have the ability to detect a substantial portion of patients without incorrectly labeling a disproportionate number of patients without disorders" (Sheehan et al., 1998, p. 23).

M.I.N.I. Psychometrics

Validation and reliability studies were executed comparing the M.I.N.I. to the

diagnostic standards for the *DSM-IV* (SCID) and for the *ICD-10* (Composite International Diagnostic Interview [CIDI]). Concordance rates were characterized by good to very good kappa values for the M.I.N.I. – SCID comparison, with only one value (current drug dependence) below .50. Kappa values were also good to very good for the M.I.N.I. – CIDI comparison, with only two values (simple phobia and generalized anxiety disorder) below .50. Moreover, the operating characteristics (e.g., sensitivity, specificity, positive predictive values, and negative predictive values) for the majority of the diagnoses were adequate to very good (Sheehan et al, 1998). Mean administration time for the M.I.N.I. was about half that of the SCID (18.7 ± 11.6 minutes vs. 43 ± 30.6 minutes) and about one fourth that of the CIDI (21 ± 7.7 minutes vs. 92 ± 29.8 minutes) (Sheehan et al., 1998). Reliability estimates were also satisfactory. All kappa values measuring interrater reliability for each diagnosis were above .75, with 70% of them being .90 or higher. Test-retest reliability was relatively adequate, with 61% of the values being above .75 and only one value (current mania) below .45.

Based on this reliability and validity data, the authors made adjustments to the original instrument. Several questions were strengthened, improvements to enhance the operating characteristics were made, and all diagnostic modules were updated to reflect the *DSM-IV* and its time frames. A computerized version was also created to ease the process of administration The M.I.N.I. can be used by clinicians, after a brief training session, though lay interviewers require more extensive training to familiarize themselves with diagnostic criteria and procedures (Sheehan et al., 1998). In light its satisfactory psychometric properties and practical advantages (i.e., fully-structured, administration time, electronic version, brief training), the M.I.N.I. was selected as the primary

diagnostic tool in this battery of assessments. According to Maisto, McKay, and Tiffany (2003), diagnostic information is not only important in delineating severity of substance use (i.e., determining if criteria is met for abuse or dependence), but it is also critical in the identification of concurrent psychiatric disorders because this information has a profound impact on the treatment planning process and often necessitates targeted interventions and/or additional services. Furthermore, the M.I.N.I. suicidality module was utilized as a supplementary gauge of suicidal ideation and assisted the treatment team in providing appropriate care to clients who were potentially in danger of harming themselves. A suicide prevention protocol was created, and assessors were instructed about what action to take in the event that a client presented with low, moderate, or high suicide risk. The primary clinician was notified of the situation assessed in all instances, while the attending physician was also informed when clients presented with moderate to high risk.

Form 90 Drinking Assessment Interview (Form 90)

A primary concern in the study of alcohol and drug treatment is the employment of self-report measures to evaluate the extent of use. Sobell and Sobell (2003) reported that a number of comprehensive reviews have explored the reliability and validity of alcohol users' self-reports and concluded that this data can be used with confidence, particularly when it is gathered under certain conditions: the client is alcohol-free at the time of interview, the setting encourages honest reporting, the questions are clearly worded and objective, and memory aids are provided. Furthermore, questions about heavy and atypical drinking should be included to accurately capture a client's total

alcohol consumption. Considering this information, the Form 90 was selected as the primary assessment tool utilized to gather substance use data.

The family of Form 90 instruments was originally developed for Project MATCH and aimed to combine the strengths of prior methodologies used to measure use: quantity-frequency questionnaires, average consumption grids, timeline follow-back calendars, and self-monitoring diaries. All versions are structured, interviewer-administered, retrospective assessments that yield quantitative data (Miller & Del Boca, 1994). The Form 90 Drinking Assessment Interview, the one selected for the current project, was part of the Project MATCH in-person intake protocol. In addition to collecting daily drinking information for the 90 days prior to the last drink, the Form 90 examines other aspects of client functioning including drug use, participation in medical and psychological treatment, institutionalization periods, work activity, school involvement, and religious participation (Sobell & Sobell, 2003). Calendars showing all the days in the assessment window are used to aid client recall. The identification of abstinent periods, drinking patterns, and idiosyncratic drinking episodes also help promote accurate reporting.

Drinking behavior is quantified by estimating daily alcohol consumption (i.e., standard drink unit as measured by standard ethanol content [SEC]) and intoxication level (i.e., blood alcohol concentration [BAC]) These values are deduced from the amount and type of alcohol consumed and drinking episode duration. Supporting software systems employed to execute the complex SEC and BAC calculations include the Blood Alcohol Concentration Computation System and the updated, more user-friendly, Center on Alcoholism, Substance Abuse, and Addiction's (CASAA) Liquor Database and

SEC/BAC Calculator. Both of these programs are in the public domain and can be downloaded from CASAA's website, along with the instrument itself (CASAA, n.d.; Miller & Del Boca, 1994). Percentiles indicating where a client ranks in relation to other women and men in United States for average SECs per week and frequency of drug use are available to bolster the clinical utility of the instrument. This information, along with peak BAC levels, can be used within a motivational structure to provide feedback to the client regarding the severity of their alcohol and drug use problems. Average administration time for the Form 90 is 40 to 60 minutes and scoring time is 20 minutes. It is a complex procedure that is subject to numerous errors and distortions if interviewers are not properly trained. Thus, in addition to reviewing the Form 90 manual instructions, specialized training is advised (Miller & Del Boca, 1994). For this particular project, two individuals from a local clinical trials site familiar with Form 90 procedures from their participation in Project MATCH conducted a formal Form 90 training session that was embedded within the aforementioned assessment training sessions.

Form 90 Psychometrics

Sobell and Sobell (2003) reported that there is evidence supporting the stability, criterion validity, and construct validity of the Form 90. In reference to reliability, a study of 70 treatment-seeking men and women found that the agreement for daily self-report of drinking (i.e., yes or no) between the test interview and the retest interview (i.e., 2 days later), as measured by kappa coefficients, ranged from .48 to .97 with an average of .77 (Rice, 2007). Agreement for test-retest was further stratified by gender and assessment window (days 1-30, 31-60, 61-88). Results indicated that test-retest agreement was higher for women as compared to men, and was best for the most recent period (days 1-30) as

compared to more than 31 days prior to testing. In a more comprehensive review, Tonigan, Miller, and Brown (1997) several approaches were used to evaluate reliability. ICCs and *r* calculations were carried out for test-retest comparisons, while kappa coefficients were used to determine interviewer agreement regarding the presence or absence of specific drug use. Results indicated that the Form 90 yielded relatively consistent measures of drinking, drug use, and psychosocial functioning as evidenced by $r \geq .90$ in a large majority of comparisons (57 of 81 variables examined). The more conservative standard of reliability (ICC) yielded less consistent reliability estimates, though the majority of them fell within the acceptable range (Tonigan et al., 1997). With a few exceptions, kappa coefficients of interrater agreement concerning lifetime drug use were satisfactory. Grant, Tonigan, and Miller (1995) reported relatively adequate convergent validity for the timeline followback calendar approach utilized by the Form 90. Correlations with similar methods of gathering retrospective drinking information yielded values ranging from .59 to .80 for key variables (e.g., drinking days, total SEC, peak BAC).

When selecting alcohol and drug use measures, decisions need to be made about the type of information to be collected (e.g., level of precision, assessment period, administration length) (Sobell & Sobell, 2003). Since research and clinical utility were at the forefront in this project, the Form 90 emerged as a reliable, valid, and valuable measure to assess the frequency and intensity of alcohol use, along with the rate of drug use and other activities during the period leading up to treatment entry. The ability to provide clients feedback regarding their level of substance use as it compares to others was a favorable aspect of the instrument that the clinicians particularly liked because they

felt it gave them objective information they could relay to clients and often initiated a conversation regarding problem recognition and severity.

Inventory of Drug Use Consequences (InDUC)

Exploring the consequences individuals experience in relation to their alcohol and drug use is not only useful for diagnostic determinations, but it can also illuminate connections between substance use and negative physical and psychosocial consequences that clients are not always able to recognize (Maisto et al., 2003). Furthermore, such data has proven to be particularly useful in informing motivational and behavioral interventions and helping clients move through the stages associated with the behavioral change process (Miller & Rollnick, 2002). Nevertheless, there is a paucity of standardized measures assessing adverse consequences of substance use. The development of the Drinker Inventory of Consequences (DrInC) in 1995 was an initial advance in filling this gap (Blanchard, Morgenstern, Morgan, Labouvie, & Bux, 2003). This 50-item instrument was designed to evaluate alcohol-related consequences in five domains: Physical, Social, Interpersonal, Impulse Control, and Interpersonal. Considering the fact that a majority of individuals with substance use disorders have both alcohol and drug problems, the DrInC was revised to incorporate consequences of drinking and using drugs and the Inventory of Drug Use Consequences (InDUC) was created (Blanchard et al., 2003).

The InDUC is available in two general formats. The lifetime version assesses lifetime consequences and utilizes a dichotomous “yes/no” response scale to indicate whether or not the respondent has ever experienced a particular event. This version was selected for use in this project as it seemed more relevant to gather a more comprehensive

history of consequences at the outset of treatment. The recent version inquires about how frequently consequences that have been experienced during a particular time period (i.e., since treatment entry, in the previous 30 days), making it a suitable instrument to examine changes over time. Respondents answer on a 4-point Likert scale ranging from "never" to "daily or almost daily" (Blanchard et al., 2003). Scores are summed for each subscale and across subscales to produce a total score, with higher scores reflecting more severe consequences. The InDUC also employs a control scale comprised of five reverse-scaled items designed to detect careless or perseverative responding (Blanchard et al., 2003). Endorsement of at least one of these items suggests that the respondent was relatively prudent in their responding. Administration time is approximately 10 minutes, and minimal training is required. The instrument is available free of charge and can be downloaded from the CASAA website (CASAA, n.d.).

InDUC Psychometrics

Since the lifetime version of the InDUC was utilized in this project, the subsequent evidence relates to this form. In a sample of outpatient drug treatment clients, Tonigan and Miller (2002) found that three out of the five subscales had acceptable test-retest stability. ICCs were .92 for Impulse Control, .88 for Social Responsibility, and .73 for Interpersonal. In contrast, the Physical and Intrapersonal scales had reliabilities falling below the preferred level (ICC = .68, ICC = .33, respectively). In a more recent study of outpatient clients, Gillaspy and Campbell (2006) reported higher test-retest reliability for the entire scale (ICC = .94) and adequate temporal stability for nearly all five subscales: Intrapersonal (ICC = .86); Social Responsibility (ICC = .83); Interpersonal (ICC = .82); Physical (ICC = .71), and Impulse Control (ICC = .64).

Tonigan and Miller (2002) also recruited a larger clinical sample from both inpatient and outpatient settings to examine construct validity. A confirmatory factor analysis produced a single common factor, which contrasted the proposed structure of the InDUC containing five subscales (Tonigan & Miller, 2002). In a sample of outpatient substance abuse treatment clients, Blanchard and colleagues (2003) also found support for a one-factor solution, and reported high internal consistency for the entire measure (α = .96). Gillaspy and Campbell (2006) reported additional internal consistency estimates: entire scale (α = .96); Intrapersonal (α = .89); Interpersonal (α = .86); Physical (α = .85); Social Responsibility (α = .84); and Impulse Control (α = .84). These authors also note high intercorrelations among the five subscales, further challenging the construct validity of the InDUC as there seems to be much overlap and redundancy. InDUC scores demonstrated positive, yet modest, convergent validity with measures of psychological distress, depression, and alcohol and drug use (Gillaspy & Campbell, 2006).

Although the evidence for construct validity of the InDUC's five-factor structure is lacking, this instrument appears to be a reasonably reliable and valid assessment of consequences related to alcohol and drug use. In this study the InDUC demonstrated acceptable internal consistency: Total (α = .92); Intrapersonal (α = .80); Interpersonal (α = .78); Physical (α = .70); Social Responsibility (α = .76); and Impulse Control (α = .78). Its clinical applicability in increasing client awareness and recognition of how substance use has affected her/his life and gauging substance abuse/dependence severity further supported the selection of this instrument. Ease of access, administration, and scoring were also benefits to including this tool in the assessment battery.

Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES)

The SOCRATES (Miller & Tonigan, 1996) is an instrument designed to assess the stage of readiness to change drinking behavior. It is based on the transtheoretical model of change (Prochaska & DiClemente, 1992; Prochaska et al., 1992), which proposes that people progress through a sequence of stages as they initiate and maintain behavior change. *Precontemplation* is characterized by a state of unawareness of a problem or a need for change. As awareness of a problem increases, the person progresses to a state of ambivalence or c*ontemplation*. At this point, the person often weighs the pros and cons of behavior change. Eventually, the decisional balance may tip in favor of change, as adverse consequences (cons) of maintaining the status quo outweigh the perceived advantages (pros). Once this happens, the person is thought to have entered the *preparation* stage, which involves making and strengthening a commitment to change and developing a plan of action. Once these objectives are achieved, the person attempts to execute the plan and makes necessary revisions to manage difficulties in the *action* stage. If these initial efforts are successful, the person proceeds to the *maintenance* stage where the focus is primarily on relapse prevention (DiClemente, 2003; Prochaska & DiCLemente, 1992; Prochaska et al., 1992).

The SOCRATES is available in a long version (39 items) and an abbreviated version (19 items). The authors recommended the use of the short form because it generates scores that converge well with the longer version, and demonstrates greater simplicity and clearer factor structure. In accordance with this advice, the 19-item version was selected for use in this project (Miller & Tonigan, 1996). Clients are instructed to indicate the degree to which they agree or disagree with statements worded specifically about changing drinking behavior. Response options are on a 5-point Likert scale ranging

from strongly disagree to strongly agree. Administration time is approximately 5 to 10 minutes, and training is minimal. The SOCRATES and accompanying materials including an overview of the instrument and interpretation guidelines can be downloaded from the CASAA website (CASAA, n.d.).

SOCRATES Psychometrics

Factor analyses yielded a 3-factor solution amongst responses of a sample of 1,672 Project MATCH participants seeking treatment for alcohol problems. The first factor, Taking Steps (to change drinking behavior), accounted for 27% of the item response variance and consisted of eight items (e.g., I am working hard to change my drinking; I want help to keep from going back to the drinking problems that I had before). The second factor, Recognition (that an alcohol problem exists), explained an additional 11% of the variance and contained seven items (e.g., I have serious problems with drinking; my drinking is causing a lot of harm). The third factor, Ambivalence (about whether an alcohol problem exists or not) accounted for a further 7% and consisted of four items (e.g., There are times when I wonder if I drink too much; Sometimes I wonder if I am in control of my drinking) (Miller & Tonigan, 1996). In light of these findings, it appears that the SOCRATES does not fit perfectly within Prochaska and DiClemente's stages of change model, but the scales may be "better understood as continuously distributed motivational processes that may underlie stages of change" (Miller & Tonigan, 1996, p. 84). Scores are summed according to subscales, and deciles for each scale are provided to determine how individuals compare to other people presenting for alcohol treatment (i.e., low, average, high). Descriptive interpretation guidelines are also provided to further delineate what the scores might signify.

The relationship between these motivational dimensions and measures of problem severity (e.g., various consumption variables, problem scales derived from the Alcohol Use Inventory) was also examined. The strongest correlations, reflecting up to 15% common variance, indicate a positive relationship between Recognition and problem severity (Miller & Tonigan, 1996). Internal consistency estimates were generally acceptable: Taking Steps (α = .83), Recognition (α = .85) and Ambivalence (α = .60). Test-retest reliabilities were sound: Taking Steps (α = .96), Recognition (α = .95) and Ambivalence (α = .87) (Miller & Tonigan, 1996). In addition to possessing fairly sound psychometric properties, the ease of administration and scoring, simplicity of interpretation, and fit within a motivational framework (Miller & Rollnick, 2002) made the SOCRATES a suitable motivational measure to include in the battery. As Miller and Tonigan (1996) noted, the SOCRATES also has clinical utility as a client feedback tool that can help initiate a discussion about motivation and readiness for change and provide a common language to talk about such topics. Alternative versions of the SOCRATES have also been created, included one examining drug use (SOCRATES-D). The items are worded exactly the same except for the references to alcohol are substituted with references to drugs. Although the drug version has not received adequate attention in the literature regarding its psychometric properties, the decision was made to incorporate this measure into the battery for clinical purposes. Again, it was anticipated that such information would assist clinicians in engaging clients into conversations about their level of motivation and readiness for change. Both of the versions of the SOCRATES exhibited excellent reliability in this study: Alcohol Recognition (α = .99); Alcohol Taking Steps (α = .99); Alcohol Ambivalence (α = .88); Alcohol Total (α = .98); Drug

Recognition (α = .99); Drug Taking Steps (α = .99); Drug Ambivalence (α = .91) Drug Total (α = .99). These high internal consistency estimates may be the byproduct of how face valid the SOCRATES questionnaire is. Anecdotally speaking, participants tended to answer in a consistent manner that reflected high treatment eagerness/motivation if they endorsed problems with alcohol and/or drugs (i.e., strongly agree with statements) or low treatment eagerness/motivation if they did not use that particular substance (i.e., strongly disagree with statements).

Pretreatment Variables

Table 3 outlines the primary variables that were explored in this study, the assessment instruments they were obtained from, and their respective levels of measurement. Pretreatment characteristics of interest were selected based on those identified in the TCU Treatment Model (Simpson, 2001, 2004). The ASI domain composite scores were also included as they represent more global indicators of overall functioning that may be defining characteristics of this sample.

Table 3.

Pretreatment Characteristics

Variable	Instrument	Level of Measurement
Patient Attributes		
Age	ASI	Continuous
Gender	ASI	Categorical
Ethnicity	ASI	Categorical
Marital Status	ASI	Categorical

Variable	Instrument	Level of Measurement
Patient Attributes		
Education	ASI	Categorical
Recent Monthly Employment Income	ASI	Continuous
Substance Use Severity		
Substance Use in Past 30 days	ASI	Continuous
Previous AODA Treatment	ASI	Categorical
SUD Diagnosis	M.I.N.I.	Categorical
Total Drinking Days in Past 90	Form 90	Continuous
Average Weekly SEC	Form 90	Continuous
Peak BAC for Assessment Window	Form 90	Continuous
Physical Consequences	InDUC	Continuous
Interpersonal Consequences	InDUC	Continuous
Intrapersonal Consequences	InDUC	Continuous
Impulse Control Consequences	InDUC	Continuous
Social Responsibility Consequences	InDUC	Continuous
Psychiatric Symptom Severity		
Dual Diagnosis	M.I.N.I.	Categorical
Previous Psychiatric Treatment	ASI	Categorical
Been Prescribed Psychotropic(s)	ASI	Categorical
History of Abuse	ASI	Categorical

Variable	Instrument	Level of Measurement
Motivation – Alcohol Use		
Recognition	SOCRATES-A	Continuous
Ambivalence	SOCRATES-A	Continuous
Taking Steps	SOCRATES-A	Continuous
Motivation – Drug Use		
Recognition	SOCRATES-D	Continuous
Ambivalence	SOCRATES-D	Continuous
Taking Steps	SOCRATES-D	Continuous
General Functioning		
Medical Composite Score	ASI	Continuous
Employment Composite Score	ASI	Continuous
Alcohol Composite Score	ASI	Continuous
Drug Composite Score	ASI	Continuous
Legal Composite Score	ASI	Continuous
Family/Social Composite Score	ASI	Continuous
Psychiatric Composite Score	ASI	Continuous

Treatment Variables

The primary treatment variable of interest is treatment completion status. Treatment status completion was determined through a variety of methods. Clinicians were encouraged to record whether or not clients successfully completed treatment in the

program's census log. However, this data was only available for approximately half of the participants. In the event that treatment completion status was not available, the two senior assessors accessed the client's chart and examined the most recent treatment progress note(s) to determine treatment status. A client was considered a treatment completer if s/he met the majority of treatment goals, as identified by the treatment team, was discharged from the program with staff approval, and/or was transferred to a more or less intensive level of care. Examples of statements indicating treatment completion include: "patient completed treatment assignments and was given a medallion for completion of treatment;" "patient was discharged today with staff approval and is seen as reaching maximum benefit in treatment;" and "patient discussed her discharge plans with group, received feedback from peers, and received her medallion." On the contrary, a client was considered a treatment dropout if s/he did not complete the majority of treatment goals and/or was discharged from the program without staff approval. Examples of statements indicating treatment dropout include: "patient needs to complete the last two assignments in the group and also needs to obtain a temporary sponsor;" "patient was discharged due to noncompliance;" and "patient seems disinterested in the group, coming in late, on the phone during breaks and away from peers, no meeting attendance, and no assignment completion." Clinicians were also consulted to review client charts (n = 12) in situations where the two senior assessors were unable to determine if a client successfully completed treatment based on the outlined criteria. The treatment status criteria in this study were similar to those outlined in previous treatment retention research (Mammo & Weinbaum, 1993; Veach et al., 2000).

In accordance with efforts to accurately and adequately describe the treatment characteristics of the current sample, the dichotomous treatment status variable was expanded to include two additional classifications: *treatment stopouts* (i.e., treatment dropouts who returned for subsequent treatment at the same facility) and *treatment repeaters* (i.e., treatment completers who returned for subsequent treatment at the same facility). To determine whether or not clients were stopouts or repeaters, the two senior assessors accessed client charts and checked if they were readmitted to the treatment facility for inpatient and/or outpatient treatment following their discharge from the main treatment episode examined in this study. The designated period that stopouts and repeaters were identified was the day following discharge through September, 15, 2007. Number of treatment sessions and duration of treatment (i.e., number of days between admission and discharge) were also examined to further depict the nature of treatment participants received. Treatment characteristics of interest were selected based on treatment information available to the researchers.

Data Analyses

Sample Characteristics

All statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (e.g., frequencies, modes, means, and standard deviations) were conducted on identified pretreatment and treatment variables to describe the basic characteristics of this sample of clients entering an intensive outpatient chemical dependency treatment program at Roger Memorial Hospital – West Allis. Considering the aforementioned data collection obstacles that were encountered while carrying out this research project, the obtained sample may not be representative of the actual

chemical dependency treatment-seeking population at this facility. Thus, demographic variables and treatment information were obtained for those clients who were not tested at intake and subsequently excluded from the investigation (N = 171). Comparative analyses were conducted between these persons and the study participants in order to determine the equivalency of the obtained sample to the overall population from which it was drawn. These results will help to ascertain the generalizability of study findings.

Treatment Completers vs. Treatment Dropouts

In order to determine how clients who completed this treatment program differ from clients who dropped out prematurely on identified pretreatment variables (research question 1), comparative analyses between treatment completers and dropouts were performed. Analyses were selected based on the level of measurement of the variables. Chi-square analyses were carried out on the categorical variables, and continuous ASI variables were examined using independent samples *t*-tests. Considering the mixed evidence regarding how pretreatment characteristics relate to treatment completion status, the null hypothesis in each of these tests was that the measure of central tendency (e.g., mode, median) is equivalent for treatment completers and dropouts. Groups were considered to be significantly different if $p < .05$. Standardized expected cell residuals greater than 1 or less than -1 were used to detect significant cell effects for chi-square analyses.

Continuous variables deduced from the InDUC, Form 90, SOCRATES-A, and SOCRATES-D and previous 30-day use of alcohol, opiates, cocaine, and marijuana, the most used substances in this sample, were explored using profile analysis. Variables were grouped together based on the assessment instrument they were derived from and a

separate profile analysis was conducted on each group of instrument variables. By grouping the variables in this manner, the clinical utility of this project was enhanced because the results of the analyses could potentially be used to assist the treatment program in determining if and how the assessment instruments are able to differentiate between clients who go on to complete the treatment program and those who drop out of the program prematurely. Utilizing such empirically-based methods in adapting the intake evaluation process and selecting assessment instruments can aide treatment program improvement efforts and, in the end, enhance the program's retention rates and positive treatment outcomes. Raw scores on the InDUC, Form 90, SOCRATES-A, and SOCRATES-D were first converted to standardized *z* scores and then transformed into *T* scores ($10z + 50$). Outliers were subsequently recoded. Scores deviating from the mean by more than 3 standard deviations were recoded to be either 3 standard deviations above ($T = 80$) or below ($T = 20$) the mean ($n = 16$). Responses on the ASI previous 30-day use variables were all on the same scale (i.e., 0 – 30 days), thus no transformation was necessary.

Identification of Subgroups

Cluster analysis was conducted to determine if meaningful subgroups of this sample could be identified based on important pretreatment characteristics and treatment variables (research question 2). Cluster analysis is the general term used to describe a class of multivariate techniques whose primary purpose is to assemble objects (e.g., participants) based on the characteristics they possess with respect to predetermined selection criterion. If classification is successful, the clusters should exhibit high within-cluster homogeneity and high between-cluster heterogeneity. The three primary

objectives of cluster analysis include taxonomy description, data simplification, and relationship identification, making it an appropriate technique for use in this study based on the identified research questions (Hair & Black, 2000). Dennis, Perl, Huebner, and McLellan (2000) indicated that cluster analysis is a recommended analytical method for exploring questions regarding who is being served and identifying major client subgroups, one of the primary aims of this investigation.

The cluster analysis in the present study was exploratory in nature. The selection of variables, as opposed to the actual methods utilized, may have the strongest impact on the results of a classification study, thus careful consideration was undertaken in the selection process (Peters, 1997). In addition to appraising the available empirical evidence, the utility of the potential interpretation of results in comprehensively capturing the complexity of the sample was heavily weighted. Ultimately, age, ASI composite scores, and InDUC subscale scores were chosen as the variables to be included in the cluster analysis. It was deemed that these characteristics appeared to be an adequate snapshot of participant functioning across multiple domains and had potential to produce a parsimonious grouping scheme with applied value in the treatment process (i.e., identification of treatment needs at the outset of treatment).

The specific clustering procedure employed in this study was Ward's method (Ward, 1963). Ward’s method is a hierarchical agglomerative clustering technique wherein each case starts as its own cluster, and similar clusters are sequentially merged until all cases are in one cluster. For each cluster, the means of all variables are calculated and then the squared Euclidean distance (i.e., the geometric proximity between two cases) to the cluster means is calculated. These distances are then summed for all of the

cases within the hypothetical cluster. At each step, the two clusters that merge are those that result in the smallest increase in the overall sum of the squared Euclidean distances. In other words, clusters are merged so as to minimize the variability within the cluster (Borgen & Barnett, 1985; Norusis, 2006). The agglomeration schedule, the dendogram, and interpretability of identified clusters were considered in determining the adequacy of potential cluster solutions (Clatworthy, Buick, Hankins, Weinman, & Horne, 2005; Norusis, 2006). More specifically, the agglomeration coefficient is a dissimilarity measure wherein small values suggest that the clusters being combined are fairly homogeneous, whereas larger values indicate that fairly dissimilar clusters are being combined. The dendogram is a visual representation of how clusters are combined. It is read from left to right, with vertical lines demarcating joined clusters. A large distance between sequential vertical lines is used to determine at what stage the distances between the combined clusters is large (Norusis, 2006). Concurrent and predictive validation procedures (e.g., ANOVA, chi-square test) were also completed to demonstrate how the identified clusters relate to a range of variables (i.e., demographic characteristics, substance use history, psychiatric status, motivation, treatment attributes) that were not included in the cluster analysis.

Chapter IV: Results

Overview

This chapter details the results of statistical analyses completed. It begins with a discussion of how missing data was handled and then delineates how the obtained sample compares to the larger population from which is was drawn. Sample characteristics are then described, along with significant differences between treatment completers and treatment dropouts on these characteristics. Finally, results of the cluster analysis are outlined.

Missing Data

How to handle missing data is a common dilemma a researcher encounters as the improper handling of missing values can distort statistical analyses and produce a remaining data set that is biased. Completing a missing value analysis can help address such concerns, thus a qualitative analysis of the missing data was conducted. The data set in this study originally contained a total of 298 cases. Upon further examination, 13 cases evidenced missing data points due to computer problems wherein responses on the InDUC or SOCRATES were lost electronically and could not be retrieved. An additional 11 cases evidenced missing data points due to incomplete data gathering wherein the information collected was not sufficient to make a diagnosis on the M.I.N.I. or to compute summary Form 90 statistics (e.g., days of drinking, weekly SEC, Peak BAC) on the Form 90. One more case had the race/ethnicity response missing from the ASI. These missing data points were spread out across time, variables, and assessors. Taken together, these observations provide evidence to support the decision to classify it as

missing completely at random (Allison, 2002). Consequently, listwise deletion, as opposed to an imputation method, was chosen to handle the missing data in this study. Furthermore, listwise deletion produced a relatively small drop in sample size (8.4%), so although statistical power was slightly reduced, the estimated parameters were likely not biased by the absence of this data.

Generalizability

As previously mentioned, a variety of practical difficulties interfered with the assessment team's ability to evaluate each new client in the treatment program (e.g., timing of new client notification, space constraints, inconsistent client attendance at treatment groups). In recognition of the fact that the obtained sample (N = 273) may not be representative of the actual substance abuse treatment-seeking population at this facility, demographics and treatment information were obtained for those clients who were not assessed at intake and consequently excluded from the study (N = 171). The average age of the entire population (N = 444) was 38.78 years (SD = 12.00). A majority were males (62.4%). With regards to ethnicity and race, 84.5% identified as Caucasian, 9.2% identified as African, 3.5% identified as Hispanic, 1.6% identified as a Native American or Alaska Native, and 1.1% identified as Asian or Pacific Islander. The overall treatment completion rate was 49%. On average, individuals attended 12.18 group treatment sessions (SD = 6.64) and stayed in treatment for just over 3 weeks (M = 22.67 days, SD = 13.95).

Comparative analyses were conducted in order to determine the equivalency of the obtained sample to the overall population from which it was drawn to help inform the generalizability of study findings. Results indicated that study participants and excluded

individuals did not significantly differ on sociodemographic characteristics including gender, $\chi^2(1, N = 444) = 0.00, p = .95$, and race, $\chi^2(1, N = 444) = 4.71, p = .32$; however, treatment participants were significantly older ($M = 39.77$, $SD = 11.80$) than those who did not participate in the study ($M = 37.20$, $SD = 12.18$), $t(442) = -2.21$, $p = .03$. Significant differences were also detected on all three treatment variables. Study participants were more likely to complete treatment as compared to individuals who were not evaluated, $\chi^2(1, N = 444) = 28.94$, $p < .001$. They also attended more treatment groups on average ($M = 14.19$, $SD = 5.06$) than individuals who were not included in the study ($M = 8.99$, $SD = 7.56$), $t(442) = -7.95$, $p < .001$, and generally stayed in treatment for more days ($M = 27.05$, $SD = 11.39$) than nonparticipants ($M = 15.68$, $SD = 14.83$), $t(442) = -8.56$, $p < .001$.

Sample Characteristics

See Table 4 for sample characteristics. Of the total sample ($N = 273$), 62.3% were male, 86.4% were Caucasian, 44.7% were married, and 91.6% had at least 12 years of education. The mean age of the sample was 39.77 years ($SD = 11.80$). The average amount of money earned from employment in the past month was $1977 ($SD = 2948$). This estimate appeared to be impacted by a few participants ($n = 6$) who earned more than $10,000 in the past month. The median monthly income for was $1200. Of the total sample, 68.1% had participated in prior substance abuse treatment, 58.1% had received previous treatment for psychological problems, and 64.5% had been prescribed psychotropic medications. Furthermore, 60.8% of the sample had experienced some type of physical, emotional, and/or sexual abuse. Fifty-nine percent of the sample completed the treatment program, while 41.0% dropped out prematurely. Again, this estimate

represents higher estimate than was found for the population from which the sample was drawn (49%). Of the treatment dropouts in the study sample, 25.0% returned for a subsequent treatment episode (i.e., treatment stopout), while 18.6% of treatment completers also returned for additional treatment at a later date (i.e., treatment repeater). Altogether, just over 20% of the study sample returned for a subsequent treatment episode in the same program. The number of treatment days for the study sample ranged from 2 to 27 days, with an average of 14.2 (SD = 5.1). Total treatment duration for the study sample ranged from 1 day to 78 days, with an average of 27.1 (SD = 11.4).

Table 4.

Participant Characteristics by Treatment Completion Status

	Treatment Completion Status		
Characteristic	Completer (n = 161)	Dropout (n = 112)	Total Sample (N = 273)
Age ($M \pm SD$)	42.32 ± 11.00	36.10 ± 11.98**	39.77 ± 11.80
Gender (%)			
Male	63.4	60.7	62.3
Female	36.6	39.3	37.7
Ethnicity (%)			
Caucasian	87.6	84.8	86.4
African American	8.7	8.0	8.4
Native American/Alaska Native	1.2	1.8	1.5
Hispanic	2.5	4.5	3.3
Asian/Pacific Islander	0.0	0.9	0.4
Marital Status (%)			
Married	52.8	33.0*	44.7
Widowed	1.9	0.0	1.1
Separated	1.9	4.5	2.9
Divorced	17.4	17.9	17.6
Never Married	26.1	44.6*	33.7

Characteristic	Completer (n = 161)	Dropout (n = 112)	Total Sample (N = 273)
Education (%)			
Less than HS	6.8	10.7	8.4
HS	32.9	42.0	36.6
More than HS	60.2	47.3	54.9
Recent Monthly Employment Income	$2298 ± 3483	$1517 ± 1856*	$1977 ± 2948
Previous AODA Treatment (%)	67.7	68.8	68.1
Previous Psych Treatment (%)	53.4	66.1*	58.6
Been Prescribed Psychotropic(s) (%)	61.5	68.8	64.5
Been Emotionally, Psychologically, or Sexually Abused (%)	59.6	62.5	60.8

* $p < .05$. ** $p < .001$.

In the 30 days prior to the day the assessment was conducted, nearly 80% of the sample had used alcohol, 30.8% had used marijuana, almost one-fourth had used a form of cocaine, 20.2% had used opiates (e.g., Percocet, Vicadin), 10.3% had used sedatives (e.g., Xanax, Valium), 5.9% had used heroin, 2.2% had used amphetamines (e.g., Methamphetamine, Ritalin), 2.2% had used a hallucinogen (e.g., LSD, mushrooms), and 1.5% used barbiturates (e.g., Phenobarbital, Nembutal). It should be noted that prescription drug use was only counted above if participants did not use them as prescribed (i.e., took twice as much pain medication as was advised).

Nearly the entire sample (97.4%) met criteria for at least one substance use disorder: 48.4% met criteria for only an alcohol use disorder, 23.4% met criteria for only a drug use disorder(s), and 25.6% met criteria for both an alcohol and a drug use

disorder(s). This diagnostic information was gathered from a self-report instrument (M.I.N.I.), thus participants may not have endorsed questions that would qualify for a substance abuse or dependence diagnosis, despite seeking treatment for substance use problems. With reference to comorbid psychological problems, over half of the sample met criteria for at least one substance use disorder and at least one comorbid psychological disorder (51.6%). See Table 5 for a breakdown of the most common Axis I diagnostic categories that participants met criteria for. It should be noted that one-third of the sample also reported having suicidal thoughts.

Table 5.

Prevalence of Axis I Disorders by Treatment Completion Status (%)

	Treatment Completion Status		
Diagnostic Category	Completer (n = 161)	Dropout (n = 112)	Total Sample (N = 273)
Depression	37.9	49.1	42.5
Anxiety (PTSD, OCD, Panic, Social)	21.1	39.3*	28.6
Alcohol	76.4	70.5	74.0
Marijuana	13.0	17.0	14.7
Opiate	15.5	25.9*	19.8
Cocaine	14.9	32.1*	22.0
SUD Diagnosis			
No Diagnosis	3.1	1.8	2.6
Alcohol Only	57.1	35.7*	48.4
Drug(s) Only	20.5	27.7	23.4
Alcohol and Drug(s)	19.3	34.8*	25.6

Diagnostic Category	Completer (n = 161)	Dropout (n = 112)	Total Sample (N = 273)
Dual Diagnosis			
No Diagnosis	3.7	1.8	2.9
SUD Only	51.6	36.6*	45.4
Dual Diagnosis	44.7	61.6*	51.6

* $p < .05$.

Treatment Completers vs. Dropouts

Consult Table 4 and Table 5 for results of comparative analyses between participants who completed treatment and those who dropped out of treatment prematurely. Standardized expected cell residuals greater than 1 or less than -1 were used to detect significant cell effects for chi-square analyses. Treatment completers (M = 42.32, SD = 11.00) were significantly older than treatment dropouts (M = 36.10, SD = 11.98), $t(271) = -4.37$, $p < .001$, and earned significantly more income from employment in the past 30 days (M = 2298, SD = 3483) than treatment dropouts (M = 1517, SD = 1856), $t(271) = -2.40$, $p = .017$. Treatment completers were more likely to be married (52.8%) than their counterparts (30.0%), while treatment dropouts were more likely to never have been married (44.6%) as compared to treatment completers (26.1%), $\chi^2(4, N = 273) = 16.14$, $p = .003$.

Treatment dropouts were significantly more likely to have participated in previous psychological treatment (66.1%) than participants who completed treatment (53.4%), $\chi^2(1, N = 273) = 4.36$, $p = .037$. Diagnostically speaking, treatment completers were significantly more likely to have met criteria for only an alcohol use disorder and significantly less likely to meet criteria for both an alcohol and at least one drug use

disorder than their counterparts who did not complete treatment, $\chi^2(3, N = 273) = 14.42$, $p = .002$. Treatment dropouts were significantly more likely to meet criteria for an opiate use disorder, $\chi^2(1, N = 273) = 4.47$, $p = .034$, and/or a cocaine use disorder, $\chi^2(1, N = 273) = 11.44$, $p = .001$. Treatment dropouts also met criteria for both a substance use disorder and a comorbid Axis I psychological disorder at higher rates than treatment completers, $\chi^2(2, N = 273) = 7.74$, $p = .021$. In particular, treatment dropouts were more likely to endorse diagnostic criteria for an anxiety disorder (e.g., obsessive-compulsive disorder, social anxiety, post-traumatic stress disorder, and/or panic disorder) than treatment completers, $\chi^2(1, N = 273) = 10.68$, $p = .001$.

Treatment completers attended significantly more treatment groups ($M = 16.29$, $SD = 3.54$) than treatment dropouts ($M = 11.17$, $SD = 5.40$), $t(271) = -8.80$, $p < .001$. Furthermore, the total duration of treatment for completers was an average of at least 11 days longer ($M = 31.63$, $SD = 9.52$) than dropouts ($M = 20.46$, $SD = 10.65$), $t(271) = -8.90$, $p < .001$.

Profile Analysis

Profile analysis was conducted to further compare participants who completed treatment to participants who dropped out of treatment. A separate profile analysis was performed on the selected variables from the following instruments: InDUC, Form 90, SOCRATES-A, SOCRATES-D, and ASI. Raw scores on the InDUC, Form 90, SOCRATES-A, and SOCRATES-D were first converted to standardized *z* scores and then transformed into *T* scores ($10z + 50$). Outliers were subsequently recoded. Scores deviating from the mean by more than 3 standard deviations were recoded to be either 3 standard deviations above ($T = 80$) or below ($T = 20$) the mean ($n = 16$). Responses on

the ASI previous 30-day use variables were all on the same scale (i.e., 0 – 30 days), thus no transformation was necessary.

For each profile analysis, two statistical tests were executed to allow for comparison of the means of completers and dropouts on the variables of interest, as well as the comparison of the pattern of means across each assessment measure (Norusis, 2006). The *parallelism* test deduces whether the pattern of means on the variables is the same between groups. A multivariate analysis of variance (MANOVA) was executed and the *parallelism* null hypothesis was rejected if a significant group by dependent variable interaction effect was detected. Wilks' lambda, the test statistic of interest, is a direct measure of the proportion of variance in the combination of dependent variables that is unaccounted for by the independent variable (i.e., treatment completion status). The *equal levels* test explores main effects and examines whether one group scored higher, on average, across variables on a particular instrument.

Analyses of *parallelism* of each assessment measure produced only one statistically significant interaction effect. Pattern of performance on the InDUC showed a statistically significant difference between treatment completers and dropouts Wilks' Λ = .69, F (1, 271) = 2.47, p = .045, η^2 = .31. See Figure 2. Higher *T* scores reflect the experience of more negative consequences. More specifically, treatment dropouts experienced more negative consequences related to fulfilling social responsibilities (*M* = 51.68, *SD* = 9.37) as compared to their counterparts who completed treatment (*M* = 48.83, *SD* = 10.27), *t*(271) = 2.37, *p* = .019.

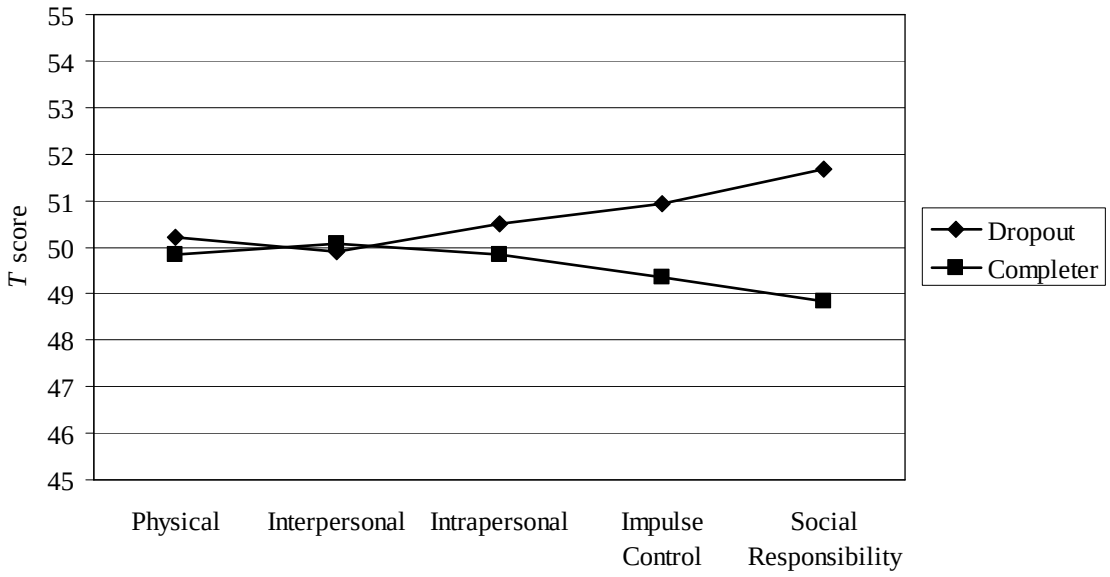

Figure 2. Comparison of InDUC subscale scores.

Analyses of *equal levels*, or main effects, produced statistically significant results on two of the assessment measures. Treatment dropouts had significantly higher average scores than treatment completers across SOCRATES-D subscales (F (1, 271) = 13.43, p < .001), indicating that dropouts demonstrated higher levels of drug problem recognition, endorsed a higher degree of ambivalence about changing their drug use, and reported they were taking more steps to reduce their drug use. Treatment dropouts also reported more days of recent (i.e., past 30 days) alcohol, opiates, cocaine, and marijuana use as measured by the ASI, (F (1, 271) = 12.25, p = .001). See Figure 3 and Figure 4 for profiles.

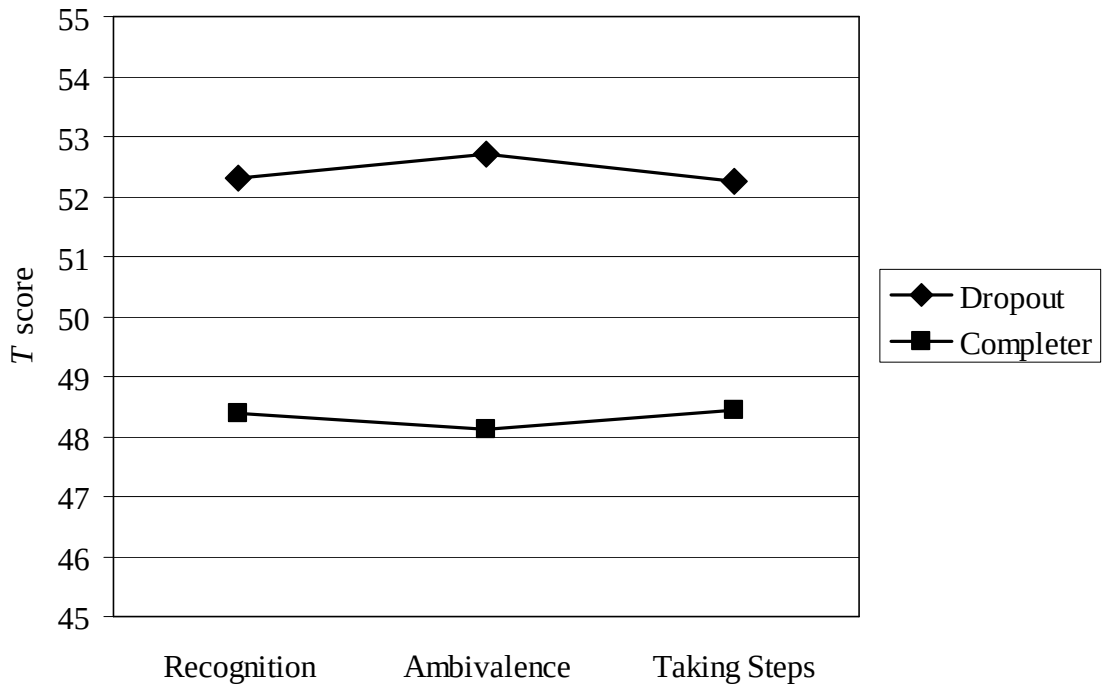

Figure 3. Comparison of SOCRATES-D subscale scores.

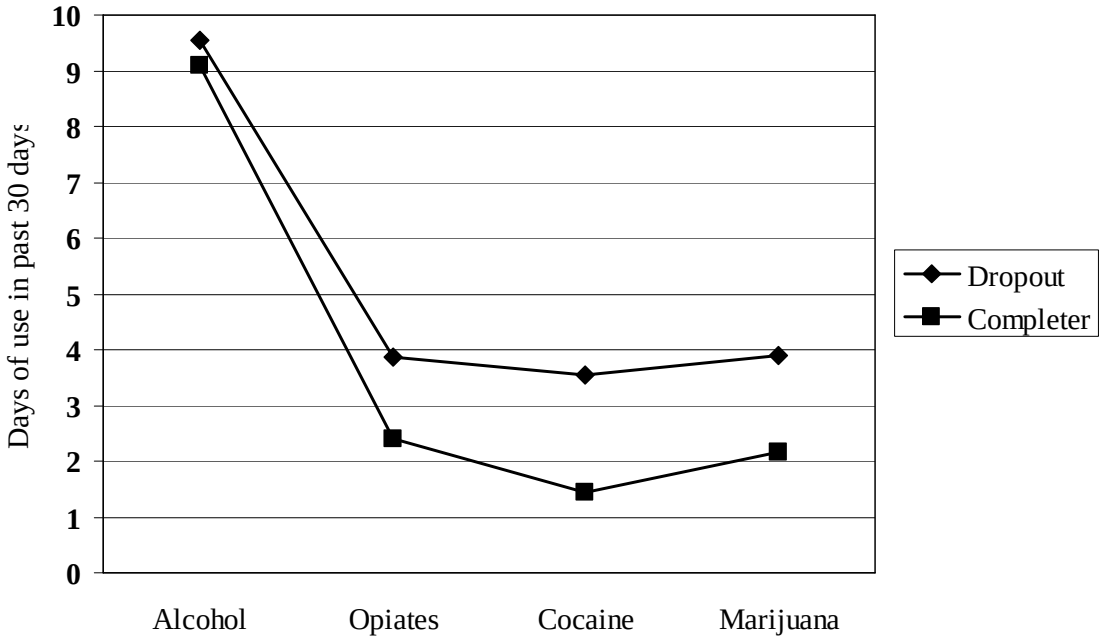

Figure 4. Comparison of substance use in the 30 days prior to date of evaluation.

Identification of Subgroups

Cluster Analysis

Age, ASI composite scores, and InDUC subscale scores were selected as the variables to be included in the cluster analysis as they appeared to be a comprehensive snapshot of participant functioning across multiple domains at the outset of treatment. These variables also had potential to produce a parsimonious grouping scheme with clinical value in the treatment planning process by determining prominent areas of concern for specific subtypes of clients. The hierarchical agglomerative clustering technique known as Ward's method (Ward, 1963) was employed to identify a cluster solution. The agglomeration schedule and dendogram were examined to ascertain the

most appropriate cluster solution (Clatworthy et al., 2005; Norusis, 2006). More specifically, potential cluster solutions were denoted by a prominent increase in the agglomeration coefficient as compared to preceding increases. The "jump" between stage 269 and 270 suggested a greater degree of dissimilarity of clusters being combined at this stage as compared to previous stages (see Table 6). The dendogram was also inspected, though the figure was too extensive to depict visually. A large distance between sequential vertical lines was the marker used to determine what stage the distances between the combined clusters was large and that a prospective clustering solution was found (Norusis, 2006). Based on these objective indicators, a four-cluster solution was identified.

Table 6.

Cluster Analysis Agglomeration Schedule

Stage	Agglomeration Coefficient	Coefficient Difference Between Stages
266	2172.02	-
267	2295.48	123.46
268	2427.91	132.43
269	2567.47	139.56
270	2761.16	193.69
271	3008.83	247.66
272	3536.00	527.17

The cluster solution is depicted in Table 7 and Table 8. The clusters range in size from 51 to 87 participants. The interpretation of each cluster and corresponding label were deduced primarily from the pattern of composite score means across ASI domains and extent of substance use-related consequences noted on the InDUC. ASI composite scores range from 0 to 1, with higher scores reflecting more severe problems. Higher scores on the InDUC subscales also reflect more extensive problems in an area.

Table 7.

Mean (SD) Age and ASI Composite Scores for Cluster Solution

Domain	Pervasive Concerns Polysubstance Use Disorder (*n* = 73)	Serious Concerns Alcohol Use Disorder (*n* = 87)	Moderate Concerns Drug Use Disorder (*n* = 51)	Minimal Concerns Alcohol Use Disorder (*n* = 62)	Total Sample (*N* = 273)
Age	36.62 (9.23)	43.92 (9.74)	33.14 (12.41)	43.11 (13.28)	39.78 (11.80)
Medical	.41 (.39)	.18 (.25)	.09 (.13)	.25 (.28)	.24 (.31)
Employment	.46 (.25)	.36 (.24)	.23 (.22)	.22 (.18)	.33 (.28)
Alcohol	.33 (.30)	.61 (.18)	.10 (.11)	.44 (.23)	.40 (.29)
Drug	.21 (.13)	.04 (.09)	.26 (.08)	.03 (.06)	.13 (.14)
Legal	.12 (.19)	.15 (.22)	.08 (.14)	.04 (.10)	.10 (.18)
Family/Social	.38 (.25)	.23 (.21)	.26 (.23)	.17 (.20)	.26 (.24)
Psychiatric	.48 (.21)	.32 (.25)	.27 (23)	.24 (.23)	.33 (.25)

Table 8.

Mean (SD) InDUC Subscale Scores for Cluster Solution

Subscale	Items	Pervasive Concerns Polysub. Use Disorder (*n* = 73)	Serious Concerns Alcohol Use Disorder (*n* = 87)	Moderate Concerns Drug Use Disorder (*n* = 51)	Minimal Concerns Alcohol Use Disorder (*n* = 62)	Total Sample (*N* = 273)
Physical	8	6.63 (1.26)	5.83 (1.82)	5.1 (1.70)	3.1 (1.70)	5.29 (2.08)
Interpersonal	10	8.27 (1.59)	7.18 (2.18)	6.24 (2.28)	4.32 (2.27)	6.65 (2.52)
Intrapersonal	8	7.60 (.88)	7.29 (1.01)	6.67 (1.57)	4.65 (2.35)	6.66 (1.87)
Impulse Control	12	8.00 (2.50)	7.31 (2.56)	5.24 (2.02)	3.37 (1.92)	6.21 (2.93)
Social Responsibility	7	6.25 (1.06)	5.05 (1.58)	5.06 (1.70)	2.5 (1.56)	4.79 (1.99)

The *pervasive concerns polysubstance use disorder* cluster was characterized by the highest average medical, employment, family/social, and psychiatric composite scores, paired with considerable alcohol and drug composite score elevations. Cluster members reported experiencing more substance use-related consequences across InDUC subscales (e.g., physical, interpersonal, intrapersonal, impulse control, and social responsibility) than their counterparts, and their age fell below the sample mean by about three years (M = 36.62 years). Conversely, the *minimal concerns alcohol use disorder* cluster had the lowest drug, legal, family/social, and psychiatric composite scores, paired with the second highest average alcohol and medical composite scores. Members of this

category endorsed the fewest number of substance-use related consequences, and their age was above the sample mean by about three years (*M* = 43.11 years). The mean age of the *serious concerns alcohol use disorder* group (*M* = 43.92 years) was comparable to their fellow primary alcohol users. This particular cluster evidenced the most severe alcohol and legal problems, significant employment and psychiatric problems (i.e., second highest average), and ranked second across InDUC subscales of substance-use related consequences. The final cluster, *moderate concerns drug use disorder*, were the youngest cluster (*M* = 33.14 years) and exhibited the highest average drug composite score and significant family/social problems. InDUC subscale scores were third in rank compared to the other clusters.

Validity of the Identified Cluster Solution

Table 9 presents a summary of the concurrent and predictive validation analyses examining the four-cluster solution across a variety of variables: demographics, diagnosis, psychiatric status, substance use, motivation for treatment, and treatment characteristics. Chi-square tests (χ^2) were executed for categorical variables and one-way analysis of variance (ANOVA) tests were executed for continuous variables. For χ^2 tests, standardized expected cell residuals greater than 1 or less than -1 were used to detect statistically significant cell effects (i.e., significantly more or fewer observations than would be expected by chance alone). For ANOVA tests, Tukey's HSD post hoc comparisons were executed to determine if a cluster was significantly different from any other cluster(s). Due to the large number of comparisons statistical tests being undertaken, the *p* value was adjusted with the Bonferroni method to control for type I

error. A total of 17 tests were completed, thus values of $p < .003$ (i.e., .05/17) were considered significant.

Table 9.

Cluster Validation Results

Variable	Pervasive Concerns Polysub. Use Disorder (n = 73)	Serious Concerns Alcohol Use Disorder (n = 87)	Moderate Concerns Drug Use Disorder (n = 51)	Minimal Concerns Alcohol Use Disorder (n = 62)	Statistic
Gender					$\chi^2 = 1.66$
Ethnicity					$\chi^2 = 19.89$
Marital Status					$\chi^2 = 40.55$
Married			-		$p < .001$
Widowed		-		+	
Separated	+	-			
Divorced		+		-	
Never Married		-		+	
Education					$\chi^2 = 21.62$
Depressive Disorder	+			-	$\chi^2 = 33.94$ $p < .001$
Anxiety Disorder					$\chi^2 = 12.51$
Alcohol Disorder	-	+	-	+	$\chi^2 = 80.07$ $p < .001$
Marijuana Disorder	+	-	+	-	$\chi^2 = 19.39$ $p < .001$
Opiate Disorder	+	-	+	-	$\chi^2 = 75.89$ $p < .001$

Variable	Pervasive Concerns Polysub. Use Disorder (n = 73)	Serious Concerns Alcohol Use Disorder (n = 87)	Moderate Concerns Drug Use Disorder (n = 51)	Minimal Concerns Alcohol Use Disorder (n = 62)	Statistic
Cocaine Disorder	+	-	+	-	$\chi^2 = 30.52$ $p < .001$
SUD Diagnosis					$\chi^2 = 168.38$
Alcohol Only	-	+	-	+	$p < .001$
Drug(s) Only	+	-	+	-	
Alcohol + Drug(s)	+	-		-	
Dual Diagnosis					$\chi^2 = 47.22$
SUD only	-			+	$p < .001$
SUD + Psychiatric	+			-	
SOCRATES-Alcohol	-	+	-	-	$\chi^2 = 56.16$
Total Motivation Score	+		-	+	$p < .001$
SOCRATES-Drug Total Motivation Score	+	-	+	-	$\chi^2 = 79.96$ $p < .001$
Total Drinking Days in	-	+		+	$\chi^2 = 37.18$
Past 90	+	+	-	+	$p < .001$
Average Weekly SEC	+	+	-		$\chi^2 = 16.42$
		+		-	$p < .001$
Peak BAC for	+	+	-		$F = 21.44$
Assessment Window		+		-	$p < .001$
Treatment Completion Status					$\chi^2 = 6.44$
Treatment Days					$F = 4.45$
Treatment Duration					$F = 3.01$

Note. Directions of significant effects are indicated using plus and minus signs. For χ^2 a plus sign in a column indicates that for that cluster, the observed frequency is significantly greater than what would be expected by chance alone, and vice versa for a minus sign. For ANOVA, lines should be interpreted

horizontally, one line at a time. A plus sign indicates that the mean value of that cluster is greater than the mean value(s) of the cluster(s) denoted by the minus sign.

Concurrent validation procedures provided evidence in support of a four-cluster solution, as results revealed that most of the observed relationships were in the anticipated direction. Substance use disorder diagnostic categories coincided with the primary substance(s) of use of each group. For example, the *serious concerns* and *minimal concerns alcohol use disorder* groups were more likely to meet diagnostic category for only an alcohol use disorder than their *moderate concerns drug use disorder* and *pervasive concerns polysubstance use disorder* counterparts. The opposite pattern was detected for marijuana, cocaine, and opiate use disorder diagnoses: the *pervasive concerns polysubstance use* and *moderate concerns drug use disorder* clusters were more likely to meet criteria for these drug-use disorders than the clusters that primarily used alcohol. Furthermore, the *pervasive concerns polysubstance use disorder* cluster was more likely to meet criteria for both an alcohol and at least one drug use disorder, while the *moderate concerns drug use disorder* cluster was more likely to meet criteria for only a drug use disorder.

Frequency of drinking also corresponded to primary substance(s) of use. The two *alcohol use disorder* clusters tended to drink on more days in the 90 days prior to treatment than the *polysubstance* and *drug use disorder* groups, and the *polysubstance use disorder* cluster drank on more days than the *drug use disorder* cluster. A slightly different pattern emerged for drinking severity indicators. The *serious concerns alcohol use disorder* cluster drank significantly more drinks on a weekly basis and had a higher peak BAC during the assessment window than their *minimal concerns alcohol use*

disorder and *moderate concerns drug use disorder* counterparts. The *pervasive concerns polysubstance use disorder* cluster exhibited a higher average weekly consumption rate and a higher peak BAC than the *moderate concerns drug use disorder* group.

Level of motivation to change alcohol use and drug use, as measured by a total score on the SOCRATES (i.e., higher scores reflect a higher level of motivation to change), coincided with group membership. The *serious concerns alcohol use disorder* displayed higher levels of motivation to change their alcohol use than all other groups, and the *moderate concerns drug use disorder* and *pervasive concerns polysubstance use disorder* groups endorsed higher levels of motivation to change their drug use than the *alcohol use disorder* clusters. As evidenced by their labels, the *pervasive polysubstance use disorder* cluster was more likely to be meet criteria for a comorbid psychiatric disorder, specifically a depressive disorder, while the *minimal concerns alcohol use disorder* cluster was less likely to meet criteria for a concurrent psychiatric disorder.

In addition to examining relationships with concurrent variables, the identified clusters were also compared to treatment variables including treatment completion status, number of treatment days, and treatment duration to explore the predictive validity of the identified cluster solution. No significant statistical findings emerged, though trends were detected in the anticipated direction based on the treatment retention literature suggesting that clients with alcohol use disorders tend to complete substance abuse treatment at higher rates than clients with drug use or polysubstance use disorders (De Leon et al., 1997; Joe et al., 1999; McKellar et al., 2006). The *moderate concerns drug use disorder* cluster was the only cluster wherein the majority of members did not complete treatment. The retention rate for this cluster was 45.1%, compared to 67.7% for *minimal concerns*

alcohol use disorder, 62.1% for *serious concerns alcohol use disorder*, and 57.5% for *pervasive concerns polysubstance use disorder*. The *moderate concerns drug use disorder* cluster also had the lowest mean number of treatment days (M = 12.94, SD = 5.05) and shortest average treatment duration (M = 23.98, SD = 11.50), while the *serious concerns alcohol use disorder* cluster had the highest mean number of treatment days (M = 15.75, SD = 4.39) and longest average treatment duration (M = 29.52, SD = 9.88). Again, these differences were not statistically significant, though appeared to trend in the expected direction based on the literature.

Taken together, the evidence for the validity of the identified four-cluster solution was mixed. Diagnostically speaking, the clusters corresponded well with primary substance(s) of use identified by the cluster title (i.e., *alcohol use disorder* clusters were more likely to meet criteria for only an alcohol use disorder as compared to the *polysubstance use disorder* and *drug use disorder* clusters). Some support was also detected for the degree of concern identified by the cluster title. For instance, the *pervasive concerns* cluster was more likely to meet criteria for a comorbid psychiatric condition, while the *minimal concerns* cluster was less likely to meet criteria for a comorbid psychiatric condition. Additionally, the *pervasive concerns* and *serious concerns* groups exhibited a higher degree of substance use severity as evidenced by greater average number of weekly drinks and peak BAC level, as compared to the *minimal concerns* and *moderate concerns* groups. Unfortunately, there was relatively poor evidence for the predictive validity of the identified cluster solution as the clusters did not produce statistically significant relationships with treatment status, number of treatment days, or total treatment duration; however, there were potentially important

trends detected that suggested that the *moderate concerns drug use disorder* group may not have fared as well as the other clusters. Moreover, the absence of statistically significant findings does not negate the descriptive value of delineating subgroups of this particular treatment-seeking population, which will be explored further in the discussion section.

Chapter V: Discussion

Overview

The purpose of this section is to evaluate the study findings. This chapter will begin with an overview of the research questions set forth. A summary of the basic characteristics of the sample and how they relate to treatment retention are then reviewed. Next, the cluster analysis results will be summarized. The implications of these findings will then be discussed along with identified study limitations and future research directions.

Research Questions

A primary purpose of this study was to describe the characteristics of a sample of clients entering an intensive outpatient chemical dependency treatment program at a nonprofit, freestanding mental health clinic and to examine how these variables differ between clients who complete treatment and clients who drop out prematurely. Additionally, in an effort to accurately depict this particular treatment program population, this investigation explored whether a classification system could be used to categorize individuals into meaningful groups based on important pretreatment characteristics and treatment variables. These areas of inquiry have both applied and empirical value.

Clinically speaking, it is critical for individual treatment programs to examine treatment outcomes; however, a treatment program must first learn more about who is participating in its program, who is completing its program, and who is prematurely dropping out to accurately portray information regarding its treatment outcomes. Upon

identifying client characteristics and determining which ones positively and negatively relate to retention, a treatment program is better prepared to design assessment procedures that allow clinicians to quickly and efficiently detect clients who may be at risk for dropout. Considering the well-established relationship between treatment retention and the achievement of positive treatment outcomes (Anton et al., 2006; Hubbard et al., 1997; Hubbard et al., 1989; Moyer & Finney, 2002; Project MATCH Research Group, 1998b; Simpson, 1993; Simpson & Sells, 1982; Weisner et al., 2003), such knowledge can inform the design of programmatic interventions to enhance retention, which can potentially improve treatment outcomes. Empirically speaking, this study will add to the existing literature describing the characteristics of clients who participate in intensive outpatient substance abuse treatment programs and provide additional evidence related to whether or not different subtypes of individuals with substance use disorders exist. Furthermore, study findings can clarify the extent to which current scientific research regarding client characteristics and their relationship to treatment retention applies to this particular program and the clientele it serves.

Generalizability

Due to the practical difficulties that interfered with the assessment team's ability to evaluate each new client in the treatment program, the consequent sample in this study (n =273) was only a portion of the target population (N = 444) that entered the treatment program during the data collection period. Basic demographic information and treatment characteristics were obtained for the individuals who were not included in the study (n = 171). Study participants and excluded individuals did not significantly differ on sociodemographic characteristics including gender and race, though study participants

were significantly older than those who were excluded from the study. This difference was fairly small though: 39.77 years (*SD* = 11.80) compared to 37.20 years (*SD* = 12.18). In examining treatment characteristics, it is apparent that the study sample had an overrepresentation of treatment completers. The overall treatment completion rate for the entire population was 49%, whereas a 59% treatment completion rate was detected within the study sample. Study participants also attended significantly more treatment groups on average than individuals who were not included in the study and stayed in treatment for a longer duration. Consequently, caution needs to be exercised when interpreting results because of the evident over-inclusion of individuals who are retained in treatment and more research needs to be conducted to confirm or refute its results. However, the preliminary and descriptive nature of this project upholds the relevancy of its results and implications, particularly as they apply to the treatment program itself.

Treatment dropout is a common obstacle in substance abuse treatment research and barriers to obtaining representative samples need to be considered in the initial stages of the research process. Early treatment dropout likely influenced participant accessibility in this study. Roffman et al. (1993) reported that 11% of clients dropped out of their outpatient treatment for marijuana dependence prior to completing their 5th treatment session. Since the average time elapsed between treatment admission and initial evaluation was 5 calendar (not treatment) days, it is likely that some of the nonparticipants dropped out of treatment prior to the assessment team even having a chance to complete the evaluation. This reality is a common challenge of carrying out research in an applied setting where resources including space, time, and data collection coverage may be limited at times. Thus, researchers and the treatment programs they are

collaborating with should be prepared to address such challenges throughout all phases of the research project and to make adjustments along the way to reduce protocol implementation barriers.

Treatment Characteristics

The 49% completion rate detected for the population from which this study sample was drawn falls within the range identified by other retention studies in (intensive) outpatient settings. At the high end of the range lies White and associates (1998) with 74% and Veach and colleagues (2000) with 72%. At the low end of the spectrum lies Dobkin et al. (2002), Green et al. (2002), and Mammo and Weinbaum (1991) with treatment completion rates equaling 47%. This degree of variability is likely influenced by a multitude of factors, including treatment program structure and expected length of stay. Consequently, these variables need to be taken into account when comparing and contrasting study results.

Generally speaking, the program in this study adheres to the Minnesota treatment model, which suggests that the typical outpatient treatment episode is 5 to 6 weeks of intensive therapy (i.e., groups sessions lasting 3 to 4 hours, 3 to 4 nights a week) followed by 10 or more weeks of aftercare sessions (i.e., 12-step meetings) (Owen, 2003). Of note, these guidelines coincide with the American Society of Addiction Medicine (ASAM) intensive outpatient treatment recommendations that advise any combination of group, individual, and family counseling at least 3 times per week that total a minimum of 9 hours of services (American Society of Addiction Medicine, 1996). Although decisions regarding treatment frequency and duration in this program are made based on factors including recommended level of care, treatment goals, scheduling availability, and

insurance benefits, providers indicated that an expected treatment episode would consist of attendance at 3 or 4, 3-hour group sessions and at least 1 individual session per week, for 4 to 5 weeks. Results of this study coincide: participants who completed treatment attended an average of 16 treatment groups and generally stayed in treatment for a total of 32 days.

Based on this information alone, it is not "fair" to compare this study's retention rates and average length of stay estimates to research undertaken in treatment programs that have notably longer (expected) lengths of stay: 10 to 11 weeks (Mertens & Weisner, 2000) and 115 days (Dobkin et al., 2002). Additionally, the 72% treatment retention rate detected by Veach and colleagues (2000) was greater than the 49% detected in this study; however, they examined participants in an intensive outpatient, Minnesota model-based program who received either 16 or 30 hours of treatment contact per week. These values vary substantially and are greater than the 10 to 13 hours typically received in this program, thus the applicability of the results are questionable. On the other hand, White and colleagues (1998) had a similar intensive outpatient program structure, with 10 to 13 contact hours per week, for 4 weeks. Though their average length of stay for treatment completers was equivalent to the length of stay detected in this study (32 days), their completion rate was 25% higher (74%) than the rate in this study. The treatment programs included in Green et al. (2002) generally adhered to ASAM's intensive outpatient treatment guidelines. Treatment involved four, two and one-half hour sessions per week, for five to six weeks. The overall retention rate was comparable (47%) to the rate in this study. This significant variation in retention rates among (intensive) outpatient programs that have similar program structure and philosophy provides further evidence

that research needs to be conducted at the individual treatment program level in order to adequately gauge treatment statistics like average length of stay, typical number of treatment days, and retention and what influences these variables.

From a larger perspective, the average treatment duration for completers in this study, as well as in the aforementioned (intensive) outpatient treatment studies, is considerably less than the 90-day threshold that has been implicated in the achievement of more positive treatment outcomes in previous large-scale drug treatment research (Hubbard et al., 1989; Simpson, 1981; Simpson, Brown et al., 1997; Simpson, Joe et al., 1997; Simpson & Sells, 1982). Recommended length of stay in these studies for outpatient treatment was 6 months and the median treatment stays was 3 months (Simpson, Joe et al., 1997). These values contrast those delineated by this study, and consequently call into question the applicability of these large-scale research findings as a 90-day treatment stay is well beyond what would be expected, and what is likely possible based on existing third-party reimbursement benefits, in this particular program. It is evident that past large-scale substance abuse treatment research efforts do not reflect how contemporary substance abuse treatment services are actually being delivered.

With regards to actual treatment stay, treatment completers in this study attended about 5 more treatment groups, and were in treatment for a total of 11 more days than treatment dropouts. Considering the wealth of research linking positive relationship between length of time spent in treatment and favorable outcomes (e.g., increased abstinent days, reduced negative substance use-related consequences, improved psychological social, and employment functioning) (Hubbard et al., 1997; Hubbard et al., 1989; McLellan, Luborsky, Woody, O'Brien, & Duley, 1983; Moos & Moos, 2003;

Simpson, 1981; Simpson & Sells, 1982), this particular treatment program should further examine if the extra 5 treatment groups and 11 days spent in treatment are statistically and/or clinically significant differences in treatment outcomes between completers and dropouts. Such research could guide the treatment program's focus and assist in determining if treatment completion is the defining factor in accomplishing more favorable outcomes or if there is a particular threshold of treatment days or total treatment duration wherein clients generally achieve more positive outcomes. Depending on the results, the treatment program could design their program to better align with the identified time frame. For example, if results indicate that positive treatment outcomes plateau at 5 weeks of treatment, the program could design a 5-week curriculum and aim to retain clients for at least that length of time.

Sample Characteristics

Considering that substance abuse treatment research is conducted in a range of treatment settings (i.e., publicly- vs. privately-funded funding; inpatient vs. outpatient; alcohol only vs. drug only vs. polysubstance), the populations from which samples are drawn are highly diverse. This variability affects generalizability and applicability of results, thus further examination of basic sociodemographic sample characteristics is necessary when conducting research at the program level. Nearly two-thirds of the sample in this study was male (62%) and the large majority was Caucasian (86%). Almost half of the sample (45%) was married. Mean age was 40 years. This sample was fairly educated, with about 92% completing high school and 60% of these individuals attending some college or earning an advanced degree. Overall, demographic characteristics of this sample are relatively consistent with other research in private,

managed care (intensive) outpatient substance abuse treatment programs that primarily treat insured or self-pay clients (Green et al., 2002; Mertens & Weisner, 2000; Satre et al., 2004; Veach et al., 2000; White et al., 1998). Aside from gender, these characteristics contrast those detected in research projects undertaken within publicly-funded substance abuse treatment agencies. Participants in these studies are generally younger, more racially diverse, less likely to be married, and less educated (Arfken et al., 2001; Klaus & Kindleberger, 2002; McCaul et al., 2001; Patkar et al., 2004). Such fundamental discrepancies in study sample characteristics challenges the applicability of results from publicly-funded treatment program research to private treatment agencies since the clientele vastly differs. For example, a single African American male in his early 30's who has not earned his high school diploma may have primary treatment goals related to maintaining his sobriety and earning his GED. These aims may be in stark contrast to the treatment goals to a married Caucasian male in his late 30's who has earned his bachelor's degree, who may be more focused on exploring how his substance use has impacted his marriage and improving his relationship with his wife. Consequently, individual treatment programs need to closely scrutinize study characteristics including sample demographics and type of treatment program in order to effectively determine if results are relevant.

In regards to substance use, the ASI substance use variables were fairly consistent with diagnostic indicators. In other words, the percentage of participants using a particular substance in the 30 days prior to the evaluation was similar to the percentage of participants that met *DSM-IV* diagnostic criteria for either abuse or dependence of that substance. Approximately 75% of the sample met criteria for an alcohol use disorder and

80% of the sample reported using alcohol in the past 30 days. Nearly 25% of the sample reported using cocaine in the past 30 days, while 22% met criteria for cocaine abuse or dependence. The percentage of those who used opiates in the previous 30 days and those who met criteria for an opiate use disorder was exactly the same (20%). In contrast, a slight discrepancy in this pattern emerged for marijuana: 31% of the sample reported use while only 15% met criteria for a marijuana abuse or dependence. As compared to Veach and colleagues (2000), this sample had comparable rates of cocaine and marijuana use disorders, but higher rates of alcohol and opiate use disorders. Similarly, this sample also had higher rates of alcohol use disorders and comparable rates of cocaine use disorders as Dobkin and associates (2002).

In the end, about half of the sample only met criteria for an alcohol use disorder, a quarter of the sample only met criteria for a drug use disorder, and the remaining quarter met criteria for both an alcohol use and drug use disorder(s). These rates were very consistent with Green et al. (2002): 51% of the sample met criteria for only an alcohol use disorder, 20% met criteria for only a drug use disorder, and 29% met criteria for both an alcohol use and drug use disorder(s). Satre et al. (2004) and Mertens and Weisner (2000) separated abuse and dependence diagnoses and found similar prevalence rates: just over 40% of their samples met criteria for alcohol dependence, just under 30% met criteria for drug dependence, just under 20% met criteria for both alcohol and drug dependence, and about 10% met criteria for substance abuse. On the whole, the treatment program in this study appears to be serving a range of clients who present with distinct types of substance use patterns (i.e., some alcohol only, some drug only, some both alcohol and drug). Prevalence rates of substance use disorders is relatively comparable to

other (intensive) outpatient treatment programs identified in the literature, thus these research findings should be of interest to this particular program.

The prevalence of comorbid psychiatric problems in this sample was high. Over half of the participants previously participated in psychiatric treatment (58%) and a majority (52%) met criteria for at least one substance use disorder and at least one Axis I psychiatric disorder at the time of the intake evaluation. More specifically, 43% of the sample met criteria for major depression and 29% met criteria for an anxiety disorder (e.g., PTSD, OCD, panic disorder, social phobia). These rates parallel the prevalence of depressive (39%) and anxiety (29%) symptoms in a large sample (N = 2784) of clients attending an outpatient program at a comprehensive addiction treatment center in Canada (Castel et al., 2006). Additionally, Charney and associates (2005) found that 63% of participants presenting to an addictions treatment unit at a university hospital-based treatment program in Canada presented with comorbid psychological symptoms including depression (15%), anxiety (16%), or combined depression and anxiety (32%). Considering the high level of psychiatric comorbidity detected in this study, the extent to which this treatment program is addressing the needs of dually-diagnosed clients is an important question to consider and will be further discussed in subsequent sections.

Treatment Retention

Despite the large number of diverse methodological investigations carried out across various treatment settings, no consistent “treatment dropout” profile has been detected in the literature, In fact, the generalizability of many of these research findings are often questioned at the local programmatic level because of the stark differences that exist between a particular treatment program and its clientele and those studied. Thus, a

series of analyses were carried out in this investigation in order to determine the applicability of previous research to the population from which this sample was drawn.

Consistent with previous research, age was positively related to treatment retention in this study (Green et al., 2002; McKellar et al., 2006; Maglione et al., 2000a; Maglione et al., 2000b; Mertens & Weisner, 2000; Roffman et al., 1993; Satre et al., 2004; Siqueland et al., 2002; Wickizer et al., 1994). Treatment completers (M = 42.32 years, SD = 11.00) were, on average, 6 years older than treatment dropouts (M = 36.10 years, SD = 11.98). Though the difference was relatively small (i.e., about one-half of a standard deviation), it was detected. Multiple theories have been proposed to explain this relationship. Stark (1992) hypothesized that younger adults exhibit greater impulsivity and lack self-discipline, which may impact the decision to drop out of substance abuse treatment prematurely. Alternatively, McKellar et al. (2006) propose that younger adults have shorter substance abuse/dependence histories, thus exhibit less chronicity and fewer adverse consequences. These realities in turn lead to a lower perceived need for treatment. Stark (1992) also purported that younger adults generally have fewer social ties to two potential sources to support their treatment efforts: their families and communities. This line of reasoning coincides with the finding that married participants in this study were more likely to complete treatment than their never married counterparts. Consideration of the observed variation in retention based on age in this program should be taken into account during the treatment planning and goal identification process. Younger treatment participants may respond more positively and stay in treatment longer if there is less emphasis on chronicity and severity of substance

use and more stress on building sober social support networks and decision-making skills.

A higher income was positively associated with treatment retention in the present investigation, with treatment completers earning an average of $2298 (*SD* = $3483) from employment in the past month as compared to $1517 (*SD* = $1856) earned by treatment dropouts. This difference may be an artifact of a small number of large earners in the treatment completion group. Thus, median monthly income estimates may be a better indicator of the strength of the relationship. Median income for treatment completers was $1500, while median income for treatment dropouts was $1000. Roffman et al. (1993) detected a similar positive relationship between income and retention in a sample of outpatients in a marijuana-dependent counseling program, while this trend only emerged for female participants in Green et al. (2002) and Mertens and Weisner (2000). A common explanation of this positive relationship between socioeconomic indicators and substance abuse treatment retention is that a higher income can reduce or offset some of the frequently encountered barriers to substance abuse treatment including access to treatment (i.e., insurance coverage) and cost of treatment (i.e., child care costs accrued during treatment sessions, insurance co-pays). However, since this relationship is not consistently detected in the literature, it may also be true that having a higher income may increase or intensify some barriers to treatment including lost wages while participating in treatment (Stark, 1992). Based on this study's finding that income was positively related to retention, it appears worthwhile for this treatment program to explore clients' financial status and to identify methods to defray treatment costs (i.e., co-pay payment plans, funding for child care) if financial barriers to treatment are detected.

Experiencing more severe comorbid psychiatric problems has regularly been linked to substance abuse treatment dropout, though gender has often been implicated in this relationship. For example, Siqueland et al. (2002) found that higher psychiatric severity kept men in substance abuse treatment longer, while Green et al. (2002) observed that it put men at risk for dropping out. More severe psychiatric problems and greater levels of psychiatric distress have been related to dropout in cocaine-dependent women (Siqueland et al., 2002), drug-dependent women (Haller et al., 2002), women in an HMO-based outpatient treatment program (Mertens & Weisner, 2000), and marijuana-dependent individuals (Roffman et al., 1993); however, Castel and colleagues (2006) reported that clients endorsing psychiatric symptoms of multiple clusters (e.g., depression, anxiety, mania, schizophrenia-like, eating, conduct disorder) attended more visits and had a lower attrition rate than clients endorsing fewer psychiatric symptoms across clusters. With regards to specific types of psychological problems, depression has been positively linked to treatment retention (Joe et al., 1999; Justus et al., 2006), positively linked to treatment dropout (Broome et al., 1999), and unrelated to whether or not clients remain in treatment (Booth et al., 1991; Curran et al., 2002). Anxiety has also been associated with treatment dropout (Broome et al., 1999). In this study, clients who had been previously treated for psychological problems (i.e., taken psychotropic medications, participated in psychotherapy) or met criteria for an anxiety disorder (e.g., PTSD, OCD, panic disorder, social anxiety disorder) were more likely to dropout out of treatment.

Potential explanations for the tenuous relationship between substance abuse treatment retention and psychiatric comorbidity vary. It may be that when clients are

experiencing more significant distress, their motivation to stay in substance abuse treatment is greater because the desire to reduce psychiatric and substance-related symptoms and improve their overall quality of life is at the forefront. Alternatively, if psychiatric problems are only mildly upsetting for a particular client, the impetus to continue participating in substance abuse treatment to explore and alleviate such symptoms may not be a top priority and the perceived need for treatment may be low (Castel et al., 2006; Curran et al., 2002). The actual symptoms of psychopathology (e.g., unstable and dysphoric mood, delusions, lack of social support, hostile affect, social anxiety, poor self-image, low frustration tolerance, lack of trust) can also directly interfere with therapeutic processes that facilitate treatment retention and positive treatment outcomes (Broome et al., 1999; Haller et al., 2002).

For this particular treatment program it appears that the types of psychological symptoms, as opposed to general psychological distress, are important markers. Participants who meet criteria for PTSD, OCD, panic disorder, or social anxiety disorder were more likely to drop out of treatment prematurely than individuals who did not endorse considerable anxiety. Of note, this pattern did not emerge for depression. Unfortunately, much of the literature regarding the integrated treatment of comorbid mood or anxiety disorders and substance use disorders – treating both disorders concomitantly – lumps these psychiatric disorders together, suggesting that treatment should incorporate pharmacotherapy, cognitive-behavioral techniques, relaxation training, stress management, and coping skills training in their treatment (Center for Substance Abuse Treatment, 2005; Petrakis, Gonzalez, Rosenheck, & Krystal, 2002). Yet, there are unique aspects of anxiety disorders and their treatment that these

recommended interventions do not address and substance abuse treatment providers have likely not received adequate training in (e.g., trauma, exposure therapy, response prevention). For example, substance abuse treatment providers can focus on helping clients with PTSD gain control of the self-destructive behaviors associated with trauma and develop alternative coping strategies, but detailed exploration of the trauma is generally not advised (Center for Substance Abuse Treatment, 2005).

A recent review of integrated treatment for substance use disorders and comorbid psychological problems provides support for the notion that there may be inherent differences between the integrated treatment of substance use disorders and mood disorders and substance use disorders and anxiety disorders (Hesse, 2009). A meta-analysis of five randomized studies providing manual-guided treatment for comorbid depressive symptoms and substance use disorders was carried out. Results indicated that integrated psychosocial treatment for depression and substance use disorders is a promising approach for clients with this comorbidity, as analyses generally favored integrated treatment over single-focus treatments for percent days abstinent at follow-up, depressive symptoms, and retention in treatment. However, the difference was only statistically significant for percent days abstinent at follow-up. A meta-analysis could not be carried out for integrated treatment for anxiety and substance use disorders because of the high degree of variability in the reporting of outcomes in the original articles; however, several studies reported that clients assigned to substance abuse treatment only fared better. The author concluded that integrated treatment for comorbid depression and substance use disorders is a promising approach, but does not have sufficient empirical support at this time. On the other hand, integrated treatment for comorbid anxiety and

substance use disorders is not empirically supported at present and there is a definite need for the development and evaluation of new treatment options for comorbid anxiety and substance use disorders. Ultimately, each substance abuse treatment program must determine, on an individual client basis, if it has the knowledge, training, and skills to provide adequate treatment for each client presenting with a substance use disorder(s) and comorbid psychological problem(s). If not, the client should be referred to a program that can provide effective integrated treatment (i.e., the Seeking Safety treatment model for PTSD and substance abuse) (Najavits, 2002) or to a specialty psychiatric treatment program, either before or after substance abuse treatment.

Another important diagnostic indicator that was related to treatment retention in this study was the type of substance use disorder(s) clients met criteria for. Clients who met criteria for alcohol abuse or dependence were more likely to complete treatment, while individuals who met criteria for an opiate use disorder or a cocaine use disorder were more likely to drop out of treatment. Such findings have frequently emerged in substance abuse treatment retention investigations across treatment settings (Alterman et al., 1996; De Leon et al., 1997; Joe et al., 1999; Paraherakis et al., 2000; Rowan-Szal et al., 2000). Generally speaking, more frequent drug use and a higher degree of drug dependence have also been linked to treatment dropout (Green et al., 2002; McKellar et al., 2006; Maglione et al., 2000a; Maglione et al., 2000b; Mertens & Weisner, 2000; White et al., 1998). Profile analysis results paralleled this trend and indicated that treatment dropouts reported, on average, more frequent use of alcohol, opiate, cocaine, and marijuana use in the 30 days prior to treatment. Treatment dropouts also experienced more negative consequences related to their substance use than their counterparts. In

particular, dropouts tended to report more problems related to fulfilling social responsibilities (e.g., missed days of work/school, money problems) than completers. Results of motivational analyses suggest that although treatment dropouts demonstrated a higher degree of problems recognition and were taking more steps to reduce their use, they were generally more ambivalent about making these behavioral changes and were unsure whether they needed treatment. This finding is consistent with Joe et al. (1998) who noted that treatment readiness, or degree of commitment to active change process through participation in a treatment program, was positively related to treatment retention. Thus, one would expect that the more ambivalent clients are about changing their behavior, the less committed they will be to participating in treatment. It should also be noted that clients who did not report drug use would likely demonstrate lower levels of motivation because they did not need to change their drug use behavior because they were already abstinent.

An array of conjectures have been put forth about what dynamics may be at play in the observed connections between substance(s) of use and substance abuse treatment retention. A common hypothesis suggests that since the majority of substance abuse treatment programs in the U.S. are rooted in the Minnesota model approach that was initially designed to treat alcohol dependency, the needs of treatment participants who are presenting with a drug use disorder(s) or both a drug and alcohol use disorder(s) may not be adequately met (Luke et al., 1996; Mammo & Weinbaum, 1991; Veach et al., 2000). More specifically, the Minnesota model of treatment maintains:

> Chemical addiction is a primary, chronic, and progressive disease. It is primary because it is an entity in itself and not caused by other factors, such as intrapsychic conflict. It is chronic because a client cannot return to “normal” drinking once an addiction is established. It is progressive because symptoms and

> consequences continue to occur with increasing severity as use continues. (Owens, 2003).

This view stems from the disease model of alcoholism, which views alcoholism as a medical ailment involving an abnormality of structure and/or function of the brain that results in behavioral impairment (Jellineck, 1960; Pattison, Sobell, & Sobell, 1977). However, etiological research purports that the development of substance use disorders is much more complex. Hesselbrock, Hesselbrock, and Epstein (1999) have augmented the family disease model with family systems theory (i.e., alcohol stabilizes family equilibrium and families strive to sustain alcohol problems despite negative consequences) and behavioral family theory (i.e., some familial behaviors are viewed as antecedents to and reinforcing consequences of alcohol use). Carroll (1999) applied learning theory to the development of alcohol use disorders and suggested acquisition, maintenance, and modification of drinking behavior is largely learned, while Sayette (1999) suggested the tension-reduction hypothesis, wherein certain groups of people under certain circumstances may be motivated to drink in times of stress in order to reduce stress. Cultural and sociological factors have also been explored in relation to alcohol use disorders (Wilsnack et al., 2000).

On the other hand, the etiological picture for drug addiction is less well-established. Ott, Tarter, and Ammerman (1999) identify a range of factors that may influence the transition from drug use to drug addiction: drug availability, route of administration, genetics, family history of drug use, family environment, stress, and life events. In particular, research has demonstrated that genetic and environmental contributions may vary by substance. In a sample of male twins, Kendler, Karkowski, Neale, and Prescott (2000) reported that cannabis and hallucinogen use was influenced by

both genetic and environmental factors; whereas, genetic factors predominated for cocaine, opiate, sedative, and stimulant use. Though additional research is needed in the etiology of substance use disorders, it is evident that there is a lack of consensus from substance to substance about the impact of biological, psychological, and sociological factors. Thus, if a substance abuse treatment program places too much emphasis on the disease model of addiction (i.e., addiction is an entity on to itself, inevitable progression of disease with continued use), at the expense of other aspects related to the development of the disorder (i.e., learned coping strategies, social network), certain clients may be at risk for dropping out prematurely because they do not identify with the treatment philosophy. For example, it is conceivable that a client in his mid-20's may be "turned off" by or less receptive to the Minnesota treatment model, particularly if he only meets criteria for substance abuse, because he may not agree that he is "destined" to be dependent and may attribute his problematic use to factors aside from a genetic predisposition (e.g., social support network that uses, availability of the substance, relaxing effects). Further research that incorporates a comparison group(s) is needed to examine this conjecture more precisely. In this study, all individuals participated in the same treatment program, so statements regarding the differential effectiveness of the Minnesota model with certain individuals (e.g., those who primarily use alcohol vs. those who primarily use drugs) remain speculatory.

From a psychosocial perspective, individuals who use drugs more frequently may be more impulsive, may engage in more illegal activities, and may be involved in a social network that thwarts treatment efforts (McKellar et al., 2006; Mertens & Weisner, 2000). Additionally, the particular legal ramifications related to drug use may interfere with

treatment participation and force clients to drop out more frequently than their alcohol-using counterparts. For instance, a cocaine-using client who relapses while in treatment may be arrested for cocaine possession and jailed, and consequently unable to attend treatment session. However, an alcohol-using client who relapses while in treatment, as long as s/he is not engaged in reckless behavior while under the influence, will likely not experience an equivalent legal barrier to treatment participation. In the end, based on the results of this study, it may be worthwhile for this treatment program to further examine these notions in clients with opiate and cocaine use disorders because they were more likely than their counterparts to drop out of treatment. Areas of exploration may included how well the client is identifying with the treatment model and connecting with its assumptions, to what extent the client is involved in illegal activities, and what influence has the client's social network had on his substance use.

A marked methodological drawback of this study was that the relationships between pretreatment characteristics and treatment retention were approached in a univariate manner: separate *t*-tests and chi-square analyses were run for each variable. Additional examination of the relationship amongst the variables (i.e., covariation) and completion of multivariate analyses would be valuable in describing the characteristics sample more comprehensively and identifying more precise correlates and predictors of treatment retention. For example, age, income, marital status, previous psychiatric treatment, meeting criteria for an opiate use disorder, meeting criteria for a cocaine use disorder, and meeting criteria for comorbid anxiety disorder were all related to treatment retention in this study. Entering these variables into a regression model could determine

the amount of variance each of these variables contributes to the observed variance in treatment retention.

Subgroups

The current study did examine how multiple pretreatment variables could be organized to form a coherent taxonomy of a substance abuse-treatment seeking sample. Not surprisingly, the sample demonstrated a high degree of heterogeneity across variables measuring age, patterns of substance use, comorbid psychiatric problems, social functioning, legal standing, health status, and negative consequences related to substance use. Even so, cluster analysis results were successful in devising a categorization scheme that produced four distinguishable subgroups that varied along two broad dimensions: primary substance(s) of use and degree of functional impairment. A comparable taxonomy was detected by Luke et al. (1996) in a sample of dually-diagnosed individuals using the ASI severity ratings wherein seven clusters were deduced according to level of functioning (e.g., good, moderate, poor) and pattern of substance use (e.g., alcohol, drug, alcohol and drug). Based on the identified grouping scheme in this study, over half of the current sample endorsed problems primarily related to alcohol (55%), about a fifth of the sample reported problems primarily related to drugs (19%), and just over a quarter of the sample demonstrated considerable problems with both alcohol and drugs (27%). This breakdown roughly corresponded to the overall diagnostic classification of the sample based on the M.I.N.I.: 49% of the sample met criteria for only an alcohol use disorder, 23% met criteria for only a drug use disorder(s), and 26% met criteria for both an alcohol and a drug use disorder(s).

Degree of functional impairment amongst the subgroups in this study ranged from severe to minor. As the title implies, the *pervasive concerns polysubstance use disorder* cluster demonstrated high levels of comorbid problems as evidenced by the highest average medical, employment, family/social, and psychiatric ASI composite scores paired with considerable alcohol and drug composite score elevations. The *serious concerns alcohol use disorder* group demonstrated the highest average alcohol and legal composite scores, along with the second highest employment and psychiatric composite scores. The *moderate concerns drug use disorder* individuals fell below the average composite score means for the entire sample in all domains except drug problems, where they had the greatest degree of problems compared to their counterparts. The *minimal concerns alcohol use disorder* cluster had the lowest average drug, employment, legal, family/social, and psychiatric composite scores paired with the second highest alcohol and medical composite scores.

Scores across the physical, interpersonal, intrapersonal, impulse control, and social responsibility InDUC subscales aligned with the degree of functional impairment of each group. The *pervasive concerns* group endorsed the greatest number of negative consequences in all realms, the *serious concerns* group ranked second, the *moderate concerns* cluster ranked third, and the *minimal concerns* group endorsed the least number of negative consequences. Interestingly, no specific type(s) of substance-use related consequence(s) was associated with a particular cluster. For instance, the scientific literature suggests that individuals who use drugs more frequently may be more impulsive, may engage in more illegal activities, and may be involved in a social network that thwarts treatment efforts (McKellar et al., 2006; Mertens & Weisner, 2000). From

this perspective, it would be reasonable to suspect that the *moderate concerns drug use disorder* cluster would report experiencing more consequences contained on the impulse control InDUC subscale (e.g., I have been arrested for driving under the influence of alcohol or drugs, I have taken foolish risks when I have been drinking or using drugs, I have gotten into a physical fight while drinking or using drugs). However, this supposition was not supported in this study. Instead, number of consequences across domains corresponded with degree of functional impairment implied from the cluster label. As a result, the treatment planning process may look different for the various clusters. Individuals in the *minimal* and *moderate concerns* groups may able to identify a few specific problematic areas to concentrate on (e.g., interpersonal conflicts, social responsibilities such as employment difficulties), while members of the *serious* and *pervasive concerns* groups may have to prioritize and select a manageable number of domains to focus on in treatment because it is unrealistic for all identified problem areas to be adequately addressed in a single, three- to four-week treatment episode in this program.

In addition to the principle distinguishing factors of primary substance(s) of use and degree of functional impairment, the clusters could also be differentiated by age. The *moderate concerns drug use disorder* cluster was an average of 10 years younger than both of the *alcohol use disorder* clusters: 33-years-old compared to 43-years-old and 44-years-old. The *pervasive concerns polysubstance use disorder* cluster fell in the middle and were on average, 37-years-old. As previously noted, younger adults tend to have shorter substance abuse/dependence histories and exhibit less chronicity and fewer adverse consequences, which may in turn lead to a lower perceived need for treatment

and higher treatment dropout rates (McKellar et al., 2006; Stark, 1992). In line with this view, the youngest group, *moderate concerns drug use disorder*, exhibited fewer substance-related consequences on the InDUC and less severe comorbid problems on the ASI than their older *pervasive concerns polysubstance use disorder* and *serious concerns alcohol use disorder* counterparts. However, in contrast to this view, the youngest cluster endorsed more consequences and demonstrated higher comorbid legal, family/social, and psychiatric problems than the older *minimal concerns alcohol use disorder* group. The *pervasive concerns polysubstance use disorder* group also exhibited the highest degree of negative consequences and comorbid problems and was about seven years younger than the two *alcohol use disorder* groups that were less functionally impaired. Accordingly, the complex interaction of age with primary substance(s) of use and degree of functional impairment needs to be further explored to reveal how these factors relate to and impact one another, as well as how they relate to and impact other variables of interest to substance abuse treatment researchers (e.g., treatment retention).

Concurrent and predictive validation procedures suggest that the four-cluster solution was a suitable way to identify subgroups of this sample. Substance use disorder diagnostic categories coincided with the primary substances of use of each group (i.e., *serious concerns* and *minimal concerns alcohol use disorder* groups were more likely to meet diagnostic category for only an alcohol use disorder than their *moderate concerns drug use disorder*, and *pervasive concerns polysubstance use disorder* counterparts, while the *drug use disorder* group was more likely to meet criteria for only a drug use disorder than both *alcohol use disorder* groups). With regards to substance use patterns, both *alcohol use disorder* clusters exhibited a higher degree of alcohol use on the

drinking indicators (e.g., days of use, average number of weekly drinks, peak BAC) than the *drug use disorder* group. Level of motivation to change alcohol use and drug use also coincided with group membership. For example, the *serious concerns alcohol use disorder* displayed higher levels of motivation to change their alcohol use than all other groups, and the *moderate concerns drug use disorder* and *pervasive concerns polysubstance use disorder* groups endorsed higher levels of motivation to change their drug use than the *alcohol use disorder* clusters. Some support was detected for the degree of concern identified by each cluster title as well (i.e., the *pervasive concerns* cluster was more likely to meet criteria for a comorbid psychiatric condition, while the *minimal concerns* cluster was less likely to meet criteria for a comorbid psychiatric condition).

With regards to treatment outcomes including treatment completion status, number of treatment days, and total treatment duration, no significant statistical findings emerged between the clusters. However, trends were detected in the anticipated direction based on the treatment retention literature suggesting that clients with alcohol use disorders tend to complete substance abuse treatment at higher rates than clients with drug use or polysubstance use disorders (De Leon et al., 1997; Joe et al., 1999; McKellar et al., 2006). The *moderate concerns drug use disorder* cluster was the only cluster wherein the majority of members did not complete treatment. The retention rate for this cluster was 45.1%, compared to 67.7% for *minimal concerns alcohol use disorder*, 62.1% for *serious concerns alcohol use disorder*, and 57.5% for *pervasive concerns polysubstance use disorder*. The *moderate concerns drug use disorder* cluster also had the lowest mean number of treatment days (M = 12.94, SD = 5.05) and shortest average treatment duration (M = 23.98, SD = 11.50), while the *serious concerns alcohol use*

disorder cluster had the highest mean number of treatment days (M = 15.75, SD = 4.39) and longest average treatment duration (M = 29.52, SD = 9.88). Again, these differences were not statistically significant, though appeared to trend in the expected direction based on the literature and may be of clinical value to the treatment program.

The varying rates of treatment completion deserve further discussion. The clusters that primarily used alcohol demonstrated the highest treatment retention, while the clusters that primarily used drugs or both alcohol and drugs fell below these rates. This particular treatment program's incorporation of the disease model of addiction and 12-step principles, which evolved from alcohol addiction research, may better fit the treatment needs of those abusing alcohol as opposed to other substances. As previously noted, there is a lack of consensus regarding the biological, psychological, and sociological factors associated with the development of drug use disorders and these dynamics may vary from substance to substance (Kendler et al., 2000; Ott, Tarter, & Ammerman, 1999). Thus, a treatment program emphasizing the disease model may inadvertently overlook factors related to the etiology of drug addiction that drug-using clients consider more important for their recovery (e.g., ineffective coping skills, life events). Additionally, treatment programs need to consider that individuals who use drugs more frequently tend to be younger and may be more impulsive, may engage in more illegal activities, and may be involved in a social network that thwarts treatment efforts (McKellar et al., 2006; Mertens & Weisner, 2000). Accordingly, interventions aimed at helping clients reduce impulsivity (i.e., CBT focusing on the interconnection amongst events, thoughts, emotions, and behaviors) and establish sober social networks (i.e., 12-step meetings) may be beneficial.

The validity of the current cluster analysis results can also be examined comparing the identified classification system with other typologies outlined in the scientific literature. Unfortunately, many of the common variables utilized in past typology research with individuals with substance use disorders (e.g., family history, age of onset, substance use pattern over time, personality characteristics) were not assessed in the current study; however, other comparisons can be made to substantiate and refute previously outlined taxonomies. The *Type A – Type B* distinction has been explored in a sample of alcohol-dependent individuals (Babor, Hofmann et al., 1992), a diverse sample of cocaine users (Ball et al., 1997), and a sample of drug addicts (Garcia et al., 2006). In general, the *Type A/chronic* cluster is characterized by fewer childhood risk factors, later age of onset, less severe dependence, fewer substance use-related consequences, fewer comorbid psychiatric problems, and lower levels of distress in the areas of work and family. In contrast, the *Type B/functional* cluster has more familial risk factors, an earlier age of onset, greater severity of dependence, increased levels of polysubstance use, more serious functional impairment, a greater level of comorbid psychiatric dysfunction, and more life stress.

In this study, the *serious concerns alcohol use disorder* groups seems to fall under the *Type B/chronic* umbrella due to the high level of comorbid concerns and negative consequences across functional areas, paired with severe alcohol problems as evidenced by the highest ASI alcohol composite score and high Form 90 alcohol use indicators (e.g., number of drinking days, average weekly drinks, and peak BAC). The *minimal concerns alcohol use disorder* cluster coincides with the *Type A/functional* taxonomy as these individuals exhibited less severe alcohol problems, a low degree of comorbid

problems, and fewer negative substance-use related consequences. Unfortunately, the remaining clusters do not fit "neatly" into either of these categories. Although the *moderate concerns drug use disorder* demonstrated the most severe drug use, they reported relatively low levels of comorbid concerns as compared to their counterparts. Alternatively, the *pervasive concerns polysubstance use disorder* cluster reported a high level of comorbid problems, but had lower alcohol severity than both *alcohol use disorder* groups and a lower drug severity than the *drug use disorder* cluster. Evidently, the dichotomous nature of the *Type A – Type B* conceptualization does not adequately capture the heterogeneity of this particular sample and their presenting problems.

Expanded taxonomies of substance users also have shortcomings when compared to four-cluster solution delineated in this study. Del Boca and Hesselbrock (1996) identified groups based on severity and risk: *low risk–low severity* (few problems at low levels), *internalizing* (moderate risk, high depression and anxiety), *externalizing* (moderate risk, high antisocial behavior), and *high risk–high severity* (multiple problems at high levels). The *pervasive concerns polysubstance use disorder* and *minimal concerns alcohol use disorder* clusters appear to fall at the opposite ends of this risk-severity spectrum, while there is not enough information known about the *internalizing* and *externalizing* markers in this sample in order to determine if the remaining two clusters could align with either of these groups. The *serious concerns alcohol use disorder* cluster does exhibit the highest legal composite score, and a greater degree of negative consequences related to their substance use than the *moderate concerns drug use disorder* counterparts, which may indicate more antisocial behavior and provide support for categorizing them as the *externalizing* cluster. However, neither of these groups is more

likely to meet criteria for a depressive disorder or an anxiety disorder based on the M.I.N.I., suggesting an absence of an *internalizing* group.

Windle and Scheidt (2004) investigated a group of inpatients from five alcohol treatment centers in both rural and urban areas and purported four subgroups in their sample. The *mild course* subtype was characterized by low rates of familial history of alcoholism; few childhood conduct problems; a later age of onset; fewer years of drinking; and lower levels of consumption and impairment. High levels of polydrug use and benzodiazepine use demarcated the *polydrug* subgroup, while the *negative affect* subgroup was distinguished by symptoms of depression and anxiety and high characterological vulnerability to a substance use disorder. The *chronic/antisocial* typology was distinguished by high levels of alcohol consumption and impairment, a longer duration of drinking, and high levels of adult antisocial behaviors. The *mild course* subtype parallels the *minimal concerns alcohol use disorder* group in this study because of the low levels of consumption and impairment, while the *serious concerns alcohol use disorder* group resembles the *chronic/antisocial* group because of its high levels of consumption and impairment. However, this taxonomy diverges from the current typology because there are two identified groups with considerable drug problems in the current study and a lack of a distinguishable group that is primarily characterized by comorbid depression and anxiety to correspond with the *polydrug* and *negative affect* subtypes.

Taken together, there appears to be nuances within and across samples of substance users that demand programmatic-level inquiry to determine the distinguishing characteristics. General trends detected in taxonomy research and in this study suggest

that type and severity of substance use, and degree of impairment in other domains of functioning often delineate subgroups of substance users (Babor, Hofmann et al., 1992; Ball et al., 1997; Del Boca & Hesselbrock, 1996; Garcia et al., 2006; Luke et al., 1996; Windle & Scheidt, 2004). More specifically, clusters of individuals positioned at the ends of the substance use and functioning spectrums comprise two respective groups (e.g., low severity/adequate functioning and high severity/poor functioning), although great heterogeneity certainly exists. Further examination of the critical differences amongst substance abuse treatment subgroups can enhance a treatment program's abilities to meet the distinctive needs of its consumers.

Implications and Future Directions

Theory Building

From the wealth of scientific literature reviewed here, and the results of the current study, it is evident that the substance abusing population is a heterogeneous group. Previous taxonomic research in the substance use disorder field has not produced clear-cut, easily identifiable coherent classification systems for individuals who meet criteria for substance abuse and dependence; however, it has shed light on commonalities of particular subgroups and how such factors relate to pertinent treatment factors such as treatment retention. Moreover, according to Peters (1997):

> Devising optimal treatment and prevention for a disease or disorder is facilitated by knowing the causal process(es) involved. Because a specific causal process often leads to a specific constellation of symptoms in subjects exposed to or involved in that specific causal process, researchers – in their search for causes – often try first to identify the different types of subjects, each type characterized by a unique symptomatology. (p. 1649)

According to this line of thinking, typology research with individuals with substance use disorders can be viewed as a starting point for generating theoretical hypotheses regarding the development, expression, and course of various substance use disorders.

In this particular sample, the categorization scheme appeared to sort participants into groups based on two broad dimensions: substance(s) of use and degree of functional impairment. Consequently, further empirical research examining what factors influence one's decision(s) to use certain substances and not others may help better understand the observed differences in treatment retention and treatment outcomes between assorted persons with substance use disorders and may also aid prevention efforts. For example, if a study with in a particular treatment program linked impulsivity to both cocaine use and treatment dropout, it could employ treatment interventions with these clients targeting this behavior (i.e., anger management training). A more in-depth analysis of what dynamics influence general and specific functioning may elucidate how and why individuals with substance use disorders differ in their abilities to cope with life events/stressors and what role substance use plays in these coping processes. Ultimately, typology research has the potential to generate numerous theoretical hypotheses and subsequent empirical investigations that could both expand and refine etiological considerations in substance use disorders. However, researchers need to keep in mind that "it is conceivable that a more parsimonious model would be useful for some purposes (e.g., patient placement), whereas a more complex model would be better for other purposes (e.g., theory building)" (Ball et al., 1995, p.123).

Assessment

An obvious shortcoming of typology research and theory in populations with substance use disorders has been its relative failure to influence assessment procedures and differential diagnosis quandaries (Babor, Dolinsky, et al., 1992). At the individual program level in particular, this type of information could be extremely useful as programs design and revise their evaluation processes. From the outset of this study, an underlying objective was to construct a valuable research protocol that could be effectively implemented and would produce clinically-useful data. However, various treatment programs employ a variety of assessment methods because the objectives of their respective evaluations differ. For example, certain programs may utilize more diagnostic tools because a client's diagnosis or multiple diagnoses are the main factor that drives treatment decisions, at least at the outset. Alternatively, a treatment program that uses more motivationally-based interventions will likely incorporate more measures examining the client's perceptions of their substance use and their motivation(s) to change. Selecting tools that have both empirical and clinical value is the key. In this study, the M.I.N.I. was a tool that demonstrated both scientific and applied utility: anxiety disorder, opiate use disorder, and cocaine use disorder diagnoses were negatively related to treatment completion and these diagnoses were useful in the treatment planning process to ensure that comorbid psychiatric conditions were being addressed. By adopting an assessment approach that integrates both science and practice, treatment programs can remain scientifically-guided when making programmatic decisions. For example, when considering whether or not to incorporate auxiliary legal counseling, a program can look at its data in this area (i.e., what percentage of clients have legal

problems, what types of legal problems do clients commonly enter treatment with, how do legal problems relate to treatment completion) to inform its decision.

A secondary upshot of this study was that the research team scrutinized how to create, implement, and evaluate a particular assessment protocol for an intensive outpatient substance abuse program at a nonprofit, freestanding mental health hospital. Most of the assessment instruments or components of the instrument proved useful in differentiating between clients who completed treatment and those that dropped out prematurely. The ASI also demonstrated utility in classifying subgroups of clients that exhibited commonalities. Although only one subscale emerged as significantly related to retention on the InDUC, this measure may still be a clinically important tool to utilize to encourage clients to reflect on how substance use has impacted lives. Anecdotally, clients tended to report that the review of these consequences was useful as they did not realize how pervasive their substance use-related problems were. Furthermore, although scores on the SOCRATES-A were not able to differentiate between completers and dropouts, gauging the extent a client recognizes they have a problems with alcohol, what steps s/he is taking to change this behavior, and the degree of ambivalence that exists in relation to making such changes also has value for a clinician who is attempting to facilitate treatment engagement and participation.

In this particular treatment program, there appear to be several “red flags” that indicate a client may be at risk for premature treatment dropout. From a demographic standpoint, clinicians should be aware that younger clients and clients who are not married tend to drop out of this program more frequently than their older, married counterparts. Diagnostically speaking, clients who meet criteria for an anxiety disorder,

opiate use disorder, or cocaine use disorder are also more likely to drop out of treatment than other clients. Armed with this information, clinicians in this program may be better able to detect and attend to the unique treatment needs of these particular clients by consistently checking directly with these clients to see if their needs are being met, openly discussing what unmet needs remain, and brainstorming about how to address the unmet needs.

In order to keep the substance abuse treatment field moving forward and tackling the complex nature of treatment retention, future research needs to move beyond focusing solely on the client and examine interaction between client attributes (e.g., demographic characteristics, substances of use, level of functioning), treatment processes (e.g., therapeutic alliance, satisfaction with treatment), and the philosophy of the treatment program and the services it has to offer (Luke et al., 1996; Mertens & Weisner, 2000; Stark, 1992). Assessment also needs to take place throughout the treatment process because the decision to stay in treatment or to drop out is not a one-time occurrence; rather, it is an ongoing choice that clients make. In addition to actual treatment interventions, the dynamics of the treatment process including a positive therapeutic alliance and client satisfaction with services have been linked to enhanced treatment retention (Meier et al., 2005; Simpson, Brown et al., 1997; Simpson & Joe, 2004; Simpson, Joe, Rowan-Szal, & Greener, 1997). More qualitative inquiries may be of particular utility in developing a better understanding of these processes and their relationship to substance abuse treatment dropout.

More specifically, prospective studies that follow clients through treatment and obtain information including personal characteristics, treatment process factors, and

treatment services that impact the client's decision to stay in treatment or to drop out would be beneficial. In an exploratory study of adolescent substance abuse treatment, White, Godley, and Passetti (2004) utilized in-depth interviews with 12 adolescents and 4 parents to examine expectations of treatment compared to actual treatment, reactions to different types of treatment sessions, definitions of treatment success, and aspects of treatment were regarded as the most and least helpful. The authors noted that in a field where a premium is put on treatment engagement and retention, taking the consumer's treatment experience into consideration when designing and enhancing treatment programming and increasing consumer input in treatment planning can only improve treatment retention and in turn, treatment outcomes.

Treatment

Within the behavioral health field as a whole, and in the substance abuse treatment field in particular, there has been increasing pressure to move beyond the mere description and identification of factors that are associated with treatment retention and/or positive treatment outcomes. The focus is slowly shifting to designing, implementing, and evaluating individually-tailored treatment interventions that correspond to the distinct, yet shared, needs of various subgroups of clients (Castel et al., 2006; Mertens & Weisner, 2000; Rapkin & Dumont, 2000; Veach et al., 2000). Although positive substance abuse treatment outcomes have been detected across a multitude of modalities and programs, and it appears that the actual treatment interventions employed may not have as much impact as previously thought (Hubbard et al., 1997; Joe et al., 1999; Miller, 1992; Miller et al., 2001; Project MATCH Research Group, 1998b); however, "matching treatment settings, interventions, and services to each individual's

particular problems and needs is critical to his or her success in returning to productive functioning in the family, workplace, and society" (NIDA, 1999, p. 3). The components of comprehensive drug abuse treatment are outlined in Figure 5 and encompass core services (e.g., intake assessment, treatment planning, behavioral therapy) and wraparound services (e.g., legal services, child care services, vocational services).

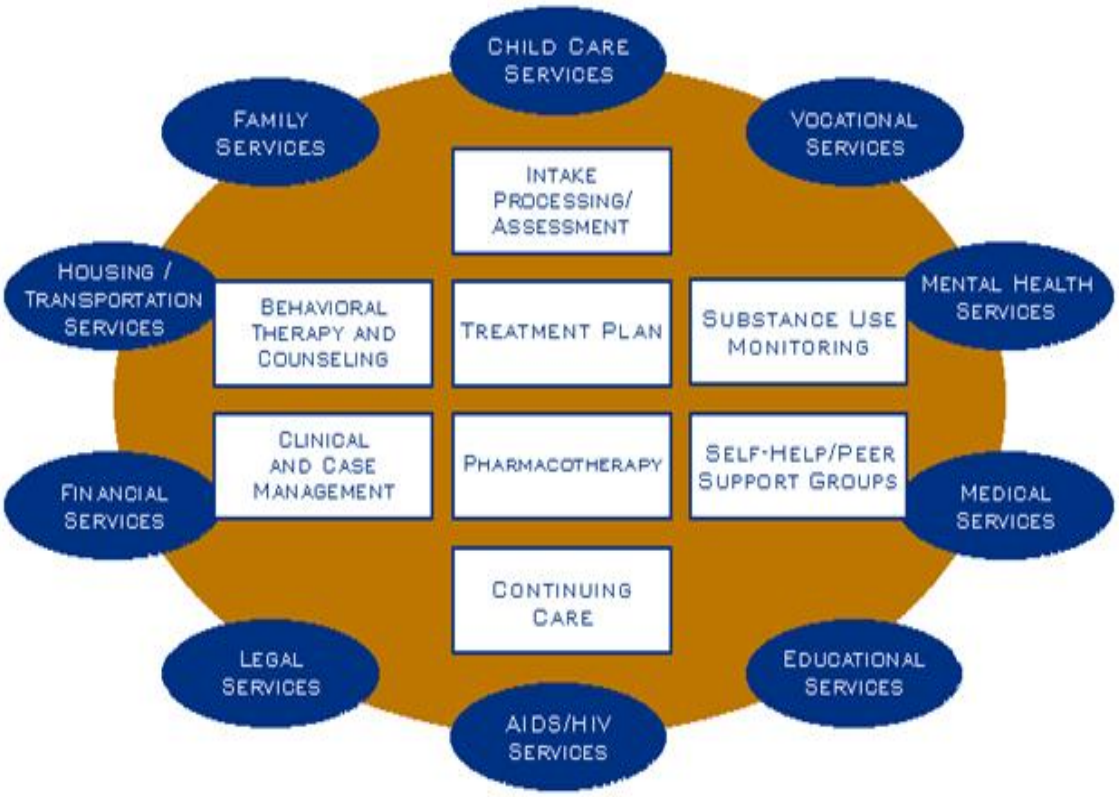

Figure 5. Components of comprehensive drug abuse treatment. From *Principles of Drug Abuse Treatment: A Research-Based Guide* (2nd ed.) by the National Institute of Drug Abuse, 2004, p. 8.

Research at the individual program level should guide the program's decisions regarding resource allocation to the delineated core treatment services and wraparound

services. For example, this study detected a high rate (52%) of psychological comorbidity, thus efforts should be made to integrate mental health treatment into the substance abuse treatment program and to establish relationships with specialized mental health service providers in the event a referral is necessary. On the other hand, this sample was particularly educated, with only about 8% not earning a high school diploma. Consequently, apportioning a great deal of resources to secure educational services for clients in this program would likely be an ineffective use of provider time and program money.

The general manner in which treatment services are matched to client needs in this particular program could be anchored in the subgroup classification scheme detected by this study: *pervasive concerns polysubstance use disorder, severe concerns alcohol use disorder, moderate concerns drug use disorder,* and *minimal concerns alcohol use disorder*. For example, the *pervasive concerns polysubstance use disorder* cluster had considerable elevations on alcohol and drug ASI composite scores, along with multiple comorbid issues: highest medical, employment, family/social, and psychiatric composite scores. Thus, providers could anticipate that these individuals would require a great deal of case management interventions to link them to employment/vocational resources, medical services, legal aid, and mental health treatment. On the other hand, individuals falling into the *minimal concerns alcohol use disorder* group would likely need minimal adjunct services and providers might focus primarily on the core aspects of substance abuse treatment: behavior therapy, substance use monitoring, participating in self-help groups, and arranging for aftercare. The *moderate concerns drug use disorder* reported

extensive family/social relationship problems, thus a key treatment component for this group would likely be involving a significant other(s) in treatment.

Luke et al. (1996) outlined a potential treatment matching heuristic based on their cluster analysis results that would align well with the results detected in this study. See Table 10. Interventions are organized along two broad dimensions: level of functioning and types of substance use. Applied to the clients in this program, the *serious concerns alcohol use disorder* group might respond well to a moderate-length outpatient treatment stay and involvement in Alcoholics Anonymous. Due to relatively high employment and legal concerns, these clients might also benefit from an approach that links the client to specific community resources such as Wisconsin's Department of Vocational Rehabilitation and Legal Action of Wisconsin, an agency that provides legal representation to low-income persons. Alternatively, the *minimal concerns alcohol use disorder* group may get their needs met with a shorter outpatient treatment episode focused on more proactive measures to avert significant functional decline such as relapse prevention and aftercare, while providers may seriously consider a referral to residential treatment for the *pervasive concerns polysubstance use disorder* group due to the high degree of concurrent medical, employment, family/social, and psychiatric distress.

Table 10.

Treatment Matching Heuristic for Substance Use Treatment Clients

General Domain	Specific Category	Characteristics of Treatment Module
Level and breadth of functioning	Relatively high functioning across all domains	• Short-term • Links to community support • Prevention-oriented
	Low functioning in specific domains	• Moderate length • Targeted to specific problem areas • Specific community links
	Low functioning in multiple domains	• Long-term • Broad-based focus • Most appropriate for residential care
Type of substance use problem	Minimal substance use problems	• Assess for potential substance abuse • Prevention
	Only alcohol use problems	• Alcoholics Anonymous or other substance-specific support group
	Only drug use problems	• Narcotics Anonymous or other substance-specific support group
	Polysubstance use problems	• Link to multiple or general substance abuse support group • Integrative substance abuse treatment

Note. Adapted from "Exploring the Diversity of Dual Diagnosis: Utility of Cluster Analysis for Program Planning," by D. A. Castel et al., 1996, Journal of Mental Health Administration, 23, p. 312.

Such frameworks seem plausible and make theoretical "sense," but without subjecting them to scientific scrutiny, they will merely remain conjecture. Designing and carrying out effectiveness investigations based on treatment matching heuristics like the one outlined above would assist individual treatment programs in their quest to design service delivery programs that are scientifically-driven and empirically-validated. Such

research would likely improve the provision of substance abuse treatment, which would in turn enhance treatment retention, which would consequently help clients achieve more positive treatment outcomes, the ultimate goal of substance abuse treatment research.

Additional areas of inquiry to consider based on this particular study sample is the level of psychiatric comorbidity detected. A further examination of whether or not clients are receiving adequate treatment of concurrent psychiatric conditions will be important to assess how well this particular program is meeting the needs of its dually-diagnosed clientele and whether or not such symptoms are impacting participation in substance abuse treatment. Specialized, integrated treatment could also be considered for this subgroup; however, further well-controlled research is needed to identify exactly which interventions, both psychotherapeutic and pharmacological, are safe and effective (Petrakis et al., 2002). Though previous substance abuse treatment research has explored treatment retention and found that correlates may differ by gender, this factor did not receive much attention in this particular study (Siqueland et al; Green et al.; Mertens & Weisner, 2000). Additional inquiry may consider differences in the development and identification of substance use disorders between the sexes, and explore how these dynamics influence various aspects of substance abuse treatment: treatment-seeking behaviors; access and barriers; initiation, engagement, retention, and treatment outcomes (Green, 2006). Quality and availability of social support as also been implicated in substance abuse treatment processes (Broome et al., 2002; Dobkin et al., 2002), though was not thoroughly examined here. Future research in this program may want to explore the role of social support and social networks within the context of treatment in order to

incorporate ancillary services that may enhance treatment retention and treatment outcomes.

Mammo and Weinbaum (1993) note that "systems that by virtue of their design inadvertently neglect particular groups should be corrected to reflect appropriate and effective treatment plans for a mix of clients" (p. 101). The dynamic nature of substance abuse and dependence and the continuous transformation of substance abuse treatment clientele (i.e., prevalence in certain demographic groups, substance(s) of choice, routes of administration) call for an ongoing reassessment of treatment participants, treatment programs, and treatment systems.

Limitations of Present Study

Important limitations should be considered in interpreting the findings of this study. Firstly, various protocol implementation difficulties interfered with the data collection process. The timing of new client notification, space constraints, and inconsistent client attendance at treatment groups affected the assessment team's ability to evaluate each new client in the treatment program. In particular, treatment participants who dropped out of treatment after only a few treatment sessions or had inconsistent attendance at the outset of treatment posed problems for the assessment team because the client may not have been available for testing during the window of accessibility. Consequently, the study sample contained an overrepresentation of treatment completers. Study participants were more likely to complete treatment, participated in significantly more treatment groups, and stayed in treatment for a longer period of time than nonparticipants. The study's retention rate (59%) was also greater than the retention rate detected in the population from which it was drawn (49%). Generally speaking, future

investigations with substance abuse treatment outpatients should carefully contemplate the logistics of carrying out the investigation, anticipate potential problems, and work with the treatment program staff to devise reasonable solutions. More specifically, since this study was an initial cooperative attempt to create and execute a comprehensive assessment protocol, additional research within this program can improve upon the foundation outlined here by addressing the identified logistical concerns.

Although the primary aims of this study were to describe the treatment characteristics of the current sample and identify differences between those who completed treatment and those who dropped out, this dichotomy was likely too narrow of a categorization to adequately encapsulate treatment status. An alternative classification scheme could consist of the following: completion (i.e., client accomplishes the initially agreed upon treatment plan or revised treatment plan), dropout (i.e., client leaves treatment against staff advice or client contact is lost), therapeutic discharge (i.e., treatment is discontinued for reasons such as nonadherence with program rules), and other (i.e., medical or psychiatric hospitalization) (Mammo & Weinbaum, 1993). Of note, the current study did attempt to expand the dichotomous treatment status, to an extent, by reporting the incidence of clients who returned to the same treatment program for a subsequent treatment episode. Of the treatment dropouts, 25% returned for a subsequent treatment episode (i.e., treatment stopout), while about 19% of treatment completers also returned for additional treatment at a later date (i.e., treatment repeater). However, no additional statistical analyses were carried out to determine the distinguishing characteristics of these subgroups to better describe this sample of substance abuse treatment participants and ascertain potential elements that impact reengagement in this

treatment program. Furthermore, the treatment dropout group in this study included both clients who were expelled from the program due to violation of treatment rules and clients who stopped attending treatment. As Rabinowitz and Sergio (1998) highlight, there are likely fundamental differences between these subgroups of dropouts that should be examined to enhance understanding of the substance abuse treatment dropout phenomenon.

One variable that was not examined in this study that has been linked to treatment retention and treatment outcomes, and has become a driving force in contemporary substance abuse treatment, is third-party reimbursement. The power of managed care entities to control the type and quantity of substance abuse treatment calls for a more in-depth investigation of the impact of insurance coverage on substance abuse treatment processes. For this particular program, future research should consider insurance carrier status and respective benefits (i.e., approved number of treatment sessions) when examining treatment retention and dropout. Moreover, employer referrals, psychiatric services, and drug-related services may enhance retention among insured populations (Mertens & Weisner, 2000), thus exploring how available supplementary services can impact substance abuse treatment may be a worthy area of inquiry. This treatment program also serves a number of self-pay clients and should consider if the treatment needs and outcomes of these clients differ from those who utilize insurance benefits.

An additional variable that was virtually neglected in this study that has been positively linked to treatment entry and retention in previous research is external legal pressures and sanctions (Green et al., 2002; Hiller, Knight, Broome, & Simpson, 1998; Hubbard et al., 1989; Joe et al., 1999; Simpson, 1993). Although being prompted to

complete treatment was an element of the ASI legal composite score, it did not receive any individual attention in the analyses. The criminal justice system has utilized substance abuse treatment as part of their efforts to control illicit drug use and reduce alcohol abuse for much of the past century (Hiller et al., 1998). External pressure from the criminal justice system may be directly tied to a particular charge or sentence, such as court-mandated substance abuse treatment as part of a sentence for driving while intoxicated or a provision of one's probation or parole. In these instances, violations of the stipulation would result in a legal ramification such as jail time, thus clients have high external motivation to complete substance abuse treatment. Alternatively, a client may seek to be more proactive and complete a substance abuse treatment program in order to obtain a more lenient sentence in an outstanding legal matter, such as a driving while intoxicated charge or a drug possession charge (Hiller et al., 1998). In both instances, the likelihood of entering and completing substance abuse treatment his often enhanced by the existing pressure from the criminal justice system. Consequent investigations should examine this variable more closely to better describe the attributes of individuals entering substance abuse treatment and this factor's impact on treatment retention.

Finally, not unlike the large majority of existing substance abuse treatment research, this study employed quantitative methods to answer the research questions of interest. Within the substance use disorder field, "qualitative techniques have played an important role in complementing quantitative research by helping to interpret, illuminate, illustrate, and qualify empirically-determined statistical relationships" (Neale, Allen, & Coombes, 2005, p. 1591). Researchers have advised that qualitative methods should be employed both independently and in conjunction with quantitative investigations to

elucidate factors that facilitate and hinder treatment entry; treatment engagement; lapses and relapses to substance use during and following treatment; planned and unplanned treatment termination; and treatment readmission. Further examination of the existing treatment system in terms of the services provided and their suitability for the populations served has also been suggested (Battjes, Onken, & Delany, 1999; Neale et al., 2005). A fitting follow-up to this study could explore the reasons and factors related to remaining in substance abuse treatment or dropping out, which could potentially validate the findings from the present investigation and expand the conceptualization of the relatively elusive phenomenon of substance abuse treatment dropout (Neale et al., 2005).

Conclusion

Despite the limitations outlined above, this study was a successful initial step in describing the clientele served in the intensive outpatient drug-free chemical dependency program at Rogers Memorial Hospital. Furthermore, it identified client attributes that relate to treatment retention, including age, marital status, income, psychological comorbidity, substance(s) of use, and extent of use. It also delineated subgroups of clients based on age, negative consequences related to substance use, and ASI composite scores across medical, employment, alcohol and drug, legal, social, and psychiatric domains. Identified subgroups appeared to vary along two broad dimensions: degree of functional impairment and type(s) of substance use. Hopefully, these results will serve as a catalyst for future investigations within this treatment program as it continues to design, implement, and evaluate clinically-relevant and empirically-driven assessment procedures and subsequent interventions aimed at improving treatment retention and treatment outcomes.

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Appendix A

Marquette University Agreement of Consent for Research Participants

RESEARCH SUBJECT INFORMATION AND SUBJECT CONSENT FORM

Rogers Memorial Hospital, West Allis, WI
Marquette University, Milwaukee, WI

TITLE: Rogers Memorial Hospital Chemical Dependency Program Assessment Project, Phase 2

SPONSOR: Rogers Memorial Hospital, Center for Addiction and Behavioral Health Research - Marquette University

PRINCIPAL INVESTIGATOR: Todd C. Campbell, Ph.D., CADCIII, CCSII

PURPOSE OF STUDY

When I sign this statement, I am giving consent to the following basic considerations: I understand clearly that the purpose of this study is to evaluate the treatment processes and treatment outcomes for the Chemical Dependency Program at Rogers Memorial Hospital-West Allis. I understand that all patients admitted into the Chemical Dependency Program are required to participate in the standard clinical intake procedure and that the information obtained is kept in my medical record. The information in the medical record is utilized by the treatment staff and subject to state and federal regulations regarding confidentiality. I understand the standard clinical intake Session will last approximately 2 to 4 hours. I understand that I may be asked to complete several questionnaires about my age, education level, my alcohol and other drug use history, health history, mental health history, and perceptions regarding treatment. I understand that I will be contacted when I am discharged from the Chemical Dependency program and by telephone or mail at one-month, 3 months, 6 months, and 12 months post-discharge to complete an interview assessment regarding my drug and alcohol use and progress in my recovery. I understand that these follow-up interviews/assessments will last approximately 30 minutes. I also understand that this study is ongoing and there will be approximately *208 participants* in this study during any given year.

AUDIOTAPING

Session I and Session II may be audiotaped. The audiotapes will be used to supervise the research assistants who are conducting the sessions. The research assistants will be supervised by the primary investigator, Todd C. Campbell, Ph.D. All audiotapes will be erased utilizing a large magnet designed to fully erase audiotapes after feedback has been provided by the primary investigator (a process which is expected to take approximately 1-2 weeks following the sessions). The tapes will then be destroyed and thrown away.

Participant Initials _____

CONFIDENTIALITY

I understand that there are two purposes for collecting the assessment information: 1. Clinical purposes to inform the treatment team regarding my treatment plan, and 2. Research purposes to assist in the evaluation of the program's treatment processes and outcomes.

I understand that for the clinical purposes the assessment information is contained in my medical record, is available to appropriate treatment staff, and is protected by all relevant state and federal regulations pertaining to medical records.

I understand that for the research purposes of this research project, the data from the standard intake assessment will be copied and the copies will be placed in the research file. These copies will be de-identified (i.e., my name and other identifying information will be removed) and assigned an arbitrary code. I understand that if I choose to participate in this study that all information I reveal in this study will be kept confidential. Your name will not be publicly disclosed at any time, and the records will be strictly maintained according to current legal requirements. When the results of the study are published, I will not be identified by name. I have been promised that any information obtained from this study that can be identified with me will remain confidential. However, I am in agreement that scientific data not identifiable with me resulting from the study may be presented at meetings and published so that the information can be useful to others. No references to individual participants, or any identifying information will be released to anyone other than the investigative professionals at Rogers Memorial Hospital or Marquette University without my express written consent, unless required by law. I understand that once the data is no longer of use it will be destroyed and will be held no longer than 7 years.

This applies to the audiotapes of treatment sessions as well as to any written records obtained. Only authorized study personnel will have access to the session audiotapes and records. This protection, however, is not absolute. It does not, for example, apply to any state requirement to report certain communicable diseases. In addition, the investigators will report certain cases of child or elder abuse to appropriate authorities. Furthermore, if you indicate that you are in imminent danger of hurting yourself or others, the investigators may need to reveal this in order to protect you or that person. However, it is the policy of these agencies and of the investigators that every attempt will be made to resist demands to release information that identifies you.

RIGHT TO REFUSE OR WITHDRAW FROM THE STUDY

Your participation in this study is voluntary. Thus, you may refuse to participate or withdraw at any time once the study has started. I have been informed that my decision about whether or not to participate will not change my present or future relationship with Rogers Memorial Hospital or the staff of this institution; nor will it change the quantity or quality of care that is otherwise available to me. If I participate, I understand that I am free to withdraw at any time without prejudice, and that withdrawal would not in any way

Participant Initials _____

affect the nature of the care or treatment otherwise available to me. Information collected on participants who choose to withdraw will remain in the study files.

The primary investigators have the right to stop your participation in the study at any time. This could be because you have had an unexpected reaction, or have not followed instructions, or because the entire study has been stopped. Regardless of whether you choose to withdraw or if your participation in the study is terminated, certain procedures must be followed in ending your participation in the study in order to protect your safety. You may be asked questions about any reactions you may have had with this project.

PAYMENTS TO PARTICIPANTS
There are no payments for participation in this study. Should you need further treatment for alcohol-related problems after leaving Rogers Memorial Hospital, you and your insurance provider will be responsible for such costs in the same way that you would if you did not participate in this study.

RISKS
I understand that there are no known risks associated with participation in this study. I also understand that the only benefit of my participation is to help improve scientific understanding of the intake assessment process, treatment processes, and treatment outcomes. I understand that participating in this study is completely voluntary and that I may stop participating in the study at any time without penalty or loss of benefits to which I am otherwise entitled. I am not involved in any agreement for this study, whether written or oral, which includes language that clears Marquette University or its representatives from liability for negligence, if any, which may arise in the conduct of the research project.

NEW INFORMATION
Participation in this study could have risks that we cannot anticipate. If new information is found during the study that might influence your willingness to continue to participate, we will inform you as soon as possible.

OFFER TO ANSWER QUESTIONS AND CONTACTS FOR INFORMATION
If you have any questions about the general nature of the study, you may contact Dr. Todd C. Campbell at (414) 288-5889 or Mr. Mickey Gabbert at (414) 327-3000.

INSTITUTIONAL REVIEW BOARD REVIEW:
This project has been reviewed by the Rogers Memorial Hospital Human Subjects Committee and the Marquette University Institutional Review Board for the Protection of Human Subjects. All my questions about this study have been answered to my satisfaction. I understand that if I later have additional questions concerning this project, I can contact Todd C. Campbell. If you believe that there is any infringement upon your rights or if you have any questions about your rights as a research subject, you may contact the Rogers Memorial Hospital Human Subjects Committee at (414) 327-3000 and/or you may contact Marquette University's Office of Research Compliance at 414-288-1479. Participant Initials _____

I, _____, have read the information provided above. I voluntarily agree to participate in this study. My signature also indicates that I have been given a copy of this documented informed consent, and may request an additional copy at any time. I know that this research has been reviewed by the Rogers Memorial Hospital Human Subjects Committee and the Marquette University Institutional Review Board for the Protection of Human Subjects and has been found to meet the federal, state, and the Rogers Memorial Hospital Human Subjects Committee and the Marquette University Institutional Review Board for the Protection of Human Subjects guidelines for the protection of human subjects. Finally, I understand that if the principal investigator decides it is wise to limit or terminate my participation in the study, he can do so without my consent.

I agree to have my intake session(s) audiotaped, as described above:

_____ _____
Signature of Subject or Authorized Representative Date

_____ _____
Signature of Witness Date

I have defined and fully explained the study as described herein to the subject.
TYPE OR PRINT:

_____
Name of Principal Investigator or Authorized Representative

TYPE OR PRINT:

_____
Position Title

_____ _____
Signature Date

Participant Initials _____

Appendix B

Personal Feedback Report for:
Date Completed:

Client Perception of Problem/Need for Treatment

Medical		Employ		Alcohol		Drug		Legal		Family		Social		Psych	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Legend:
A= Perceived Problems, B= Desire for Treatment
0=Not all, 1=Slightly, 2=Moderately, 3=Considerably, 4=Extremely

Interview Severity Ratings

Medical	Employ	Alcohol	Drug	Legal	Family	Psych
9	9	9	9	9	9	9
8	8	8	8	8	8	8
7	7	7	7	7	7	7
6	6	6	6	6	6	6
5	5	5	5	5	5	5
4	4	4	4	4	4	4
3	3	3	3	3	3	3
2	2	2	2	2	2	2
1	1	1	1	1	1	1
0	0	0	0	0	0	0

Legend:
0-1: No Real Problem, 2-3: Slight Problem, 4-5: Moderate Problem, 6-7: Considerable Problem, 8-9: Extreme Problem

Treatment Problem List

According to the ASI interview, the following are possible problem statements that could be addressed on the treatment care plan:

Medical:

Employment:

Alcohol/Drug:

Legal:

Family/Social:

Psychiatric:

Alcohol Use

YOUR DRINKING
Last 90 days: _____ days abstinent _____ days light drinking (1-4 standard drinks) _____ days heavy drinking (5+ standard drinks) Typical week: _____ standard drinks Your drinking compared to American adults: _____ percentile *(same sex)* Estimated BAC level on heaviest drinking day: _____ mg%

Other Drug Use

Percentiles (US Adults)					
Your use (days) in last 90					
Drug	Tobacco	Marijuana	Stim./Amph.	Cocaine	Opiates

Preparation for Change

Socrates Profile	Very Low	Low	Medium	High	Very High
Recognition _____	7-26	27-30	31-33	34-35	N/A
Ambivalence _____	4-8	9-13	14-15	16-17	18-20
Taking Steps _____	8-25	26-30	31-33	34-36	37-40

*Alcohol Use:

Socrates Profile	Very Low	Low	Medium	High	Very High
Recognition _____	7-26	27-30	31-33	34-35	N/A
Ambivalence _____	4-8	9-13	14-15	16-17	18-20
Taking Steps _____	8-25	26-30	31-33	34-36	37-40

*Drug Use:

Inventory of Drug Use Consequences Scores

Physical	Inter-personal	Intra-personal	Impulse Control	Social Responsibility	Total Score	Control Scale*
Out of 8	Out of 10	Out of 8	Out of 12	Out of 7	Out of 45	Out of 5

*This score is separate, and does not contribute to the Total InDUC score. Scores on Control Scale items may indicate careless or dishonest responding.

Alcohol Abstinence Efficacy Scale: Temptation to Drink

Negative Affect	Social/Positive	Physical and Other Concerns	Cravings and Urges	Total
0-Not at all	1-Not very	2-Moderately	3-Very	4-Extremely

Alcohol Abstinence Efficacy Scale: Confidence in Ability to Abstain

Negative Affect	Social/Positive	Physical and Other Concerns	Cravings and Urges	Total
0-Not at all	1-Not very	2-Moderately	3-Very	4-Extremely

Diagnostic Criteria Met (Mini International Neuropsychiatric Interview)

DSM-IV-TR Axis I:

_____

_____

_____

Client Strengths

1.

2.

3.

Components of Interview or Results Processed with Client (i.e. percentiles, peak BAC):

Overall Impression of Client: