Pretreatment Client Characteristics and Treatment Retention in an Intensive Outpatient Substance Abuse Treatment Program

Shauna Elizabeth Fuller
Marquette University

Recommended Citation

Fuller, Shauna Elizabeth, "Pretreatment Client Characteristics and Treatment Retention in an Intensive Outpatient Substance Abuse Treatment Program" (2009). *Dissertations (1934 -)*. 1.
https://epublications.marquette.edu/dissertations_mu/1

PRETREATMENT CLIENT CHARACTERISTICS AND TREATMENT RETENTION
IN AN INTENSIVE OUTPATIENT SUBSTANCE ABUSE TREATMENT PROGRAM

by

Shauna Fuller, M.S.W.

A Dissertation submitted to the Faculty of the Graduate School, Marquette University, in
Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

Milwaukee, Wisconsin

August, 2010

ABSTRACT
PRETREATMENT CLIENT CHARACTERISTICS AND TREATMENT RETENTION
IN AN INTENSIVE OUTPATIENT SUBSTANCE ABUSE TREATMENT PROGRAM

Shauna Fuller, MSW

Marquette University, 2010

The effectiveness and efficacy of substance abuse treatment is well established. At the same time, clients often prematurely drop out of substance abuse treatment, negatively impacting their chances of achieving favorable outcomes. Investigating variables associated with treatment retention has become increasingly important considering one of the most robust findings in substance abuse treatment outcome research is the positive relationship between the amount of time spent in treatment and post-treatment outcomes (e.g., decreased drug/alcohol use, decreased criminal activity, improved social functioning). This study examined the relationship between pre-treatment client characteristics and treatment drop-out among 273 adults who were admitted to intensive outpatient substance abuse treatment. An intake assessment battery was administered to all participants in an effort to gain a broad understanding of client attributes at the point of treatment entry. A series of regression analyses were used to investigate if client characteristics could help predict treatment completion status, time to drop-out, and number of treatment sessions attended. Results indicate that age and meeting criteria for an anxiety disorder were statistically significant predictors in all three regression analyses. Meeting criteria for a cocaine disorder was found to be a statistically significant predictor of treatment completion status and time to drop-out. Finally, number of years using alcohol regularly was found to be a statistically significant predictor of the number of treatment sessions attended. The clinical implications of these findings are discussed and recommendations to help improve client retention in the substance abuse treatment program utilized for this study are provided.

ACKNOWLEDGMENTS

Shauna Fuller, MSW

This dissertation reflects a great deal more than simply the printed word and (literally) years of research and writing. It is also representative of all the guidance and support that so many wonderful people were willing to share with me along the way.

To my advisor, Dr. Campbell: What can I say? Without you this project would have never existed in the first place. Thank you for the personal and professional support throughout my graduate career and helping me realize autonomy in my abilities.

To my committee members Drs. Melchert and Brondino: Dr. Melchert, thank you for both personal and academic support throughout my education and dissertation process. Dr. Brondino, thank you for all your expertise and guidance in the area of research design/statistics. You always made time to meet with me and that effort has not gone unnoticed or unappreciated.

Thank you Roger's Memorial Hospital for allowing us to complete this project and providing a great deal of support along the way. A special thank you to Mickey Gabbert and the treatment team of the intensive outpatient substance abuse treatment program for working with us throughout this lengthy process. I know it wasn't always easy having us around.

To my friends and colleagues Jess, Joni, Matt, Matt, Cathy, and Heidi, who were willing to spend precious time reading numerous drafts, provide thoughtful feedback on my project, and share enthusiasm as I passed each hurdle.

To my parents for their constant love and support throughout the long journey of my graduate work. Thank you both for helping with the boys and providing "the spa" during my down times to relax and recover.

To Jake and Julia who lovingly spent an enormous amount of time with their grandsons so that I was able to work on this project. Thank you for selflessly being there when we needed your help.

And finally, to the three most important guys in my life: Dylan, Ethan, and Clayton. Dylan, you have been my cheerleader, reality checker, and unwavering supporter. Thank you for your patience throughout this process and believing in me even when I did not. Ethan and Clayton, thank you both for being the best reward after a hard days work. Finally, Ethan a special thank you for your thoughtful empathy when you told me how impressed you were that I finished this project as you simply could not imagine working on a single homework assignment for four years.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter I: Introduction

Substance Use Disorders

Clinical Definition of Substance Use Disorders

Substance use disorders encompass a wide spectrum of symptoms and

characteristics and include the taking of either drugs (both prescribed and illicit) and/or

alcohol. These disorders are often characterized by a strong desire to continue using

drugs and/or alcohol despite experiencing repeated negative consequences (American

Psychiatric Association, 2000). Substance use disorders are generally distinguished as

being substance dependence or substance abuse. For the purpose of this study, the term

substance use disorder will be used to describe either category of substance abuse or

substance dependence.

According to the Diagnostic and Statistical Manual of Mental Disorders (2000),

the hallmark of substance dependence is when an individual experiences "a cluster of

cognitive, behavioral, and physiological symptoms indicating that the individual

continues use of the substance despite significant substance-related problems" (p. 192).

Although it is not specifically included as a criterion of a dependence diagnosis, these

individuals are likely to experience cravings of the substance(s) used. A diagnosis of

dependence is contingent upon the individual demonstrating a maladaptive pattern of

substance use, leading to clinically significant impairment or distress, manifested by three

(or more) of the following, occurring at any time in the same 12-month period: tolerance;

withdrawal; taking of the substance in larger amounts or over a longer period than

intended; a consistent desire or unsuccessful efforts to cut down; spending a lot of time

attempting to obtain and use the substance as well as time to recover from the effects of

use; social, occupational, or recreational activities are reduced or stopped altogether because of the use; use of the substance is continued despite experiencing recurrent physical or psychological problems related to the use (pp. 192-193). A diagnosis of substance dependence trumps a diagnosis of substance abuse.

Substance abuse, on the other hand, includes the cardinal feature of "a maladaptive pattern of substance use manifested by recurrent and significant adverse consequences related to the repeated use of substances" (p. 198). This diagnosis requires that the individual demonstrates this maladaptive pattern, which results in impairment or distress as demonstrated by at least one of the following within a 12-month period: repeated use of a substance resulting in inability to fulfill responsibilities at home, work, or school; repeated use in situations where it is physically dangerous; repeated legal problems associated with the use; continued to use despite having experienced consistent social or interpersonal difficulties resulting from or exacerbated by the use.

Prevalence of Substance Use Disorders

Substance use disorders are both common and problematic. The National Longitudinal Alcohol Epidemiologic Survey (1991-1992) reported on national estimates of drug and alcohol abuse and dependence (National Institute on Alcohol Abuse and Alcoholism, 1992). Their survey found that approximately 7.4% of adults in the U.S. were either dependent on alcohol (4.4%) or abused it (3%). This 7.4% comprised more than half of the heavy drinkers identified. One and a half percent of adults in the U.S. were identified as being either dependent (.5%) or abusing (1%) drugs (National Institute on Alcohol Abuse and Alcoholism, 1992). These rates have remained fairly consistent since the early 90s. For example, results from the 2005 national survey on drug use

indicated that 9.1% of the population (22.2 million people) met criteria for either

substance abuse or dependence, 7.7% were classified as abusing or dependent on alcohol,

and 1.7% were classified as dependent upon or abusing illicit drugs (Substance Abuse

and Mental Health Services Administration, 2006). As these numbers illustrate, substance

use disorders continue to be a significant problem that millions of individuals face each

year. In 2005, the number of people in need of treatment for a substance use problem was

approximately 23.2 million. Unfortunately, roughly 20.9 million of those who needed

treatment did not receive it (Substance Abuse and Mental Health Services

Administration, 2005). This is noteworthy considering there are a myriad of problems, on

a variety of levels, which result from substance abuse disorders.

Substance Abuse Impact on Society and Individuals

Substance use disorders are a great public concern. The economic costs of alcohol

and drug use are wide reaching and include but are not limited to: increased health care

costs, premature death, lost earnings, increased costs to employers, vehicle crashes, and

crime (National Institute on Drug Abuse, 1992). According to the Marin Institute (2006),

25-40% of hospital patients are treated for health problems that are a direct result of their

alcohol use. Furthermore, health care costs associated with alcohol related problems have

been estimated at 22.5 billion. It should come as no surprise then that individuals who are

considered to be heavy drinkers consistently incur greater health care costs than moderate

drinkers and/or abstainers (Marin Institute, 2006).

As reported, substance users experience a variety of negative consequences.

Physical problems often associated with alcohol and drug use include liver disease,

ulcers, cognitive impairments, cancers, reproductive problems, sexually transmitted

diseases, and cardiovascular problems. The National Survey on Drug Use and Health (2007) reported that individuals with a sexually transmitted disease were more likely to demonstrate recent use of alcohol and an illicit drug than those individuals without a sexually transmitted disease. Alcohol is also commonly implicated in traffic-related accidents and deaths and is thought to be a factor in 40% of traffic related deaths (National Institutes of Health, 2006). Psychological ramifications are also evident. Clients reporting for substance use treatment often present with co-occurring psychiatric problems. Substance use treatment populations have documented rates of comorbid psychiatric symptoms around 63-69% (Castel, Rush, Urbanoski & Toneattto, 2006; Charney, Palacios-Boix, Negrete, Dobkin & Gill, 2005). Data from 2004-2005 demonstrated that approximately 2.7 million adults (about 1.2 % of the population) were dually diagnosed with both an alcohol and depressive disorder (Substance Abuse and Mental Health Services Administration, 2007). Psychological symptoms often include depression and anxiety, suicidal thoughts, insomnia, and intense cravings for substances (Kessler et al., 1996). Moreover, when calculating general patterns of co-occurring psychiatric and addictive disorders, "all the mental disorders are consistently more strongly related to dependence than to abuse" (Kessler et al., 1996, p. 19).

In addition to co-occurring psychiatric problems, clients who enter treatment for substance abuse often also experience problems in other areas of their life. Increased problem severity in medical, employment, family and legal arenas has been shown to negatively impact a client's ability to reduce their substance use for a prolonged period (Hser, Evans, Huang & Anglin, 2004). These consequences, coupled with the often high rates of substance use recidivism (Fletcher, Tims & Brown, 1997), point to the

importance of and need for substance use treatment. Unfortunately, there are a number of issues that often complicate the seeking of treatment. Various barriers to treatment have been identified and include but are not limited to: individuals being unable to afford substance use treatment (including not having insurance to cover the costs), and limited child care options while attending treatment (Green, 2006). There is also the stigma associated with one admitting that he or she struggles with substance use, which has the potential to interrupt the process of seeking treatment.

Benefits of Substance Abuse Treatment

Even though barriers exist that prevent individuals from seeking substance abuse treatment, when individuals do attend treatment there are significant positive effects. More specifically, as Simpson (1993) reported,

> Drug use, crime, and other social functioning measures generally improve during and following treatment in the three major modalities used: methadone maintenance, therapeutic communities, and outpatient drug-free programs. Clients in these treatment settings have better outcomes than drug users who undergo detoxification only and thosewho enter treatment but fail to continue (p. 122).

Individuals with an alcohol dependence diagnosis have also been found to achieve significant reductions in the percentage of days they drink and the amount consumed when drinking after participating in substance abuse treatment (Anton, Miller, O'Malley, Zweben, & Hosking, 2006). Over three decades of investigations both within and outside of the United States have demonstrated that substance abuse treatment significantly decreases substance use and helps improve overall social functioning (Gerstein & Harwood, 1990, as cited in Simpson and Joe, 2004; Gossop et al., 1997; Gossop, Marsden, Stewart & Kidd, 2003; Hubbard, Craddock, Flynn, Anderson, & Etheridge,

1997; Hubbard et al., 1989; Longabaugh, Donovan, Karno, McCrady, Morgenstern & Tonigan, 2005; Pearson & Lipton, 1999).

Substance Abuse Treatment Dropout

Although the efficacy and effectiveness of substance abuse treatment is well established, in order for treatment to produce favorable outcomes a client must be retained in it. This can be a challenge due to high rates of dropouts typically associated with substance abuse treatment. For example, Weisner, Mertens, Tam, and Moore (2001) note that approximately 29-42% of clients who are admitted for treatment do not subsequently return to receive it. Other research has demonstrated similar results in that about a third of clients have been found not to return for treatment following the initial intake assessment (Jackson, Booth, McGuire & Salmon, 2006; King & Canada, 2004; Weisner et al., 2001). Once clients are engaged in treatment, attrition rates have been reported to be around 65% (and up to 75%) and those clients who leave treatment tend to do so early on in the process (i.e., before completing even half of the treatment regimen) (Justus, Burling, & Weingardt, 2006; Sayre et al., 2002; Siqueland et al., 2002; Veach, Remley, Kippers, & Sorg, 2000). Outpatient treatment has been known to demonstrate some of the worst dropout rates, often exceeding 70% (Stark, 1992; Wickizer, Maynard, Atherly, & Frederick, 1994). Client retention has been identified as the most important variable positively associated with treatment outcomes (Ball, Carroll, Canning-Ball, & Rounsaville, 2006) and as such, has been considered a critical intermediate outcome measure in research (Chou, Hser, & Anglin, 1998).

Rationale for Studying Treatment Retention

Investigating variables associated with treatment retention has become increasingly important considering one of the most robust findings in substance abuse treatment outcome research is the positive relationship between the amount of time spent in treatment and post-treatment outcomes (e.g., decreased drug/alcohol use, decreased criminal activity, improved social functioning) (Chou et al., 1998; Etheridge, Hubbard, Anderson, Craddock, & Flynn, 1997; Hser, Evans, Huang, and Anglin, 2004; Roffman, Klepsch, Wertz, Simpson, & Stephens, 1993; Simpson & Joe, 2004; Simpson, Joe, and Rowan-Szal, 1997; Simpson & Sells, 1982). More specifically, according to Simpson and Joe (2004), better treatment outcomes have been found to be predicted by minimum retention thresholds associated with different treatment modalities (i.e., 90 days for residential and outpatient treatment, and 12 months for methadone treatment). Unfortunately, "because of their high initial attrition rates, very few substance-abusing clients receive the potential benefit from treatment, and once having dropped out, most suffer relapse and its attendant ills" (Stark, 1992, p. 97).

It is not just client treatment outcomes that are impacted by client retention in substance abuse treatment programs. Poor client retention has obvious negative implications for agencies providing services as well (Simpson et al., 1997). Poor retention is problematic because early dropouts cost a significant amount of money, and require increased time from staff, due to the heavy front-end requirements including assessments and subsequent treatment planning by nurses, doctors, and therapists. Therefore, "agencies with high overall client dropout rates operate at a comparatively low organizational efficiency and effectiveness levels" (Simpson et al.,1997, p. 280).

Importance of Program-Level Research

It has been noted that efficacy and effectiveness research have typically remained fairly distinct modes of inquires; they have been considered as existing at opposite ends of internal-external validity continuum and each approach has limitations associated with it (Rounsaville, Carroll, & Onken, 2001). Although treatment effect is more clearly determined in efficacy studies, the ability to generalize the treatment approach into real-world settings is often a significant challenge. Additionally, it can be a challenge for individual programs to determine if and how efficacy research results pertain to their individual programs. Rounsaville et al. (2001) have argued that some of the criticism associated with RCTs is unfounded since RCTs are not intended to be an end point of research. Rather, the authors define RCTs as "an essential hurdle a treatment must clear to justify subsequent research on its transportability, robustness, and mechanisms of actions" (p. 135). Seen this way, investigating factors associated with effectiveness studies are not dismissed but encouraged once a treatment is first deemed efficacious.

Indeed, one model that illustrates the path by which investigations should follow from large-scale to local-level investigations has been illustrated by Onken, Blaine and Battjes (1997), who proposed a Stage Model of Behavioral Therapies research in an effort to "maximize the breadth and depth of information obtained about a particular therapy" (p. 479). This stage model creates a system whereby a therapeutic approach is first scientifically established prior to being widely disseminated to the clinical community for implementation. In this way, a stage model has been likened to the approach typically employed by pharmaceuticals for medication development (Onken et al., 1997). This approach consists of three stages to guide behavioral therapy research

(Stage I, Stage II, and Stage III), "that leads from initial clinical innovation through efficacy research to effectiveness research" (Rounsaville et al., 2001). Stage I involves the development of the therapy itself. This development includes reviewing research findings on treatment approaches, creating new approaches, manualizing treatments, adjusting treatment approaches based on patient and clinician feedback, and conducting preliminary testing of the treatments (Onken et al., 1997). If the pilot testing indicates that a treatment approach is capable of producing clinically meaningful change then research can progress to the subsequent phase, Stage II.

Stage II research involves efficacy studies (RCTs) to investigate therapeutic approaches and the therapeutic elements identified in Stage I that appear to be the mechanisms of action for change. Those therapies deemed efficacious are replicated at different sites. Additionally, "as a rule, in Stage II research, comparison interventions should be operationally defined, standardized, and manualized" (p. 482). It is recommended that control/comparison groups are carefully considered and selected by researches so as to most appropriately answer the research question. It is not until Stage III that the degree to which a specific therapy is transferable and useful in the clinical realm at the community level is evaluated (Onken et al., 1997). Only those therapies that have been found to be efficacious in at least two RCTs are evaluated further (Rounsaville et al., 2001). For example, a Stage III study might investigate the feasibility with which a therapy that has been well established through efficacy studies is able to be packaged and delivered in a community setting. The investigation might also include the development of training materials to deliver the therapy and even refine the approach if necessary. By following this stage model it is argued that therapeutic approaches can follow a predictive

path from conceptualization to validation. Rounsaville et al. (2001) also stress that a strength of this model is the recognition that the study of therapeutic approaches does not begin and end with RCTs. In fact, the authors argue that Stage III research efforts are "crucial for the process of bridging the much-noted gap between research findings and clinical practice" (p. 134).

Although this specific study did not investigate the effectiveness of a specific treatment approach, it was conducted in the spirit of stage III research by evaluating a treatment phenomenon at the local level. For example, the existing corpus of literature suggests that retention is a critical factor related to treatment outcomes. As such, results from previous studies considered to be Stage I and II research were utilized to inform this investigation. For example, since age has been implicated as impacting client retention, client age will be considered a potential covariate for this analysis. Consistent with the philosophy of Stage III research, the results of this study are intended to be used to inform the specific treatment program of potential factors related to their retention rates, and less so about generalizability beyond this specific treatment program. By assessing treatment phenomena locally, the results are immediately and directly applicable to the treatment program involved.

Statement of the Problem

Despite there being a large body of literature focusing on varied correlates and predictors of treatment retention, these studies have produced conflicting findings, hence, it remains difficult to draw broad conclusions about any consistent predictors of treatment retention. This lack of consensus stems from a number of factors. First, investigations previously conducted at the local level that have identified client factors related to

retention may have limited generalizability. More specifically, different programs incorporate different treatment approaches, offer differing services, and employ providers at varied skill levels. The variability in treatment approaches, client representations, and services offered at different treatment programs is one of the only consistent between-program characteristics (Simpson et al., 1997). Even treatment programs that embody similar theoretical orientations and approaches still operate uniquely as a result of distinct management approaches, financial resources, environmental settings, the legal systems they are connected to, and the needs of their clients (Simpson et al., 1997). Perhaps not surprising then, when similar treatments are delivered and differences in client characteristics are controlled for, retention rates have still been found to differ between programs (Broome, Simpson, & Joe, 1999; Joe, Simpson, & Broome, 1998). Therefore, although a number of potential correlates and predictors of retention have been suggested, "there is little agreement on the generalizability of the findings" (Sayre et al., 2002, p. 56). Limited generalizability can make it difficult for treatment programs to deduce if and how research findings pertain to their respective programs.

Although a wide variety of factors have been implicated as potentially impacting retention, these have not been investigated comprehensively and more accurately identifying the factors remains an ongoing research challenge (Simpson, 2004). "In addition to replicating previous findings concerning treatment retention, more work is needed to address these effects in terms of treatment compliance and related process indicators for different therapeutic settings and types of clients" (Simpson et al., 1997, p. 294). Recommendations from researchers of large-scale multi-site drug treatment evaluations have also echoed the need for smaller scale investigations to be conducted in

treatment settings (Etheridge et al., 1997; Fletcher et al., 1997). Important variations in

treatment philosophies and clientele across modalities need to be considered and

investigated. Such investigations have been especially recommended to take place in

outpatient treatment programs due to the vast variability typically seen in both the range

of substance users that are treated, as well as the orientations that guide the treatment

approaches utilized at such settings (Simpson et al., 1997).

Purpose of the Study

The primary purpose of this study was to examine if pretreatment client

characteristics are predictive of retention in an intensive outpatient substance abuse

treatment program. Clinically, this study has relevance as retention is clearly linked to

client attributes that are amenable to change through the therapeutic process (e.g.,

motivation and psychiatric distress) (Klag, O'Callaghan, & Creed, 2004). Research

results can be used to inform treatment staff of the specific client characteristics that are

related to retention, thereby allowing for a process where at-risk clients can be screened

up front and treatment approaches can target the client factors in need of change

(McKellar, Harris, & Moos, 2006). Moreover, it would also be useful to be aware of how

those client characteristics that are considered "static" (e.g., gender, age) relate to

completion rates. Even though static characteristics cannot be changed by the therapeutic

process, the treatment process itself could be altered in an effort to provide more tailored

treatment to at-risk groups (i.e., delivering culturally sensitive services to remove barriers

to treatment).

Additionally, the importance of evidenced-based treatment in the area of

substance abuse treatment has gained momentum in recent years (Tucker & Rother,

2006). This movement, coupled with the challenge individual treatment programs face in determining if and how research results pertain to their specific program, provided an ideal opportunity for this study to bridge the gap between science and practice. In doing so, not only can the results contribute to and be compared with the larger body of retention literature, but they can also provide practical information for the treatment program to inform their practice and additional research efforts. Key stakeholders from the treatment center involved in this study, and managed care systems, are increasingly making demands for treatment programs to prove treatment and cost effectiveness. This increased pressure provided an ideal opportunity to further narrow the science and practice gap that exists in the field of substance abuse (Tucker & Roth, 2006). In turn, this might help the treatment center improve their retention rates and outcomes, while at the same time help to demonstrate that smaller research studies on the local level can be useful in informing treatment approaches and future research efforts. An additional advantage to conducting research on-site is that client populations, in terms of their patterns and severity of use, are constantly in flux which calls for consistent evaluation of treatment outcomes to help identify important factors of treatment dropouts from specific programs (Mammo & Weinbaum, 1993).

From an empirical perspective, the findings of this study contribute to the current scientific literature base on treatment retention. More specifically, the results should help to clarify some of the inconsistencies found in the literature related to the correlates and predictors of retention. Additionally, the study results provide evidence regarding how comparable the obtained findings at this treatment center are with the current body of literature.

Research Questions

Based upon the stated problem and need for this study, the following research questions were addressed:

1) What client characteristics, at the point of treatment intake, are found to predict treatment completion status among those attending an intensive outpatient chemical dependency treatment program at a nonprofit, freestanding mental health hospital?

2) Can time to dropout of treatment be predicted by client characteristics at the point of treatment intake?

3) What pre-treatment client characteristics are found to predict the number of treatment sessions attended by clients?

Definition of Terms

Addiction – "Any psychological or physiological overdependence of an organism on a drug" (Reber & Reber, 2001, p. 11). This term will be used interchangeably with the DSM-IV diagnostic category of substance dependence.

Substance Abuse Treatment – A "specific procedure designed to cure or to lessen the severity of" a substance use disorder (Reber & Reber, 2001, p. 765).

Substance Use Disorder – Problematic use of a drug of abuse (including but not limited to: alcohol, cocaine, marijuana, heroin) that can lead to difficulties in social functioning and medical illness (American Psychiatric Association, 2000).

Treatment Completion – For this study, a treatment completer will be defined as one who was found to have met all, or a sufficient amount, of the treatment goals to

warrant what was considered to be successful completion as determined by his/her counselor. Specifically how this determination was made is described in detail in Chapter III.

Treatment Non-Completer – "A client who terminates treatment before it is completed" (VandenBos, 2007, p. 302). For this study, a client who was not found to meet treatment goals, or who left the program prematurely, either on his/her own volition or due to mandatory dismissal for non-compliance with treatment rules, will be considered treatment non-completers. This term will be used interchangeably with treatment drop- outs.

Retention – For the purposes of this study, a client will be considered retained in treatment if s/he remains in treatment through completion.

Chapter II: Literature Review

Introduction

An extended literature review in the area of substance abuse treatment retention

was already conducted by this author and evaluated by the chair and committee members

of this project. Therefore, per the instruction of the chair of this study, the extended

literature review will not be repeated in its entirety here. Instead, a more concise and

succinct review can be found in this chapter, focusing primarily on the literature that

specifically relates to this study. As this study's focus is on the predictive relationship of

pretreatment client characteristics with treatment retention, only previous treatment

retention research investigating such relationships will be included herein. However, the

previously submitted extended literature review, excluding sections in this chapter to

reduce redundancy, can be found in Appendix A for reference.

Treatment Retention – Review of the Literature

To date, a substantial amount of retention research has been concerned with the

relationship between client demographic variables and treatment retention (Brocato &

Wagner, 2008). This area of study was rooted in the assumption that when clients left

substance abuse treatment prematurely it was a result of their own personal traits versus

programmatic or treatment factors. (Chou, Hser, & Anglin, 1998; Fiorentine, Nakashima,

& Anglin 1999). As such, a large portion of previously conducted research ignored the

dynamic interplay between program and client factors and instead, focused only on client

characteristics that were thought to impact retention like demographic variables.

Additionally, when program and client factors were investigated, they were often studied

in isolation of one another (Roffman, Klepsch, Wertz, & Simpson, 1993). Although the

field now recognizes that retention is a complex phenomenon (Simpson, 2001), much of this previous body of retention literature has still helped point to how various client factors may be related to or impact retention. Although client characteristics are certainly not the only factor related to retention, they have been found to play an important role. By identifying client characteristics that could put one at a greater risk of premature dropout, programs could develop more appropriate interventions in an attempt to retain such clients. As such, a review of the retention literature will be discussed as it relates to client characteristics since that was the focus of the present study.

Client's Level of Motivation

Client motivation is thought to be an important factor related to the recovery of substance abusers. "Treatment motivation" is a complex theoretical construct that has been oversimplified and undifferentiated from "treatment readiness" in substance abuse research (Simpson, 2004). Nonetheless, motivation is generally distinguished as internal or external. Internal motivation has been conceptualized as including problem recognition, desire for treatment, and a commitment to take behavioral steps towards change (Joe, Broome, Rowan-Szal, & Simpson, 2002). External motivation generally involves coercion into treatment as prompted by the criminal justice system.

Client motivation has consistently been found to be positively related to treatment retention (Brocato, 2004; Broome et al., 1999; Simpson & Joe, 2004; Simpson et al., 1997). A client's level of motivation at treatment onset has also been found to be positively associated with therapeutic participation and therapeutic alliance (Brocato, 2004; Brocato & Wagner, 2008; Joe et al., 1999), which also appears to be related to increased retention and engagement (Brocato & Wagner, 2008; Simpson, Joe, Rowan-

Szal, & Greener, 1997). Clients are often externally motivated or pressured to seek treatment for substance abuse problems. For example, a spouse may threaten to leave if treatment is not pursued, or an impending job loss due to substance use may prompt treatment seeking. External motivation may prompt initial attendance in treatment (DiClemente, Bellino & Neavins, 1999; Weisner et al., 2001), however it often will not result in an individual committing to treatment, or assist the client in actively engaging in the treatment process (Battjes, Onken, & Delany, 1999). Men engaged in outpatient treatment who were pressured to do so from family members were found to remain in treatment for shorter periods of time than those who were not engaged in treatment due to a family induced ultimatum (Mertens & Weisner, 2000).

Indeed, even reports from clients who prematurely left outpatient treatment cited lack of motivation or hope for change as the most consistent reason for their inability to have remained in treatment (Ball et al., 2006). Interestingly, these findings do not appear to be consistent when a treatment episode is legally coerced based on a "driving while intoxicated" infraction or other illegal activity. In these cases, when clients are engaging in treatment to satisfy a court order or are involved in the criminal justice system in some other way, they are more likely to complete treatment (Hser et al., 2004; Maglione, Chao, & Anglin, 2000b; Mammo & Weinbaum, 1993). It could be hypothesized, however, that treatment effects may not hold if an individual is motivated to complete treatment to satisfy a court order rather than an internal desire to alter the substance use. Indeed, it has also been found that client relapse rates can increase significantly once monitoring probation programs end (Brecht, Anglin, Whang, 1993) and clients legally coerced to

attend treatment have been found to demonstrate worse outcomes (Perron & Bright, 2008)

Taken together, research suggests that motivation appears to be a critical factor of treatment retention, hence the utilization of techniques that can enhance a clients' motivation for substance treatment have emerged. Motivational Interviewing and Motivational Enhancement Therapy are two examples of such an approach. Supporting the research that stresses the importance of motivation on retention, investigations have found that when motivational enhancement techniques are utilized in a treatment setting, they have been found to increase early retention rates (Carroll et al., 2006), retention rates as far as six months after treatment engagement (Secades-Villa, Fernande-Hermida & Arnaez-Montaraz, 2004), and the probability of clients initiating and returning for treatment (Carroll, Libby, Sheehan, & Hyland, 2001).

Client Personality Characteristics/Disorders

The personality characteristic of persistence has also been found to be related to treatment retention. Clients who present with high degrees of persistence have been found to remain in inpatient alcohol treatment for a longer period of time than those clients who scored lower on persistence measures (Cannon, Keefe, & Clark, 1997). Additionally, clients who enter treatment with increased levels of hostility and are high risk takers have been found to be more likely to drop out of treatment prematurely (Broome, Flynn, & Simpson, 1999; Lang & Belenko, 2000). Although these studies suggest that personality factors could play a role in treatment retention more research is this area is called for. Client personality factors or even personality disorders have the potential to significantly impact how a person responds to adversity and challenging

situations (like changing substance abuse patterns), but presently, there is very little known in this area.

Personality disorders (i.e., Axis II), which tend to be less amenable to change than clinical syndromes (i.e., Axis I), have also been found to be associated with treatment retention. For example, clients who were dually diagnosed with a substance abuse and personality disorder, were found to drop out of residential and outpatient treatment more often than clients without such a diagnosis (Justus et al., 2006; Mueller & Wyman, 1997). Siqueland et al. (2002) replicated these findings that a diagnosis of ASPD was a predictor of earlier treatment dropout. These results are not surprising in that individuals diagnosed with ASPD display characteristics including a failure to conform to social norms (including a disregard for lawful behavior), impulsivity, and a reckless disregard of safety for self. Each of these symptoms could theoretically put an individual at a greater risk for using and abusing alcohol or drugs and refusing to adhere to a treatment regimen.

Client Cognitive Deficits

Cognitive impairments are common among substance abusers and can result from moderate to heavy drug and alcohol use over time. Although deficits associated with cognitive processing have been reported, the clinical implications of clients exhibiting such deficits have received less attention (Aharonovich, et al., 2006). Cognitive impairments that are typically associated with substance toxicity also have been directly linked to retention. Aharonovich et al. (2006) investigated the retention rates of cocaine users and found that those clients who demonstrated poorer cognitive functioning were more likely to drop out of treatment than those clients who were retained. The authors measured overall cognitive functioning across domains including memory, attention, and

spatial ability and those who dropped out differed significantly on each domain compared

to completers. The effect sizes associated with these differences were medium to large,

ranging from 0.64 for memory to 0.87 for "global cognitive functioning". The strongest

relationship between cognitive functioning and retention appear to be related to client's

ability to attend, suggesting that those individuals who are not as able to focus and

maintain attention are more likely to prematurely drop out of treatment. These findings

were supported through unpublished dissertation research which suggested that clients

who demonstrated neurocognitive impairments remained in treatment for a shorter period

of time than clients who were cognitively intact (McKenzie, 2007). Considering that

treatment episodes for individual sessions typically last for 45-50 minutes, and group

sessions for an even longer period, these results suggest that clients with cognitive

impairments may not be able to attend for extended periods during treatment episodes.

The authors hypothesize that the inability to attend may negatively impact a client's

ability to process and encode information that is needed for successful treatment

outcome, like learning to develop alternative coping strategies.

Client Psychiatric Comorbidity

Clients reporting for substance abuse treatment often present with co-occurring

psychiatric problems. Substance abuse treatment populations have documented rates of

comorbid psychiatric symptoms around 63-69% (Castel et al., 2006; Charney et al.,

2005). This phenomenon of substance abuse and comorbid psychiatric symptomology

has also been documented with high prevalence rates in non-clinical populations, and

increases the probability of seeking and receiving various types of treatment (e.g.,

specialty addictive, specialty mental health, general medical, self-help group) (Kessler et

al., 1996). The data suggest that not only is there a risk of clients entering substance use treatment with a co-occurring mental illness, but that when they do, they are more likely to exhibit a more severe substance use disorder. If the future reflects previous trends, then the number of clients entering treatment with co-occurring disorders is likely to increase considering that from 1995 to 2001 the proportion of clients entering substance abuse treatment with a dual diagnosis grew from 12 to 16 percent (Substance Abuse and Mental Health Services Administration, 2004).

Clients who are diagnosed with more substance use disorders tend to experience more psychiatric symptoms as well (Castel et al., 2006). Treatment retention and outcomes have been shown to suffer when substance abuse treatment clients also experience psychiatric distress. Substance abuse treatment clients who experience symptoms of depression or anxiety have been found to demonstrate worse treatment outcomes (Charney et al., 2005). Not to mention, "many people with comorbid psychiatric illness are not receiving specialized substance abuse treatment" (Petrakis, Gonzalez, Rosenhack, & Krystal, 2002). It may not be surprising then, that clients experiencing depressive symptomology when entering substance treatment have been found to dropout of treatment early on (Curran, Kirchner, Worky, Rookey & Booth, 2002). Furthermore, clients who have histories of psychiatric problems in their lifetime (not just at the time of treatment engagement) are less likely to be retained in outpatient methadone and residential alcohol or drug treatment (Broome et al., 1999; Justus et al., 2006; Lang & Belenko, 2000). Contrary to these findings, Ross, Culter, and Sklar (1997) found very weak associations between client psychiatric distress and treatment retention, although this investigation did not include clients who presented for substance abuse

treatment coupled with "severe levels" of psychiatric distress, which could have impacted these results. Other investigations have not supported the finding that co-occurring depressive symptomology negatively impacts retention. Instead, research has demonstrated that clients with co-occurring depressive symptomology have been more likely to remain in treatment for longer periods and complete treatment more often than clients without depressive symptoms (Broome et al., 1999; Justus et al., 2006). One possible explanation for these results could be that for some clients experiencing co-occurring depressive symptoms could actually motivate them to remain in treatment to alleviate symptoms, provided the depression is not severe enough to negatively impact their ability to do so. Seen this way, it might not be the mere presence of depressive symptoms itself that impacts retention, but instead the severity of such symptoms.

Indeed, the severity of the psychiatric symptoms has been identified as a factor related to treatment retention. Clients who report high levels of psychiatric distress have been found to be less likely to complete treatment (Roffman et al., 1993). This may be especially true among women for females who were identified as entering treatment with high levels of depressive and anxiety, were more likely to drop out of treatment than women with less severe psychiatric disturbance (Haller, Miles & Dawson, 2002; Mertens & Weisner, 2000). Drug use patterns also appear to suffer when clients exhibit psychiatric distress. For example, one investigation found that clients who were identified as experiencing more severe psychiatric distress while in treatment were more likely to continue to use drugs after dropping out of treatment (Siqueland et al., 2002).

A client's ability to tolerate psychological distress also appears to be related to early treatment dropout. More specifically, clients who have a higher tolerance for

psychiatric distress have been found to persist in residential treatment for over 30 days;

clients with lower levels of tolerance for psychiatric distress were found to drop out of

treatment more often during the same first 30 days of treatment (Daughters et al., 2005).

These findings support the hypotheses posited in the previous paragraph while also

pointing to the importance of identifying co-occurring psychological problems early on in

treatment. This way, ancillary psychological services or more specialized substance abuse

treatment could be offered and efforts to reduce dropout could then be tailored to such

individuals. Additionally, it appears prudent for clinicians to work with clients on

developing healthier coping techniques which can be utilized to better tolerate

psychological distress that often accompanies attempts to abstain from alcohol or drug

use. The literature supports this notion; when clients are offered more comprehensive

treatment services (which include psychiatric services) they are more likely to remain in

treatment through completion (Marrero et al., 2005). Additionally, pharmacological

treatment of psychiatric distress and substance abuse disorders appears to have some

clinical utility. For example, a recent meta-analytic review of the literature by Nunes and

Levin (2004) found that anti-depressant medication has a "modest beneficial effect for

patients with combined depressive-and substance-use disorders" (0.38 effect size, 95%

confidence interval, 0.18-0.58). The review found that when anti-depressants are

successful in treating depressive symptoms substance use decreases, but pharmacological

approaches are not suggested as a stand-alone treatment. When clients present with co-

occurring disorders pharmacological treatment should be combined with

psychotherapeutic treatment as well (Nunes & Levin, 2004). And although the review

was restricted to depressive disorders, it still provides evidence suggesting that

supplementing substance abuse treatment with psychiatric treatment when indicated can provide beneficial results. Further, if clients feel as though their treatment is specialized enough to treat both their psychiatric and substance abuse symptoms they may be more likely to remain in treatment.

Drug of Abuse and Severity of Substance Abuse by Client

Not surprisingly, clients who enter treatment with longer standing and more severe substance use problems (i.e., daily use) have been found to remain in treatment for shorter periods of time regardless of the treatment setting or substance of choice (Alterman, McKay, Mulvaney & McLellan, 1996; Lang & Belenko, 2000; Maglione et al., 2000b; Marrero et al., 2005; Mertens & Weisner, 2000; Westreich, Heitnre, Cooper, Galanter & Gued, 1997), and are more likely to return for subsequent treatment episodes (Booth, Yates, Petty, & Brown, 1991). These results conflict with other research, however, which failed to find that a higher degree of alcohol dependence or increased level of alcohol related problems was directly related to dropout of treatment (Kavanagh, Sitharthan, & Sayer, 1996). Nonetheless, in a review of the literature, Stark (1992) indicates that a great deal of evidence suggests that clients who use more drugs demonstrate higher drop-out rates. Easton, Mandel, Babuscio, Rounsaville, and Carroll (2007) found that men who entered treatment abusing drugs and alcohol, versus alcohol only, were more likely to drop out of treatment prematurely and less likely to remain abstinent from alcohol while in treatment.

Furthermore, while in treatment, if clients are more successful in abstaining from using substances, their chances of remaining in treatment appear to improve. For example, Mammo and Weinbaum (1993) found that clients who decreased their alcohol

use while in treatment (but did not *abstain* from use) were 1.26 times more likely to prematurely leave treatment and those clients who did not decrease their use at all were over seven times more likely not to complete treatment compared to those who abstained. Additionally, an unpublished dissertation study found that initial positive urine toxicology screens, regardless of the type of drug indicated, predicted early attrition from an intensive outpatient program (Sapadin, 2006). When clients enrolled in treatment for cocaine dependence demonstrated an initial positive urine toxology result, or reported using cocaine more frequently either in the 30 days prior to admission or upon entering treatment, they were less likely to complete treatment (Alterman et al., 1996; White, Winn, & Young, 1998). The fact that clients who use more substances while in treatment are more likely to drop out is likely due to the impairments associated with substance use that can interfere with a client's ability to successfully engage and remain in treatment (Stark, 1992). For example, a client's judgment is likely impaired when using substances which will likely impact their decision to return to treatment. They may no longer deem it necessary. Additionally, many programs will not allow clients to return for treatment if they begin using while engaged in the program. If clients are aware of such rules they may simply make a decision to leave treatment before being asked by treatment staff to leave.

Drug of abuse has also been found to impact treatment retention, treatment outcomes, and relapse rates. The type of substance abused has been found to be the strongest predictor of dropout when compared with demographic factors, treatment history, psychiatric status, employment and legal problems and family history (Paraherakis, Charney, Palacios-boix, & Gill, 2000). When comparing alcohol, cocaine,

opiate and sedative addictive disorders with one another, those addicted to opiates have been found to demonstrate worse retention rates than the other groups. Those clients addicted to opiates were found to use the drug more often, demonstrate lower levels of abstinence and attend treatment sessions less often than clients in the other groups (Paraherakis et al., 2000). Interestingly, clients addicted to opiates were also found to be younger than clients in the alcohol or sedative addicted groups. Perhaps a constellation of factors (i.e., age, intensity of use, daily patterns of use) contributed to the significant difference in this group's retention rates.

Type of substance abused has been found to be related to retention and outcomes in other studies as well. The large-scale national Treatment Outcome Prospective Study (TOPS) found that clients who were cocaine dependent were especially likely to relapse after being discharged demonstrating an overall relapse rate of 57% one month post-discharge (Fletcher et al., 1997). Cocaine abuse has been linked to early retention problems. For example, one sample included in a substance abuse investigation found that treatment clients who were dependent on cocaine demonstrated a 69% premature dropout rate (Siqueland et al., 2002). Clients entering treatment due to cocaine abuse have been found to drop out of treatment prematurely more often than those with an alcohol-only or cannabis addiction (Sapadin, 2006; Veach et al., 2000). Treatment outcomes associated with cocaine abusers also appear to suffer. When clients enter treatment with cocaine as their drug of choice this has been found to be predictive of more negative treatment outcomes (King & Canada, 2004). And, those clients who use crack, a subset of cocaine users, have been found to be retained in treatment for a shorter period than non-crack users (Rowan-Szal, Joe, & Simpson, 2000).

These findings suggest that both type and intensity of substance use (both prior to and while in treatment) can significantly impact retention. Clients' use of substances obviously influences how well they are able to engage in and benefit from treatment. This is not only due to the impairments associated with substance use, but also the negative consequences of using while in treatment. At the very least clients stand to frustrate treatment providers when using while in treatment, which can impact the manner with which staff interact with them. Worse however, is the fact that many clients are dismissed from treatment prematurely by staff if they are found to be using substances during treatment, negating treatment effects since they are unable to receive it. Regarding type of substance abused, decreased retention rates associated with cocaine or crack use may be related to the type of treatment typically delivered. Many outpatient programs incorporate treatment that is based upon models developed for alcohol dependent individuals (Veach et al., 2000). Clients entering treatment with a cocaine or crack only dependence diagnosis may not fare as well in programs with such an approach that focuses so intensely on alcohol abuse and does not consider factors that may be distinct for those with a positive dependence for cocaine. Such clients may be more appropriately suited for different types of treatment interventions, supporting the notion that the fit between client and program is a critical factor (Wickizer, et al., 1994). Indeed, research has indicated that clients engaged in intensive inpatient alcohol treatment, whose primary substance of abuse was not alcohol, were more likely to drop out of treatment than those clients with alcohol as their primary drug of choice (Wickizer, et al., 1994). On the other hand, clients who use drugs more often prior to entering treatment may also find it difficult to follow any type of treatment program as it is counter to "the antisocial

lifestyle frequently adopted by substance abusers" (White et al., 1998, p. 56). Regardless, these types of issues should be considered by treatment providers when determining appropriate level of care as well as developing treatment plans and interventions for clients.

Age

The relationship between client age and retention has been identified as one of the most consistently significant findings in the literature. More specifically, older clients are found to be retained in treatment for longer periods and prematurely dropout of treatment less frequently than younger clients, regardless of the treatment modality (Chou et al., 1998; Green, Polen, Dickinson, Lynch, & Bennett, 2002; Kavanagh et al., 1996; Mammo & Weinbaum, 1993; Mitchell-Hampton, 2006; Roffman et al., 1993; Rowan-Szal et al., 2000; Satre, Mertens, Arean, & Weisner, 2004; Stark, 1992). This phenomenon has been especially true among male clients with older males remaining in treatment for longer periods as well as demonstrating more favorable treatment outcomes than their younger counterparts (Hser et al., 2004; McCaul, Svikis & Moore, 2001; Mertens & Weisner, 2000). One investigation indicated that in regards to age, "for each one-year increase in age, there was a 2.8% increase in the likelihood of completing treatment" (Siqueland at al., 2002, p. 29). The consistency of age being a significant predictor of treatment retention may be due to younger persons using more substances, using a more wide variety of substances, being less likely to have children who rely on them, or possessing a behavioral impulsivity that is often associated with teens and younger adults (Satre et al., 2004; Stark, 1992). These results do suggest that older adults can be retained in treatment and fare well while engaged. Although older individuals tend to represent a small

percentage of substance abuse treatment samples (Satre et al., 2004), their presence in the therapeutic milieu could potentially assist younger clients by modeling longer stays in treatment.

Gender

Gender has also been implicated as being related to treatment retention. Past research often focused solely on male substance abuse populations, although this tendency has changed (Jarvis, 1992). Historically, women have been excluded from research samples since they often represented such a small percentage of the overall sample, which prevented researchers from being able to conduct separate analyses adequately (Booth, Blow, Cook, Bunn, & Fortney, 1997). Nonetheless, it has been documented that women generally face more barriers to seeking and engaging in treatment than men (Green, 2006) and report experiencing different types of problems outside of their drug or alcohol use when entering treatment.

The literature on treatment retention and how gender relates to it has been mixed. For example, in a large multi-site and multi-modality treatment sample (Joe et al., 1999), among methamphetamine users (Maglione, Chao, & Anglin, 2000a; 2000b), and uninsured African Americans (Mitchell-Hampton, 2006), women have been found to remain in outpatient treatment for a longer period than men, though this finding was not confirmed in methadone maintenance programs or inpatient treatment. Other studies including outpatient samples demonstrated opposite findings suggesting that men not only attended more counseling sessions but also remained in treatment for a longer period than women (Hser et al., 2004; Arfken, Klein, di Menza, & Schuster, 2001; King & Canada, 2004; Mammo & Weinbaum, 1993; McCaul et al., 2001).

Research conducted in the 70s to early 90s suggested that females were less likely

to initiate, engage in, and remain in substance abuse treatment compared to males (Green,

2006; Stark, 1992). This may be an artifact of the concept that treatment approaches have

been geared towards men more than women. Male-focused treatment may have resulted

from, historically, men being diagnosed with substance use disorders more often than

women (Keyes, Grant, & Hasin, 2008); hence men have comprised a larger proportion of

the treatment population. More recently however, research has found that gender

differences associated with the prevalence of substance abusers are shrinking. For

example, there is increasing evidence that the gender gap previously linked with alcohol

use between men and women is closing. Although men have typically been found to

drink more alcohol and are diagnosed with alcohol disorders more often than women,

these gender differences are decreasing. Since the 1970s women have been using alcohol

more often, in larger quantities, and suffering from alcohol related disorders in increasing

numbers (Keyes et al., 2008). This may be a consequence of the changes in traditional

roles typically associated with women since the 1970s as evidenced by more women

working outside of the home and having children later in life or not at all. Furthermore,

recent studies suggest that women are just as likely as males to engage in, remain in, and

complete treatment (Green, 2006; Green et al., 2002; Hser, Evans, & Huang, 2005;

Jarvis, 1992). These findings may be reflective of the more recent trend to provide

thoughtful, gender-sensitive treatment addressing specific treatment needs associated

with the different genders (Green et al., 2002). For example, treatment programs may

offer child-care services or make other attempts to remove the barriers that could

potentially impede women from remaining in substance abuse treatment.

The inconsistent results regarding gender differences has prompted the hypothesis that more specific factors associated with certain subgroups of men and women may be related to treatment retention. This deduction has resulted in the claim that "sex-specific risk factors are an understudied area" (Mertens & Weisner, 2000, p. 1526). For example, younger female veterans who were diagnosed with depressive disorder (Justus et al., 2006), and women engaged in a program that accepted private and public funding (Chou et al., 1998) have been documented as remaining in treatment for a longer period than men. At the same time, women were more likely to drop out of treatment than men when they indicated higher problem severity in the employment arena (Green et al., 2002) or with regards to psychiatric distress (Mertens & Weisner, 2000; Siqueland et al., 2002). This latter finding is noteworthy considering that a larger proportion of women are admitted into treatment with a co-occurring psychological disorder (44%), compared to males (30%) (Substance Abuse Mental Health Services Administration, 2004). Men have also been found to be less likely than women to complete treatment when they report experiencing greater psychiatric distress (Green et al., 2002) and have drug dependence diagnoses (Mertens & Weisner, 2000). On the other hand, men have been found to be more likely to remain in outpatient treatment than women when they also identified a strong need for employment counseling (McCaul et al., 2001), were better educated (Mammo & Weinbaum, 1993) and were over the age of 40 (Mertens & Weisner, 2000).

These results suggest that although there do not appear to be significant differences between males and females in terms of their initiating, engaging in, and completing substance abuse treatment, the correlates and predicators associated with treatment retention and outcomes between the genders are likely distinct. Therefore, men

and women may respond to different types of treatment interventions. For example, women may respond more favorably to approaches that help to eliminate barriers and provide more comprehensive support both within and outside of the treatment realm, whereas men may benefit from treatment identifying employment related problems and include interventions that focus specifically on improving such functioning. Research has supported this notion. When the same treatment was delivered to single gender groups, treatment retention and completion was not significantly higher than the retention and completion rates of the mixed-gender treatment groups (Bride, 2001).

Ethnicity

Ethnicity has been linked to length of stay in and premature dropout of substance use treatment across treatment modalities. For example, when developing a predictive model for retention among cocaine users, Siqueland et al. (2002) found that younger, African American clients who were unemployed remained in treatment for a shorter period of time. Furthermore, in an outpatient HMO treatment sample, African American women were found to be at an increased risk of prematurely dropping out of treatment compared to the Whites and Latinos in the sample (Mertens & Weisner, 2000). Other studies have found similar results demonstrating that African American clients were more likely than Whites to dropout of substance abuse treatment before it was completed (King & Canada, 2004; Mammo & Weinbaum, 1993). This is especially noteworthy because although African Americans are "overrepresented in treatment centers relative to their population size, an indication of the prevalence of the problem in this race group, few remain to complete the (treatment) program" (Mammo & Weinbaum, 1993, p. 94).

Milligan, Nich and Carroll (2004) investigated results from two previous studies examining treatment differences between African American and White clients. Their results demonstrated that poorer retention among African Americans was the most salient difference between the two groups. The less favorable retention rates of African Americans remained even after pretreatment characteristics and expectations regarding treatment were controlled for. A review of earlier research unveiled more conflicting results with studies finding higher, lower, and no difference in rates of dropout for African American clients compared to that of Whites and other ethnic minorities (Stark, 1992). White et al. (1998) found that outpatient Hispanic clients were over two and half times more likely to demonstrate premature attrition than Whites or African Americans. Ethnic minorities have also been found to spend fewer days in methadone maintenance and inpatient treatment modalities to treat heroin addiction (Verdurmen, Smit, Toet, Van Driel, & Van Ameijden, 2004).

Reasons for the demonstrated associations between ethnicity and retention have not been adequately explained. Although the links between ethnicity and treatment retention have underscored the need to address this issue, the factors that appear to deter minorities from remaining in treatment remain elusive. The question remains whether such differences are due to the programs' inabilities to appropriately address the distinct needs of different ethnic groups, including offering more culturally competent services, or if other treatment factors are involved. It has been hypothesized that treatment practices are often designed to suit the needs of the majority population (Verdurmen et al., 2004). For example, some research has suggested that a client's ethnicity may impact how well a client "fits" with the norms or cultures associated with different treatment

models and settings since African Americans have been found to fare better in intensive

inpatient versus intensive outpatient, where the opposite has been found to be true for

White clients (Wickizer, et al., 1994). The reasons for these differences in "fit" have not

been identified. Moreover, minority populations do not have the same access to quality

treatment and tend to experience more serious consequences of substance use than

Whites. For example, African Americans and Hispanics are more likely to develop new

problems of dependence over their life and more likely to die from alcohol cirrhosis than

Whites (Schmidt, Greenfield, & Mulis, 2006). These disparities between ethnic

minorities and Whites may be illustrated by the fact that alcohol consumption and

problems have decreased since the 1980s for Whites, but these rates have remained fairly

stable among African Americans and Hispanics (Schmidt et al., 2006).

Summary of Retention Literature/Conclusions

The cited body of retention literature presents conflicting findings and wide

variability regarding the correlates and predictors of retention. Some of these

inconsistencies could be due to a number of methodological limitations. For example, the

challenge inherent in comparing findings between studies may have to do with the variety

of methods and instruments employed to measure client characteristics (Rounsaville,

1993, as cited in Broome et al., 1999). For example, psychiatric factors were measured in

different ways and by different people, including the use of self-report measures like the

Symptom Check List, (Roffman et al., 1993), and the Addiction Severity Index (Lang &

Belenko, 2000), or clinician driven determinations through the Structured Clinical

Interview for the DSM (SCID) (Daughters et al., 2005; Justus et al., 2006). Related, it can

be difficult to measure predictor variables suspected of being related to retention when

there are a number of ways to conceptualize and define the variables. Motivation is a good example of this. As was indicated above, motivation is a complex theoretical construct that has been defined and measured in various ways (Klag et al., 2004; Simpson, 2001). Although it has been recommended that standardized assessments be used across studies to address this variability, it is likely that the large number of substance abuse investigations, spanning many years, has prevented this standardization from taking place (Rounsaville, 1993, as cited in Broome et al., 1999).

Another common methodological problem associated with retention investigations includes the manner with which the variable "retention" is measured and defined. Some investigations looked at treatment completion status as indicative of retention (e.g., Green et al., 2002; Sinqueland et al., 2002), while others included specific lengths of stay as representative of retention (Broome et al., 2002; Hser et. al., 2003). The duration of time utilized to define retention through these specific lengths of stay has also been inconsistent. These definitions have been found to vary significantly from study to study, and the only consistency is the inconsistency with which variables like completion, drop-out, and retention are defined (Wickizer et al., 1994). This inconsistency interferes with one's ability to interpret, apply and aggregate research results across studies while also making it challenging for treatment programs to extrapolate meaningful conclusions as they relate to their program. The lack of consistency in how retention is being defined begs the questions of whether retention studies are investigating the same phenomenon and if some of the lack of reliability associated with the results is related to the variability in definitions of retention (Wickizer et al., 1994).

In summary, it is perhaps not surprising that much of the retention literature is conflicting. If different programs attract different types of clients, and the programs themselves offer different types of treatments and services, retention trends and predictive characteristics are likely to vary (Joe et al., 1999). Indeed, client factors that have been found to be predictive of retention in one study are not consistently implicated in others, and single variables that are repeatedly predictive of retention have not been unequivocally identified (Kayman, Goldstein, Deren, & Rosenblum, 2006). Compounding these issues is the variability of the treatment approaches employed at various centers and the types of clients they attract. Even when similar treatments are delivered and differences in client characteristics are controlled for, retention rates have been found to differ between programs (Broome et al., 1999; Joe et al., 1998). Although a wide variety of factors have been implicated as potentially impacting retention, these have not been investigated comprehensively and more accurately identifying the factors remains an ongoing research challenge (Simpson, 2004).

Chapter III: Method

Overview

The purpose of this chapter is to illustrate the method that was utilized to investigate client predictors of retention in an intensive outpatient substance abuse program. A description of the participants, the data collection procedure, the assessments utilized, and the approach utilized for the data analysis is included. The data collection process was completed in November of 2006. This research project was carried out as a collaborative effort between a Midwest intensive outpatient substance abuse program and a professor and graduate students from Marquette University's Counseling Psychology Department. The primary purpose of the collaboration was an effort to standardize the intake assessment procedure at the treatment center creating a method whereby the assessment information could be utilized both for treatment planning and research purposes. Based upon the treatment process research conducted by Simpson (2004) and colleagues at Texas Christian University (TCU), it is recommended that thorough information be collected on clients at intake and the data should focus on "patient attributes" including motivation for change and indicators of problem severity. Both level of motivation for change and problem severity have been found to predict retention in treatment and hence a client's level of these indicators should be assessed at the point of treatment onset (Miller & Rollnick, 2002; Simpson, 2004).

For the purpose of this investigation, the intake information was collected for dual purposes. First, the information was summarized and compiled into an intake report which was utilized to inform clinical staff of the clients' pertinent treatment issues and treatment plan recommendations. Secondly, for those clients who agreed to participate,

the intake information was also to be utilized for research purposes in an effort to assist

the program in gaining a better understanding of the types of clients that are engaging in

treatment and the predictive elements associated with their treatment retention rates.

Participants

Participants were individuals who entered into the intensive outpatient substance

abuse program from the period of January 2005 – November of 2006. The treatment

program was offered through a private, non-profit, psychiatric hospital in the Milwaukee

metropolitan area. Although it was attempted to conduct the intake assessment procedure

with every client that entered the program during the indicated duration, this was not

possible for a number of reasons. It will be detailed later in this chapter what prevented

every client from being tested, but it should be noted therefore that the sample utilized for

this study was a convenience sample and consisted of a total of 273 participants. Only

clients enrolled in the intensive outpatient program were included in the sample. All

participants were of adult age (at least 18 years) and deemed competent to give consent to

participate. Each participate was read the informed consent form, and consent was

obtained prior to the assessment procedure taking place.

Treatment Program

The intensive outpatient substance abuse program is an abstinence based, 12-step

focused treatment approach. This approach is similar to the Minnesota Model of

treatment, although it does remain distinct from how the Minnesota Model was originally

designed. For example, the origins of the Minnesota Model include inpatient treatment

for a 28-day period focusing on an abstinence prescribed and family involvement

treatment approach. The Minnesota Model began in the 1950s, and more recently, it has

been adjusted so as to be utilized in outpatient settings as well (Anderson, McGovern, &

DuPont, 1999). The treatment program utilized for this study employs some of the basic

tenets of the Minnesota Model including being abstinence based and 12-step focused.

Yet, it should also be noted that it does differ from the origins of the Minnesota Model as

it is not a 28-day inpatient program that intimately involves family members. The

treatment program utilized for this study also includes educational components about

addiction as well as opportunities for emotional processing. Homework assignments are

an integrated part of the treatment process. Upon entry into the program, and at various

points through treatment, drug screens and breathalyzers are administered to monitor

sobriety. Clients are expected to participate in the screens and refusal to do so results in

an automatic assumption that the screen is positive and can thus result in immediate

discharge from the program. The treatment approach employs a group format; the

morning group sessions are three hours and run daily seven days a week; the evening

group sessions are also three hours and run on Monday, Tuesday, and Thursday late

afternoons. In addition to the groups, clients meet weekly with an assigned individual

therapist. Both the group therapy component and completion of the homework

assignments are required for treatment completion. Upon entry into the program each

client meets with a physician for a physical examination. The physician has been working

for this treatment program for over ten years and is also a licensed addictionologist. The

entire treatment team consists of the physician, two primary counselors, and a nurse. Both

counselors hold MSW degrees and are licensed clinical social workers. They also each

hold an advanced license in order to provide specialized clinical services in the area of

addition (CADC-III). Both counselors have been working clinically in the field of

addiction for over 20 years and at this specific treatment center for at least five years.

Decisions about treatment regimens are made individually by the physician and

counselors as well as collaboratively during a weekly staffing.

Intake Assessment Procedure

Assessor Recruitment, Training, and Supervision

Two Ph.D. students (this author and a colleague) from the Department of

Educational and Counseling Psychology were supervised by a faculty member, Todd C.

Campbell, Ph.D., a licensed psychologist, in implementing the standard assessment

procedure. Both Ph.D. students were considered the research project coordinators. To this

end, the two Ph.D. students recruited, trained, and supervised Master's student volunteers

to assist with the assessment administration. A total of approximately 16 students

comprised the assessment team at any given point in time during the two-year data

collection period. All members of the assessment team had received prior training in

basic counseling skills, ethics, and clinical psychopathology. Additionally, the Ph.D.

students conducted two formal trainings for all volunteers that covered the background,

administration, and scoring of the assessments utilized. Each training period lasted

approximately four hours and included lecture components as well as didactic practice

sessions. The first training focused primarily on the background and purpose of the study,

the policies and procedures that were developed to inform the assessment procedure, and

ethical issues pertinent to the research including the informed consent procedure, suicide

risk protocol, supervision, and confidentiality. The second training included formal

instruction on the background, administration, and scoring of the assessment instruments

utilized. Once students completed the formal training sessions they were required to be

observed by at least one of the Ph.D. students during at least one mock administration session with a fellow student. During, and following the administration, feedback was given to the volunteers. In an effort to ensure proper and standardized administration, the mock observations were required before the assessment volunteers were permitted to be observed with clients enrolled in the treatment program. Additionally, before the program coordinators or volunteers were allowed patient contact at RMH, all were required to complete a human resources orientation through RMH. The orientation included CPR certification, self-defense training, and general information about the policies and procedures of the hospital. Finally, the entire assessment team completed an on-line tutorial through the Institutional Review Board on conducting human subjects research.

Once the volunteers completed all the necessary training they were permitted to administer an assessment battery with a treatment client under live supervision by one of the Ph.D. students. Following administration the volunteers were also required to score and interpret the results and compile the results into a feedback form for treatment planning purposes for the clinical staff. At least two administrations of the battery, while under live supervision, were mandatory. Once both were completed the volunteer's comfort level with and proficiency of administration was discussed. When the volunteer, project coordinator, and University supervisor were in agreement that a volunteer was adequately prepared for solo administration they were assigned to a time slot that corresponded with the group times to conduct assessments. The project coordinators had regular contact with the clinical staff in an effort to provide quality assurance checks related to the volunteers performance. Additionally, individual and group supervision was provided by the project coordinators and University supervisor on an as-needed basis.

Intake Battery Administration

　　The intake assessment battery was utilized in an effort to gain a broad understanding of client attributes at the point of treatment entry. This was done in accordance with the TCU model for treatment evaluations which indicates that important client attributes should be considered to comprehensively evaluate for proper level of care placement and other treatment planning efforts (Simpson, 2004). Patient attributes that were included in the assessment procedure included but were not limited to: DSM diagnosis, level of motivation, consequences of substance use, and problem severity. Because these attributes are amenable to change through the therapeutic process and the assessment results were to be used for treatment planning purposes, it was the goal of the project to test new clients within the 48 hour period following treatment entry. Furthermore, it was anticipated that clients would be capable of answering assessment questions around the time of intake since they would have completed any necessary detoxification prior to their admission into the outpatient program.

　　The assessment team was notified when new clients entered treatment by the clinical staff. The assessment team maintained an ongoing log of clients which indicated if and when they had been assessed. The log was kept in a lock drawer in the assessment office. When a new client was added to the list an assessor would report to the group room during the morning or afternoon session and the therapist on staff would locate the new client. It was explained to all clients that the intake assessment procedure was a mandatory component of their treatment regimen and that the results would be utilized for clinical planning purposes as well as shared with the individual clients during a feedback session if requested. If the next client on the testing log was not available for

testing the subsequent client on the list was located. In the event that there was more than one client that needed to be tested the client with the oldest treatment entry date was given priority. If time permitted more than one client would be tested during a group period.

It was a collaborative decision between the researchers and clinical staff to administer the assessments during group time. There was a dual purpose for this approach. First, the assessment procedure was being viewed as part of the client's clinical treatment (just like any intake session) and hence treatment time could then be used for this purpose. Secondly, it allowed for an ease of scheduling both for the clients and the assessors, and did not require the client to devote additional personal time to complete the assessment protocol. Despite making a vigilant effort to test all clients within the 48 hour period of treatment entry, this was not always feasible for a variety of reasons. Early on in the data collection process, the clinical staff would periodically forget to notify the treatment staff of new clients. Also, when a large influx of clients entered treatment at the same time it was not always possible to complete testing on all the clients within the two days since there was only one four hour block available and one office available to conduct the assessments each day. When the master's level volunteers graduated there was often a period of time during the summer months before the next group of volunteers could be trained, when the assessment team was smaller and unable to adequately cover every group time slot. Finally, client attendance also impacted the timeliness with which they could get assessed. Clients would often miss group or prematurely drop out of treatment. Similar obstacles have been noted in the literature as commonly taking place when research is conducted in naturalistic settings (Joe et al., 1999; Simpson et al., 1997).

Although the intake assessment was a required component of the clients'
treatment regimen, participation in the study was optional. All clients were asked if they
would be willing to participate in an intake assessment research project and the study was
described to them. Only a small number of clients declined to participate in the study
(*n*=3). Reasons given for refusal to participate included one client's frustration with the
intake testing process in general, and two other clients who expressed discomfort with
sharing personal information that was then to be utilized for research purposes. For those
clients who agreed to participate, the informed consent was read verbatim to them, they
were given an opportunity to ask any questions pertaining to the study, and a copy of the
informed consent was provided to each participant for future reference (Appendix B).
After the informed consent procedure was completed the assessor would begin
administering the intake battery.

The length of time required to complete the battery would range from
approximately 90 to 150 minutes. The battery was always administered in the same order
and the assessor would read all the questions aloud to the clients and record their
answers. The Addiction Severity Index (ASI; McLellan et al., 1992) was administered
through the computer-assisted version. The program would then automatically generate a
report incorporating the client's responses. The report was passed on to clinical staff for
treatment planning purposes. The data collected through the ASI was exported directly
into an SPSS file through an export program. The Mini-International Neuropsychiatric
Interview (M.I.N.I; Sheehan et al., 1998) was initially administered through a paper-
pencil format. When a computer assisted program was released it was purchased
(February, 2006) and utilized to collect the remaining data. Because an export program

was not available to export the data into SPSS, the paper-pencil responses and

computerized data was all manually entered into an SPSS database by the program

coordinators. The remaining assessments, Form90 Drinking Assessment Interview

(Form90; Miller, 1996), Inventory of Drug Use Consequences (InDUC; Miler, Tonigan,

& Longabaugh, 1995), and Stages of Change Readiness and Treatment Eagerness Scale

(SOCRATES; Miller & Tonigan, 1996), were originally administered in paper-pencil

format and later converted to an on-line format (February, 2006) for ease of

administration and data export. All the completed paper-pencil assessments were

retrospectively entered into the on-line format for ease of data export. The project

coordinators were responsible for compiling and managing the data base. The Alcohol

Abstinence Self-Efficacy Scale (AASE; DiClemente, Montgomery, & Hughes, 1994) was

also part of the assessment process, but was incorporated long after the data collection

process started. Because of this, and the fact that the instrument was only utilized with

clients who abused alcohol, it was not included in the data analysis process.

After the administration of the battery was completed, the assessor would

manually score all the instruments and utilize the results to complete a personalized

feedback form (Appendix C). The computer generated ASI report was also printed out.

Both documents were given to the client's primary clinician and became part of their

medical chart. The feedback form was designed with a few purposes in mind. First, it

provided a means to efficiently summarize the assessment results for utilization in

treatment planning by the clinical staff. Second, it was also designed to facilitate a

discussion with the client during a feedback session as a clinical intervention. Although

the treatment staff did not consistently conduct feedback sessions with the clients, all

clients were informed that a feedback form would be provided to their counselor and they were able to request a feedback session if interested. The original completed instruments, a copy of the ASI generated report, and feedback form, were maintained on all clients who agreed to participate. Each packet was de-identified and assigned a code number. All de-identified files were maintained in a locked filing cabinet at RMH. The signed informed consent packets were held in a locked cabinet at Marquette University. The data will be kept for approximately seven years and then destroyed.

Measures

The psychometric quality of assessment instruments is a critical factor when attempting to collect reliable and valid data. Psychological practice and research tends to measure a broad constellation of factors included but not limited to: problem severity, clinical diagnosis, symptomology, and impairment (Blacker & Endicott, 2008). In order for the assessment of these factors to be useful for both clinical and research purposes measures should be selected that help to improve the reliability and validity of the information gleaned then what might be gathered from an unstructured interview. According to Blacker and Endicott, "thus, an evaluation of each measure's reliability and validity is key to judging the potential value of each measure for a particular purpose" (p. 7).

There has been a lack of consensus, however, in establishing standards or guidelines of acceptable reliability and validity (Charter & Feldt, 2001). Established guidelines have been found to vary depending on whether the instrument is to be used for research or clinical purposes and a variety of standards have been identified by various authors throughout the years (Charter, 2003). For example, Nunnally and Bernstein

(1994) indicated that for research purposes (i.e. exploring group differences) "time and energy can be saved using instruments that have only modest reliability, e.g., .70. It can be argued that increasing reliabilities much beyond .80 in basic research is often wasteful of time and money." (pp. 264-265). When making decisions about people based upon test scores however, Nunnally and Bernstein purported that more rigorous standards be implemented. When decisions based upon test scores say for education placement purposes are to be made, Nunnally and Bernstein indicated that a reliability coefficient of .90 is "the bare minimum" and a coefficient of .95 is more ideal. Cicchetti (1994) also reported reliability standards when measures are utilized for clinical purposes. He provided the following guidelines: $r < .70$, unacceptable; $.70 \leq r < .80$, fair; $.80 \leq r < .90$, good; and $r \geq .90$, excellent. It should be noted, however, that Cicchetti's standards have been argued as being too lenient (Charter, 2003). Other standards have been identified when making clinical decisions. For example, a reliability of at least .85 was identified by Aiken (2003) and Rosenthal and Rosnow (2008). Furthermore, according to Sternberg (1994), when utilizing instruments for screening or diagnostic purposes, reliability estimates should not fall below .85 and ideally, be around .90.

As illustrated, there is variability in what constitutes an adequate reliability coefficient and fittingly, it has been stated that "any [reliability] threshold values are bound to be arbitrary" (Mäkelä, 2004). Nonetheless, for the purposes of this study, we attempted to utilize measures that demonstrated reliability coefficients of at least .80. It should be noted though, that because the clinical utility of the measures was also important, we may have sacrificed some psychometric strength in exchange for increased clinical utility at times, especially since we were not utilizing the result to make

important decisions about the clients (i.e., level of treatment placement). Hence, when selecting measures for this study, we attempted to find a balance between being scientifically rigorous by utilizing psychometrically sound instruments, while also attempting to create an assessment battery that was not too lengthy, despite collecting comprehensive client information.

Because the assessment results were utilized to construct a feedback form for treatment planning purposes, the type of clinical information yielded by the assessments was also considered when selecting the instruments. As indicated by Donovan (2003) the client's level of awareness as it relates to their substance use patterns (including frequency and quantity), the consequences of their use, and their own perceptions of these factors, is an important consideration. Donovan stated that it is the use of assessment instruments that can help increase this awareness as "an important step in the process to initiate behavior change and treatment-seeking behavior" (Donovan, 2003, p. 138). In order to collect comprehensive intake data on the clients, measures were selected that would investigate a broad range of factors that have been indicated in the substance abuse literature as potentially impacting client retention. These factors include, but are not limited to, problem severity, client motivation, legal difficulties, and comorbid psychiatric distress (Simpson, 2004).

Addiction Severity Index, 5th Edition (ASI)

The ASI is a semi-structured interview that has been used widely both for clinical and research purposes for almost 30 years and "is probably the most commonly used instrument in the substance abuse treatment field" (McLellan et al., 1992; Rush, First, & Blacker, 2008, p. 454). It was developed by A. Thomas McLellan and colleagues at the

Center for Studies of Addiction in Philadelphia primarily for research purposes (Mäkelä, 2004). The ASI was designed to collect broad client information that is thought to be impacted by substance abuse treatment (i.e. psychiatric severity, employment problems, and criminality) and was done so in a format that would allow for follow-up administrations. One of the strengths of the ASI is that it can be used to identify problems outside of, but perhaps related to, substance use and hence be used as a multidimensional measure of substance abuse treatment outcomes (Donovan, 2003). The primary reason the authors designed the ASI to collect such broad information, through various points of treatment, was in an effort to conduct outcome assessments across programs (McLellan at al., 1992). The ASI is currently in its 5th edition as changes were implemented in an effort to reflect how drug use patterns and knowledge of substance use disorders have changed over time. For example, when the ASI was first introduced the use of "crack" and polysubstance abuse was not as common as phenomenon as now. The instrument was updated to reflect such cultural shifts and the growing body of scientific knowledge regarding addictive behaviors (McLellan et al., 1992).

Administration of the ASI is completed in an interview format and takes approximately 45-60 minutes when conducted by a trained assessor. This author attended a two-day training covering proper administration and scoring of the ASI by the Treatment Research Institute (TRI). Training materials were provided and subsequently utilized during the volunteer assessor training at Marquette University. Proper administration of the ASI requires specific wording of the questions and the comprehensive training by TRI included formal instruction and mock sessions in an effort to help increase the consistency with which the data is collected and to reduce

errors (McLellen, Cacciola, Alterman, Rikoon, & Carise, 2006). A computer assisted program can also be utilized to increase consistency of administration since there are specific prompts that specify the exact wording of each question. The computer assisted program was utilized for every administration in this study.

Administration of the ASI is conducted in a semi-structured format and consists of items to identify potential problems in seven distinct areas that are often negatively impacted by substance abuse: medical status, employment status, drug and alcohol use, legal status, family/social status, and psychological status. Both a client's subjective appraisal of problem severity, and objective questions to assess for problem severity are included (Rush, First, & Blacker, 2008). Each of the seven sections focuses questions on the frequency, intensity, and duration of the problems experienced by the client both within the past 30 days and over the course of their lifetime. At the conclusion of each section the client indicates, based upon a four point scale, how troubled or bothered they have been by the related problems over the past 30 days and how important it is to receive treatment for those problems. The interviewer also indicates the client's severity rating (between 0-9) for that section based upon clinical judgment and the information shared by the client. Per the manual, it is suggested that the interviewer first identify a two to three point range of severity and then refine this estimate based upon the answers provided by the client (Alterman, Brown, Zaballero, & McKay, 1994). There are two separate summary indices for each of the seven sections, composite scores, and interviewer severity ratings. Sample items from the ASI include the following: "How many times have you been treated for any psychological or emotional problems?" and

"How much have you been trouble or bothered by these psychological or emotional problems in the past 30 days?" (Rush et al., 2008, p. 455).

A number of strengths and limitations of the ASI have been identified. One of the most frequently noted strengths is that the ASI is able to gather a large amount of broad data with a wide range of substance abusers (Rush et al., 2008). This data can be used to gather information at the point intake, throughout treatment, at discharge, and at various follow-up points, to evaluate client progress and change. As such, the information gleaned from the ASI can be utilized for treatment planning, treatment monitoring, program evaluation, and treatment outcome studies (McLellan et al., 1992). In addition to the ASI being used throughout the world, there is a great deal of normative data available on a number of client populations and as such it has the potential to facilitate communication between clinicians and researchers (Rush et al., 2008). It should also be noted that the ASI is available through the public domain and can be utilized at no additional cost to treatment programs. There have also been noted limitations associated with the use of the ASI, however. Longer administration time, a required interview format, and high face validity are a few limitations of the ASI. Furthermore, until recently, the use of ASI with adolescent populations had not been validated and further study in this area is warranted. Finally, the determination of the severity ratings have been described as subjective and point to the importance of proper training of ASI interviewers (Rush et al., 2008).

Psychometric Properties of the Addiction Severity Index

A fair amount of research has been conducted on the psychometrics associated with the ASI. For example, in a review article by Mäkelä (2004), 37 investigations were

identified as reporting psychometric data on the ASI. Historically, the reliability and validity associated with the ASI has been summarized in the literature as "very positive" (Mäkelä, 2004, p. 398). As will be discussed, however, when looking more closely at the data, there have been variations detected in the ASI's ability to generate reliable and valid data, especially among specialized populations.

Reliability estimates were investigated by McLellan et al., (1985) through three treatment centers providing both outpatient and inpatient care. Concurrent and test-retest reliability estimates were evaluated. Concurrent reliability coefficients for each scale were calculated separately and overall were found to be "high" (McLellan et al., 1985). The authors concluded, "thus the data indicate that for any given scale, the coefficient of reliability will fall between .74 and .99 depending upon the method used to calculate it, and that eight judges will agree within 2 points on the 10-point estimate 89% of the time" (McLellan et al., 1985, p. 415). The same study also investigated test-retest reliability with a time frame of three days. The severity rating assigned by the interviewers were quite similar as demonstrated by coefficients of .92 or higher, even when two interviewers were utilized (McLellan et al., 1985). A longer test-retest time period (13 days) of the "lifetime" questions of the ASI was examined in a more recent investigation. Results demonstrated that longer interval test-retest reliability of the ASI generated reliability coefficients deemed "good to excellent" for most of the lifetime items included in the medical, employment, drug, alcohol and legal problem areas. Questions included on the family/social and psychiatric sections of the ASI, however, had many items that did not achieve acceptable reliability coefficients. These interpretations were based upon the following cutoff scores of the ICC and kappa: less than .40, poor; between .40 and

.59, fair; between .60 and .74, good; greater then .74, excellent (Cacciola, Koppenhaver, McKay, & Alterman, 1999). The authors suspect that part of these conflicting results may be related to the notion that problematic interpersonal relationships and psychiatric distress involve more subjective interpretations that can vary over time, versus more objective medical and substance use histories. Still, the authors conclude that the ASI is capable of producing reliable data over longer interval test-retest conditions overall (Cacciola, Koppenhaver, McKay, & Alterman, 1999).

In Mäkelä's review article the results of test-retest studies of the ASI composite scores have been varied. For example, among homeless populations there was considerable variation across sites with ICCs ranging from .03 (family/social relationships) to .97 (alcohol use) (Drake, McHugo, & Biesanz, 1995). Additionally, Mäkelä cited a 10-day test-retest study that included alcohol dependent patients which demonstrated reliability coefficients between .71 and .95 for composite scores (Daeppen, et al., 1996). After reviewing a total of eight studies that investigated the test-retest reliability of the ASI, Mäkelä concluded that the reliabilities ranged from excellent to unsatisfactory. It should be noted however, that the majority of studies which demonstrated unsatisfactory reliabilities coefficients were conducted with "special populations" including homeless populations (Drake, McHugo, & Biesanz, 1995) and individuals with severe mental illness (Corse, Zanis, & Hirschinger, 1995). On the other hand, a study that included alcohol-dependent participants (who are more closely related to the sample for this current study), results demonstrated test-retest reliabilities of composite scores between .71 and .95 (Daeppen at al., 1996).

Internal consistency has also been investigated in a number of studies since the 1980s. Zanis, McLellan, and Corse (1997) reported that all ASI domains demonstrated at least acceptable internal consistencies, except for the legal section (α=.57). Internal consistency for ASI composite scores has also been evaluated. Results demonstrated a mean alpha of .80, with a range of .89 (medical) to .70 (employment) (Lawrence, Vida, Edward, & Daniel, 1997). In a sample of psychiatric patients, Appleby, Dyson, Altman, and Luchins (1997) reported an overall high internal consistency with a mean alpha of .80 for the composite scores. Individual alpha scores were found to range from .89 (medical) to .70 (employment). In Mäkelä's (2004) review article, of the 12 studies cited for reporting internal consistency, high internal consistencies were regularly reported for the medical, alcohol, and psychiatric composite scores. In four of the 12 studies, lower consistencies were reported for the other domains including employment, drug use, legal status, and family/social relationships.

Inter-rater reliabilities have also been examined. Some studies have demonstrated high reliabilities for severity ratings (above .80) among clients entering substance abuse treatment (McLellan et al., 1980, 1985; Stoffelmayr, Bertram, Mavis, Brian, & Kasim, 1994). Appleby et al. (1997) reported inter-rater reliabilities utilizing the ICC. The ASI severity ratings assigned by eight raters demonstrated an average ICC of .74. Reliability for the medical (.75), employment (.74), and alcohol (.79) sections was defined as substantial. The reliability for the drug (.83) and legal (.87) sections were defined as very high. The ICC for the family/social section was .70 and only moderate for the psychiatric section (.48). Agreement between the raters was very high for the composite scores on all seven sections with the lowest coefficient at .95. Zanis et al. (1997) reported inter-rater

reliabilities with coefficients ranging from .71 (employment) to .95 (legal) with an overall

mean of .79. Mäkelä's (2004) review article reported inter-rater reliabilities ranging from

high to unstable. He asserts that the employment, drug, family/social, and psychiatric

severity sections were found to demonstrate the lowest coefficients. Inter-rater

reliabilities of the composite scores though, were found to be consistently higher, likely

due to the notion that there is more subjective judgment associated with the assigned

severity ratings.

Because the authors of the ASI made a considerable effort to create seven distinct

domains, discriminant validity associated with the ASI has been investigated. Satisfactory

discriminate validity would be represented by stronger relationships existing between

conceptually corresponding measures than non-corresponding measures. As reported by

Mäkelä (2004), the studies conducted on the ASI are limited to investigations focused on

intercorrelations of the ASI problem areas themselves and not other conceptually similar

or distinct measures. Appleby et al. (1997) reported that both the drug and legal section,

and family and psychiatric section were moderately correlated. Nonetheless, the authors

concluded that despite some overlap, the domains are "largely independent of each other"

(p. 159). Appleby et al. (1997) also investigated the ASI's criterion validity, which

"refers to the extent to which the measurement correlates with an external criterion of the

phenomenon under study" (Mäkelä, 2004). The alcohol severity and composite scores of

the ASI were correlated with the CAGE and the Short Michigan Alcoholism Screening

Test (SMAST). The CAGE is an instrument that assesses for alcohol problems over one's

lifetime and the SMAST is an instrument that measures lifetime alcohol use. The drug

severity and composite scores of the ASI were correlated with the CAGE-AID, which

assesses lifetime drug use problems, the Chemical Use, Abuse, and Dependence Scale (CUAD), which provides a substance use diagnosis and severity ratings for drug and alcohol use, and the Drug Abuse Screening Test (DAST), which measures drug abuse. Moderately significant relationships between the alcohol severity rating and alcohol composite score with the CAGE (.45, .50) and SMAST (.52, .59) were reported. More robust relationships were identified in the assessment of drug problems. The drug composite score was strongly related to the CAGEAID (.64), DAST (.73), and CUAD (.70) (Appleby et al., 1997).

A more recent investigation looked at how well the ASI composite scores could predict DSM-IV substance dependence diagnoses (Rikoon, Cocciola, Carise, Alterman, & McLellan, 2006). Two samples were utilized, each with a different diagnostic tool. One group included the ASI with *DSM-IV* questions included and the other included the Structured Clinical Interview for DSM Disorders (SCID) for the *DSM-IV*. Statistically significant correlations were found to exist between the alcohol and drug composite scores with the DSM-IV diagnoses of alcohol dependence (r>.66, p<.01) and drug dependence (r>.72, p<.01). Additionally, "the ASI identified dependent clients with approximately 85% sensitivity and 80% specificity" (p. 17), leaving the authors to conclude that the ASI could be utilized as a useful diagnostic screening instrument. The sensitivity and specificity of the psychiatric subscale has also been investigated. The authors reported that ASI psychiatric section was able to identify clients with concurrent depression with 89% sensitivity and 67% specificity (Kosten, Rounsaville, & Kleber, 1983).

Concurrent validity of the ASI has also been investigated in an effort to determine how well the ASI measures what it intends to measure by comparing it with validated instruments designed to measure similar constructs (McLellan et al., 1985). In the first independent study to evaluate concurrent validity was conducted with a sample of 204 opiate dependent individuals seeking substance use treatment. Results indicated that the family/social relationships, employment, legal and psychiatric severity ratings demonstrated good concurrent validity with self-report measures of social adjustment issues, employment problems, legal issues, and psychiatric problems (r = .39 - .59, p < .001). On the other hand, the drug section demonstrated little concurrent validity with drug abuse problems (r = .11) and the medical subscale was not included in the evaluation as no instrument assessing physical health as a comparison was available (Kosten, et al., 1983). McLellan et al. (1985) evaluated the concurrent validity of the ASI severity ratings by dividing the sample into low, middle, and high severity across the seven domains. Comparisons were then made between the groups and items that were identified as clearly indicating problem status. Results indicated that "clear evidence of concurrent validity for the ASI scale ratings" (p. 417). Current validity was also investigated with participants from specialized populations. Carey, Coccoo, and Correia (1997) investigated the ASI's concurrent and discriminate validity when administered to a group of clients with severe mental illness. Results indicated that support for convergent validity was indicated for many scales but evidence to support the discriminate validity was less consistent especially for the family/social and employment subscales.

As illustrated by the variety of studies cited, the ASI has demonstrated both favorable and questionable psychometric properties. Most of the less favorable findings were found to be indicated when the ASI was used with special populations, including those with severe mental illness and homeless populations (Carey et al., 1997; Zanis et al., 1997). Taken together, the results also suggest that the ASI can produce both reliable and valid data, especially when administered by a trained assessor. The population utilized for this study was drawn from clients entering an outpatient substance abuse treatment program and hence the utilization of the instrument with this type of group appears to be appropriate. Additionally, the counselors at the treatment center were found to appreciate the clinical utility associated with the ASI. Psycho-social reports were automatically generated after the interview was completed and provided the counselors with a helpful picture of their client at treatment outset. This reason, coupled with the evidence that the ASI is appropriate to use with such a population, is why the instrument was utilized for this study.

Form 90 Drinking Assessment Interview (Form 90)

Perhaps one of the most important dependent variables to measure in substance abuse treatment research is alcohol consumption (Miller & Del Boca, 1994). Historically, there has been much debate about the ideal manner with which to measure this critical variable. Previously "it was once common to simply assess if treated alcoholics were successful (abstinent) or relapsed (drinking) at treatment discharge" (Rice, 2007, p. 615). During the 1990s, the approach used to measure alcohol consumption shifted from this binary method to four popular approaches: (1) quantity-frequency questionnaires, (2) average consumption grids, (3) timeline follow-back calendars, and (4) self-monitoring

diaries (Miler & Del Boca, 1994, p. 112). Quantity-frequency methods are deemed as being useful to collect reliable information about the total amount of alcohol consumed and total number of days drinking. This can be a relatively quick method recommended when used for evaluating drinking behaviors that are not pattered (Sobell & Sobell, 2003). Average consumption grids can be useful when the client has an established pattern of regular or episodic use. One of the benefits of this type of approach is that blood alcohol concentration (BAC) and total number of hours intoxicated can be calculated relatively easily (Miller & Del Boca, 1994). The timeline follow-back approach is a widely used method that utilizes a calendar to allow the client to retrospectively chart their alcohol use (Rush et al., 2008). The approach is designed for the interviewer to attempt to account for the amount of consumption every day on the assessment calendar. This will help to illustrate how times through the day and events are linked to drinking patterns, and helps the interviewer to classify drinking patterns as "abstinent", "light", "medium", or "heavy" (Miller & Del Boca, 1994). Finally, self-monitoring diaries are distinct from timeline follow-back methods by providing a client with a prospective calendar and asking them to keep a diary of their drinking as it takes place. Some noted limitations with this approach is that compliance to regularly fill out the diary can be compromised especially over long periods of time, and also the process of self-monitoring could impact patterns of drinking behavior (Miller & Del Boca, 1994).

Because no single method was identified as being superior, a number of researchers developed a new instrument in an attempt to incorporate the strengths of the methods identified above. The result was a hybrid instrument that combined the timeline follow-back and average consumption grid, which would record alcohol consumption

over a 3-month period (Miller & Del Boca, 1994). Hence the "Form90" was born. The

Form90 is a structured, interviewer conducted assessment that incorporates the use of a

calendar illustrating each of the 90 days of drinking behavior that are get recorded.

Holidays, and other memory prompts (e.g. NFL games), are included to assist with recall.

Alcohol consumption is measured for each of the 90 days in the assessment window. All

abstinent days are recorded first and then the interviewer begins to determine if the client

demonstrated steady patterns of drinking. A steady pattern chart is then constructed to

represent steady and consistent patterns of drinking. Exceptions to steady patterns are

also calculated by documenting episodic patterns (to represent recurring drinking

episodes) and finally, idiosyncratic drinking days that do not fall into steady or episodic

categories are calculated. For any drinking episode the client's BAC can also be

calculated by inquiring about the period of time in which the alcohol was consumed

(Miller &Del Boca, 1994). To calculate peak BAC levels for clients in this study we

utilized a computer program, The Blood Alcohol Concentration Computation System

(BACCuS), which converts alcohol quantities into standard drink units and indicates

BAC levels based upon gender, weight, and time spent drinking.   Administration of the

Form90 is complex and requires adequate training (Miller & Del Boca, 1994). For the

purposes of this study the program coordinators received formal training on

administration and mirrored this training for the volunteers. The training involved both

lecture based format as well as an audio taped mock interview so the volunteers could

practice recording the information and feedback was provided.

Psychometric Properties of the Form90

Tonigan, Miller, and Brown (1996) conducted two reliability studies of the Form90, one cross-site study to investigate inconsistencies between site interviewers, and one within-site study to investigate inconsistencies between paired interviewers. Reliability estimates were calculated on the outcome measure of drinking, illicit drug use, and general adjustment. Outcomes were found to be "relatively consistent" in both tests with $r \geq .90$ in 57 of the 81 comparisons. More specifically, results indicated fair to excellent reliability of drinking outcome indices (ICC = .55-.97) and comparisons of the weekly ICCs demonstrated that the Form90 can produce reliable alcohol consumption data over time (Tonigan et al., 1996). Rice (2007) also investigated the retest reliability of the Form90 with 83 participants demonstrating heavy drinking patterns. Comparison of the initial and retest interviews indicated a kappa coefficient of .766 (95% confidence interval: .750-.782).

A study investigating the convergent validity of the Form90 with similar alcohol consumption measures was also conducted. Grant, Tonigan, and Miller (1994) looked to compare the Form90 with two other alcohol consumption measures, a quantity-frequency scale and a grid measure. Adequate convergent validity of the Form90 was reported by the authors. More specifically, the comparisons between the Form90 and the grid method demonstrated the highest correlation on drinking days ($r = .80$) and modest correlations on standard drinks consumed ($r = .59$) and peak BAC ($r = .66$). Comparisons between the Form90 and the quantity-frequency measure on days of drinking demonstrated similarities between the measures in number of days drinking ($r = .80$) and total number of standard drinks consumed ($r = .70$).

Because the Form90 has demonstrated adequate convergent validity and satisfactory reliability it has been recommended for use for a variety of applications and in a variety of settings when assessing for alcohol problems (Sobell & Sobell, 2003). It was selected for this project for these reasons coupled with the benefits associated with providing feedback to clients about their drinking behaviors. The very detailed accounting of previous drinking patterns has the capability to assist clients in gaining a more accurate understanding of actual drinking behaviors and degree of intoxication. In this way, the results of the Form90 can be utilized as a feedback tool to enhance client motivation for change (Sobell & Sobell, 2003).

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

Making a clinical diagnosis is a component of the intake process to ensure proper treatment planning and approaches. In substance abuse treatment clinical diagnoses typically include both substance use disorders and other psychiatric problems (Maisto & Tiffany, 2003). Conducting structured interviews to make an accurate diagnosis is critically important for research purposes in order to make comparisons across sites and helps to ensure "diagnostic precision" in non-research clinical settings (Sheehan et al., 1998, p. 22). An extensive psychiatric interview is not always feasible during substance abuse treatment intakes however, since it is only one component of the intake procedure and can take in the upward of 90-120 minutes (Maisto & Tiffany, 2003). In an effort to address the problem of time constraints associated with clinical interviews, the Mini-International Neuropsychiatric Interview (M.I.N.I.) was developed to "bridge the gap between the detailed, academic, research-oriented interview and the ultrashort screening tests designed for primary care" (p. 23). The development of the M.I.N.I. was intended to

be short, inexpensive, easy to administer, very sensitive, specific, compatible with the International Classification of Diseases (ICD-10) and Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), capture symptoms that are not severe enough for a diagnosis, and have both clinical and research utility (Sheehan et al., 1998).

Psychometric Properties of the M.I.N.I.

Reliability and validity studies have been conducted on the M.I.N.I. Two parallel validation studies looked to assess the agreement between a diagnosis on the M.I.N.I. with the standards of diagnosis of the *DSM-IV* (SCID-P) and for the *ICD-10* (Composite International Diagnostic Interview [CIDI]). Each of the 17 Axis I diagnoses determined by the M.I.N.I. was assessed for accordance with the standard instrument utilized for the *DSM-IV* and *ICD-10* using Cohen's kappa, sensitivity, specificity, efficiency, and positive and negative predictive values (Sheehan et al., 1998). When comparing the M.I.N.I with the SCID-P, the M.I.N.I. diagnoses were described as good or very good kappa values. There was only one kappa value reported below .50 (concurrent drug dependence: .43). Sensitivity values were at .70 or higher for all categories with the exception of dysthymia (.67), obsessive-compulsive disorder (.62), and current drug dependence (.45). The operating characteristics of specificity and negative predictive values were .85 or higher across all diagnostic categories. Finally, the positive predictive values ranged from good to acceptable. When comparing the M.I.N.I. with CIDI diagnosis kappa values were found to range from good to very good for all but two categories (simple phobia: .43 and generalized anxiety disorder: .36). The operating characteristics of sensitivity, specificity and negative predicative values were also found to be good at .70 or higher for all categories but four (Sheehan et al., 1998).

The mean length of the interview associated with the M.I.N.I. was approximately half of that associated with the SCID-P (18.7 ± 11.6 minutes vs. 43 ± 30.6 minutes) and approximately one fourth of the CIDI (21 ± 7.7 minutes vs. 92 ± 29.8 minutes). The M.I.N.I. "provided a reduction in the median administration time over the SCID-P of more than 50% for patients with primary diagnoses of anxiety, major depression, and mania and of more than 70% for those with a primary diagnosis of psychotic disorder" (Sheehan et al., 1998, p. 30). Reliability estimates were also investigated. The authors reported inter-rater reliability as excellent with all kappa values over .75 and 70% of all kappa values at .90 or higher. Test-retest reliability was described as good with 61% of the values above .75 and only one below .45 (current mania) (Sheehan et al., 1998). Based on these studies the authors conclude that the M.I.N.I. "succeeds" in producing both valid and reliable data for making clinical diagnoses in a shorter period of time. The results of these studies also prompted some changes to the M.I.N.I. in an effort to strengthen some questions as well as the sensitivity, specificity, and positive predictive values of the instrument. Additionally, the various modules of the M.I.N.I. were updated to be consistent with DSM-IV and its associated time frames. Finally, a computerized version was also developed to assist with ease of administration.

These findings, coupled with the importance of gaining accurate clinical diagnoses, promoted the use of the M.I.N.I. for this research study. In additional to providing clinical diagnoses of Axis I disorders, the M.I.N.I. also features a suicidaility module that identifies a client's potential risk for suicide as "low", "medium", or "high". All information gleaned from this module was shared directly with the counselors and

treatment staff. A suicide protocol was developed to provide a standard procedure for all

assessors to follow in the event that clients endorsed items in this section of the M.I.N.I.

Inventory of Drug Use Consequences (InDUC)

Although making an accurate diagnosis of a substance use disorder is critical

"knowledge of a diagnosis of substance use disorder does not in itself provide an

adequate basis for developing a full treatment plan" (Maisto et al., 2003, p. 69). Other

assessments evaluating domains like severity and consequences of use were also included

to assist the counselors with the treatment planning process. It is well known that

individuals who abuse alcohol and/or drugs often experience a variety of negative

consequences related to their use (e.g. legal problems, relationship strain, physical

injury). It has been suggested that evaluating consequences of use can provide relevant

information to clinician when making a diagnosis and also assist clients in the process of

change (Maisto et al., 2003). More specifically, by helping a client make connections

between their substance use and the negative consequences of that use, this can bolster

client motivation for change and help address issues of ambivalence the client may be

experiencing about the change process (Maisto et al., 2003).

The Inventory of Drug Use Consequences is a measure that assesses for negative

consequences an individual may have experienced as it relates to their alcohol and drug

use. Its "parent" inventory is the Drinker Inventory of Consequences (DrInC; Miller,

Tonigan, & Longabaugh, 1995), which was designed to measure alcohol use related

consequences only. The DrInC was a first step in addressing the paucity of instruments

available to assess for alcohol use related consequences. The DrInC was later revised to

create the InDUC in an effort to allow for a broader use of the instrument since it is

known that clients often use both alcohol and drugs. In this way, the InDUC allowed for

the assessment of both alcohol and drug use consequences, becoming one of the first

standardized assessments to do so (Blanchard, Morgenstern, Morgan, Labouvie, & Bux,

2003). The InDUC is a self-report measure and evaluates the consequences as they fall

broadly into the five following domains: (1) Impulse Control (2) Social Responsibility (3)

Physical (4) Interpersonal, and (5) Intrapersonal (Tonigan & Miller, 2002). There are two

forms available, one that assesses for consequences experienced in the past 90 days, and

the other, assessing for consequences over a person's lifetime (Blanchard et al., 2003).

For this project the version assessing consequences over one's lifetime was employed in

an effort to more comprehensively evaluate a client's background in terms of their

substance use.

For the purpose of this project the clients were read the directions and each

question aloud. For the version assessing for consequences over one's lifetime clients

could respond dichotomously with "yes" or "no" answers if they "ever" experienced

specific consequences related to their drug and/or alcohol use. Item examples include:

"My physical appearance has been harmed by my drinking or drug use" (Physical

domain), "I have not done what is expected of me because of my drinking or drug use:

(Social Responsibility domain); "I have felt bad about myself because of my drinking or

drug use" (Intrapersonal domain). The five different domains were separately tabulated

and the overall score was calculated with higher scores indicating a greater number of

consequences experienced. Scores for each of the separate domains were also calculated

in an effort to illustrate any specific areas where clients have experienced more

consequences than others. The assessment can be utilized at the time of intake to

determine baseline characteristics, as well as throughout the course of treatment to help

detect change over time. The InDUC also includes a control scale to help detect

preservative or careless answering (Tonigan & Miller, 2002). The InDUC is designed to

be utilized by clinicians and/or researchers and administration time is approximately 10

minutes (Tonigan & Miller, 2002).

Psychometric Properties of the InDUC

In one of two studies conducted by Tonigan and Miller (2002), the test-retest

reliability of the InDUC was evaluated with a sample of outpatient clients. They reported

that four of the five subscales of the INDUC demonstrated "good-to-excellent stability"

(p. 167). More specifically, the intraclass correlations (ICC) for each scale are as follows:

Physical: ICC=.68 (r= .77); Intrapersonal: ICC=.33 (r=.34); Social Responsibilities:

ICC=.88 (r=.89); Interpersonal: ICC=.73 (r=.75); Impulse Control: ICC=.92 (r=.93). As

demonstrated by these scores, the intrapersonal domain was the exception of the good to

excellent stability demonstrating poor reliability. A more recent study conducted by

Gillaspy and Campbell (2006) also investigated the test-retest reliability of the InDUC

with a sample of outpatient clients. Their findings demonstrated good to excellent

stability for all five subscales, indicated as follows: Physical: ICC=.71 (r= .89);

Intrapersonal: ICC=.86 (r=.94); Social Responsibilities: ICC=.83 (r=.96); Interpersonal:

ICC=.82 (r=.89); Impulse Control: ICC=.64 (r=.89). The full measure also demonstrated

high test-retest estimates with an intraclass correlation of .94 (r=.97).   Questions of

validity have also been examined but with some conflicting results. The second study

conducted by Tonigan and Miller (2002) attempted to determine the validity of the

InDUC with a sample of clients from both outpatient and inpatient treatment programs.

Confirmatory factor analysis results demonstrated a better fit with a four-factor model,

versus the original five-factor model, by excluding the Intrapersonal subscale. The

authors indicated that "the same four scales were sufficient to depict the larger construct

of adverse consequences" (p. 167). On the other hand, Blanchard et al. (2003) reported

that the items comprising the InDUC loaded primarily on one main factor related to

adverse consequences. High internal consistency between items on the full measure ($\alpha =$

.96) and a significant amount of shared variance between subscales provided evidence to

support a single factor model.

All three of the cited studies examining the psychometric properties of the InDUC

suggest that the instrument's scores can be both reliable and valid, and particularly the

overall score. Gillaspy and Campbell (2006) state that the InDUC can therefore be an

effective tool to be utilized both for clinical purposes to help motivate clients for change,

and for research purposes as an intake assessment tool and to measure client change over

time.

Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES)

Client motivation to change their substance use has consistently been found to be

positively related to treatment retention (Brocato, 2004; Broome et al., 1999; Simpson &

Joe, 2004; Simpson, Joe, & Rowan-Szal, 1997). One component of treatment motivation

includes a client's recognition and awareness of their substance use problems. Problem

recognition has been identified as a necessary step in seeking treatment and making

positive behavior changes (Donovan, 2003). Originally, the SOCRATES was designed to

assess for the stages of change introduced by Prochaska and DiClemente (1992). The five

stages of change include pre-contemplation, contemplation, preparation, action, and

maintenance, and essentially describe the various phases an individual goes through during a behavior change, including that of altering substance use. Determining where a client is at in their change process allows for specific interventions to target movement towards more favorable behavior (Donovan, 2003).

The original form of the SCORATES was developed to include items that would assess for each of the stages in the change model excluding maintenance, since the instrument was designed to be used with clients in need of treatment (Miller & Tonigan, 1996). The SOCRATES went through a number of iterations in an effort to improve items and psychometrics. A fifth version was finally settled upon and is available in both longer (39 items) and shorter forms (19 items). Because the scores on the longer version were found to converge quite well with scores on the shorter form, and the shorter form has greater simplicity, the authors recommend usage of the shorter version (Miller & Tonigan, 1996). For these reason also, it was decided that the shorter version would be utilized for this study. Although originally designed to include factors from each of the stages of change, factor analytic studies of the current version yielded three scales: readiness for change, taking steps for change, and contemplation (Donovan, 2003; Miller & Tonigan, 1996). Administration time of the SOCRATES is typically quite brief, typically around five to 10 minutes, and requires little training for proper administration. The SOCRATES is available at no charge including scoring templates and guidelines for interpretation on the CASAA website (http://casaa.unm.edu/). Separate versions for drug and alcohol use are available.

Psychometric Properties of the SOCRATES

Miller and Tonigan (1996) investigated the psychometric properties of the SOCRATES with two samples. The first included 1,672 alcohol dependent clients who were seeking substance abuse treatment and the second included 82 heavy drinkers. Reliability coefficients (Cronbach's α) for the two studies follow respectively: Ambivalence (.60, .88), Recognition (.85, .95), and Taking Steps (.85, .95). Two day test-retest coefficients were calculated with the sample of 82 heavy drinkers and are as follows: Ambivalence = .83, Recognition = .99, and Taking Steps = .93.

As previously noted, Miller and Tonigan (1997) identified the three factors of readiness for change, taking steps for change, and contemplation, which led to the three main categories of the SOCRATES. Research on this factor structure with adult populations has not confirmed this three factor model. Maisto et al. (1999) found that the contemplation (or ambivalence) factor has not been found to be as stable as originally thought. This finding is not particularly surprising since Miller and Tonigan's (1997) factor analysis demonstrated that the ambivalence scale accounted for the least amount of variance (7%) of the three scales (Taking Steps accounted for 27% of the item variance and Recognition accounted for 11% of the variance). In reference to concurrent validity, Miller and Tonigan (1997) found that the scores on the Recognition scale were correlated the strongest with substance use problem severity (based upon consumption variables and Alcohol Use Inventory), reflecting up to 15% common variance.

The SOCRATES is an instrument that can demonstrate excellent clinical and research utility. Motivation for change has been implicated in substance abuse retention literature and this construct can be used as a clinical indicator to develop interventions

aimed at specific levels of motivation to facilitate the change process. The SOCRATES is

an instrument that can be used to help indicate level of motivation and can be utilized at

various times throughout the course of treatment to monitor changes in client motivation.

The ease of administration and sound psychometric properties, coupled with the clinical

utility, provided ample evidence to include the SOCRATES as a measure in this

assessment battery.

Pretreatment Covariates

The following table illustrates the various covariates that were included in the

study, their respective levels of measurement and the specific instruments from which

they were assessed. The covariates listed are those variables that were thought to be

possibly predictive of the dependent variables (Hinkle, Wiersma, & Jurs, 2003). The

instruments that were used to assess for the specific predictors are also indicated. As

previously noted, the possible predictors were chosen based upon the TCU model for in-

house treatment evaluations (Simpson, 2001), as well as what would provide clinically

meaningful information for the counselors in their treatment planning. The information

gathered on the following categories was collected at the point of treatment intake only.

Table 1

Pretreatment Covariates

	Variable	Level of Measurement	Instrument
Client Factors	Age	Continuous	ASI
	Race	Nominal	ASI
	Gender	Nominal	ASI
	Marital Status	Nominal	ASI

	Education Level	Continuous	ASI
	Income	Continuous	ASI
	Religion	Nominal	ASI
Substance Use	Years of Lifetime Substance Use	Continuous	ASI
	Substance use past 30 days	Continuous	ASI
	Alcohol Only Disorder	Nominal	M.I.N.I.
	Drug Only Disorder	Nominal	M.I.N.I.
	Alcohol and Drug Disorder	Nominal	M.I.N.I.
	Previous Substance Use Treatment	Nominal	ASI
	# Drinking Days, Past 90	Continuous	Form90
	# Heavy Drinking Days, Past 90	Continuous	Form90
	# Drug Using Days, Past 90	Continuous	Form90
	Average Weekly SEC	Continuous	Form90
	SEC for Heaviest Drinking Episode	Continuous	Form90
	Peak BAC, Drinking Episode	Continuous	Form90
	Adverse Consequences of Use	Continuous	InDUC
Psychiatric Factors	Current Psychiatric Symptoms	Nominal	ASI
	Previous Psychiatric Treatment	Nominal	ASI
	Been Prescribed Psychotropics	Nominal	ASI
	History of Abuse	Nominal	ASI
	Axis I Diagnosis(es)		
	Depressive Disorder	Nominal	M.I.N.I
	Suicidal Ideation	Nominal	M.I.N.I
	Bipolar Disorder	Nominal	M.I.N.I
	Anxiety Disorder	Nominal	M.I.N.I

	Eating Disorder	Nominal	M.I.N.I
	Dual Diagnosis Status	Nominal	M.I.N.I
Motivation	Recognition	Continuous	SOCRATES
	Ambivalence	Continuous	SOCRATES
	Taking Steps	Continuous	SOCRATES
	Composite Score	Continuous	SOCRATES
ASI Composites	Medical	Continuous	ASI
	Employment	Continuous	ASI
	Alcohol	Continuous	ASI
	Drug	Continuous	ASI
	Legal	Continuous	ASI
	Family/Social	Continuous	ASI
	Psychiatric	Continuous	ASI

Dependent Variables

The first dependent variable is treatment completion status (used to address research question #1). Treatment completion status was defined in the following way. First, we consulted the program census log in which the counselors were to record whether a client successfully completed the treatment program. Unfortunately, for about half of the participants this information was not included in the log. Consequently, when the information was not readily available, the two psychometrists accessed the clients' electronic file and reviewed case notes to determine completion status. A treatment completer is one who was found to have met all, or a sufficient amount, of the treatment

goals to warrant what was considered to be successful completion as determined by the counselors. This information was explicitly stated in their medical chart (examples are to follow). Additionally, a treatment completer is one who, according to their medical chart, celebrated their graduation/medallion ceremony, or was discharged from the program with staff approval. Some of the following statements are examples of the types of information that were used to identify those clients considered to be treatment completers: 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. Conversely, those clients who were not found to meet treatment goals, or who left the program prematurely, either on their own volition or due to mandatory dismissal for non-compliance with treatment rules, are considered to be non-completers. Some of the following statements are examples that were used to identify those clients considered to be treatment non-completers: 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. For a small number of the cases ($n=12$) the psychomterists were unable to determine treatment completion status by consulting with the client medical record. For these cases, the counselors were asked to review the chart and assist the psychometrists in determining completion status based upon the aforementioned criteria.

The second dependent variable is time to dropout. This dependent variable was explored in an effort to predict the time (# of calendar days) to treatment dropout (research question # 2). Finally, the third dependent variable was defined as the total number of treatment sessions attended by each client (to address research question #3). This dependent variable was explored to determine if it is possible to predict the number of sessions attended by clients based upon their pretreatment characteristics. A brief description of the statistical analyses used to address the research questions related to these dependent variables is provided next.

Data Analysis

Initial descriptive statistics were conducted on independent and dependent variables in an effort to describe the clients that entered the treatment program during the data collection period. As previously indicated, not every client that entered the chemical dependency program during the time period of the data collection process was tested. The psychometrists had access to a list of patients that were admitted to the program during the same time frame of the data collection process but not tested (n=171). Basic information on these clients was gathered through their electronic chart, including gender, age, ethnicity, and treatment status (i.e., treatment completion or treatment dropout and number of treatment sessions attended). Therefore, the convenience sample of this study was compared to the group of individuals not tested on basic demographic characteristics and treatment status information, to determine if the groups significantly differ from each other. Chi square was used to test the differences between the categorical variables (e.g., gender) and t-tests were used to test the differences between continuous variables (e.g., length of time in treatment) (Hinkle et al., 2003). Groups were

considered to be statistically significantly different if $p < .05$ (Huck, 2000). These

analyses helped to yield information about the generalizability of the findings of this

study while also helping to inform decision-making about conducting the more advanced

statistical analyses.

To determine if any client characteristics were predictive of treatment completion

status (Research question #1), binary logistic regression analysis was run. Logistic

regression is designed specifically to be used with dichotomous dependent variables and

provides the probability associated with the prediction (Wright, 1995). "In logistic

regression analyses for a dichotomous dependent variable, one attempts to predict the

probability that an observation belongs to each of the two groups" (Wright, 1995, p. 219).

The assumptions of logistic regression outlined by Wright (1995) were met, including:

the dependent variable is dichotomous; the outcomes of the dependent variable are

independent (i.e. clients can only belong to one group – treatment completers or non-

completers); the categories are mutually exclusive; and the sample size was adequate

(minimum of 50 cases per predictor variable). Due to the fact that there is considerable

variability in how client characteristics at intake are related to treatment retention, the

null hypothesis for this analysis was that the predictor coefficient for any of the client

variables is 0 in the population. Predictors were considered statistically significant if $p <$

.05 (Wright, 1995).

In an effort to predict time (# of calendar days) to treatment dropout (research

questions #2) survival analysis was conducted. Survival analysis is a method utilized to

predict time to an event taking place. It has been noted that when research questions aim

to evaluate phenomena associated with time, it presents unique research challenges. For

example, at some point in time the data collection processes cease and not all the

participants will have necessarily experienced the event being targeted. To address these

unique challenges, a number of statistical techniques were identified, one of which is

survival analysis (Singer & Willett, 1991). In short, survival analysis is used "to help

researchers simultaneously explore whether events occur and if so, when" (Singer &

Willett, 1991, p. 268-269). For this particular study, the "event" is treatment dropout. It is

noted that for any given point in time during the study a participant needs to be included

in one of the two groups and, similarly to the assumptions above, those groups must be

mutually exclusive and exhaustive. In other words, each client is either in treatment or

out of treatment. The null hypothesis that pretreatment client characteristics are not

statistically significantly related to time to dropout was tested. The null hypothesis was

rejected if $p < .05$.

Finally, to determine which client characteristics are found to predict the number

of treatment sessions attended (research question #3), another regression analysis was

utilized. Originally, a Poisson regression analysis was going to be conducted. This type of

analysis was going to be used since the dependent variable for this research question

represents frequency counts, i.e., the number of times a participant attended a group

session. The Poisson model requires that the dependent variable mean be equal to its

variance and this assumption is often violated in social science settings. Instead, it is

often the case that the variance is either larger than the mean (i.e., overdispersion) or less

than the mean (i.e., underdispersion). In the event that the data are over or under

dispersed, the analyses would have been run specifying a negative binomial error model.

In fitting the negative binomial model, an additional scale parameter is estimated

allowing for adjustment due to over- or underdispersion (Regression models for count outcomes: Poisson, Negative Binomial, and Gamma, n.d.). After examining the dependent variable *number of treatment sessions attended* it was discovered that this variable was normally distributed, no longer violating this assumption of Ordinary Least Squares Regression. Consequently, linear multiple regression analysis was utilized to address this research question. Because considerable variability has been noted in the literature when relating client characteristics with treatment retention, the null hypothesis that pretreatment client characteristics are not related to the number of treatment sessions attended was tested. Like above, predictors were considered statistically significant if $p < .05$ (Wright, 1995).

Chapter IV: Results

Overview

The primary purpose of this chapter is to report the results of the statistical

analyses conducted to address the research questions outlined in Chapter III. First, the

manner with which missing data was investigated and managed is described. Next, the

results of the analyses comparing the tested and non-tested subjects on basic demographic

characteristics and service utilization variables are reported to address the degree of

generalizability of the findings. Basic descriptive statistics on the sample are then

reported. Corresponding tables outlining these results are also presented. The final

section of this chapter is devoted to reporting the results of the three research questions

described in Chapter III.

Missing Data

When collecting data in treatment settings it is quite common for researchers to

encounter missing data (Hair, Anderson, Tatham, & Black, 1998). Still, addressing

missing data is essential since it can significantly bias results and negatively impact the

generalizability of the findings if not handled properly. Typically, the method to address

missing data involves first determining the underlying cause(s) that resulted in missing

data, and secondly utilizing this cause to inform the approach used to rectify the issue of

missing data (Hair et al., 1998). As such, an analysis to determine the basis of the missing

data for this study was conducted so it could be properly addressed. The approach taken

was twofold. First, any possible patterns to the missing data were examined to determine

the extent of bias associated with the missing data (i.e., whether missing data was

associated with one particular assessor or assessment). Second, the potential implications of a decreased sample size on the proposed analyses were determined.

The data set for this study was originally comprised of 298 participants. After reviewing all data points for the entire sample, it became evident that 13 of the participants were missing data from the InDUC and SOCRATES. It was determined that the responses of those 13 participants were lost electronically during a transitional phase of implementing an electronic data collection system (after eliminating the paper-pencil form) and these cases were not able to be recovered. Additionally, insufficient data collection on behalf of the assessors resulted in an inability to calculate summary scores on the Form 90, and determine M.I.N.I. diagnoses for 11 participants. It could not be determined if the insufficient data collection was resultant from a mistake by an assessor, or a refusal to answer a question by a participant. One additional case was missing a response on the race/ethnicity question of the ASI. Based upon this qualitative analysis, it was determined that the missing data took place at different points in time, across various variables, and as a result of different assessors. Consequently, the missing information was classified as *missing completely at random (MCAR)* (Hair et al., 1998). These authors suggest that one of the simplest approaches to dealing with MCAR data is to eliminate the cases with the missing data, provided this does not significantly compromise the statistical power of one's sample. As such, listwise deletion was the chosen method to handle the missing data. Even though deletion of the cases resulted in a drop of the total sample size to 273 (an 8.4% reduction), this did not significantly reduce the power of the sample, nor was it believed that the cause of the missing data would bias the results.

One final issue of missing data emerged. There were a total of 15 cases missing ASI data resulting from a mishap during data collection where the computer that stored the ASI data electronically was accidently destroyed prior to the assessors running their regular back-up. As a result, 15 cases of data went missing because the computer data were not able to be retrieved. Some of the missing data was obtained by returning to the paper report that was generated for the counselors. However, only certain data points were able to be gathered this way, therefore some missing data remained from these individuals. For one of the analyses in this study, the binary logistic regression, there is a predictor variable that was included in the model that was one of the missing data points from those 15 ASI reports. Since the data was lost due to a computer being destroyed, it was determined that the data was again MCAR. Therefore, the approach used to address the missing data was to complete the logistic regression analysis only using observations with complete data. Although this did decrease the total sample size for this particular analysis from 273 to 258, this reduction was fairly minimal and did not significantly impact the power of the sample. This determination was based upon the recommendations put forth by Peduzzi, Concato, Kemper, Holford, and Feinstein (1996), that at least 10 events of (in this case) drop-out are needed for each predictor variable included in order to maintain adequate statistical power.

Tested vs. Non-tested Clients

As noted in the Chapter III, a number of practical issues prevented all participants from being tested for the study (e.g., assessor availability, office space, client attendance). Consequently, there were approximately 171 program clients who were not assessed for this study, yet matriculated through the treatment program during the same time frame as

the data collection process. Basic demographic and treatment variables were collected on

the non-tested participants in order to compare the two groups. To determine

equivalency, comparative analyses were conducted to compare the study's sample with

the group of clients who were not tested for the study but matriculated through the

program during the same time. Tested and non-tested participants were compared on

gender, ethnicity, age, treatment duration, and treatment days grouped according to

treatment completion and non-completion status so as to make a more accurate

comparison between these two groups. Non-parametric tests were used because the

continuous variables were not found to be normally distributed when the groups were

split according to completion status.

Completers

There were a total of 217 treatment completers in the tested (n =161) and untested

(n = 56) group. Results indicated there were no statistically significant differences

amongst the completers in the study as compared to the non-study group based on

demographic characteristics, including gender, $X^2(1, N = 217) = .133, p = .715$, race,

$X^2(5, N = 217) = 7.81, p = .167$, and age ($U = 4124.5, p = .343$). Additionally, no

significant differences were found between the tested and non-tested treatment

completers with respect to treatment variables including duration ($U = 3803.5, p = .081$)

and number of treatment days ($U = 4473.0, p = .931$).

Non-Completers

A total of 227 non-completers comprised the tested (n = 112) and non-tested

group (n = 115). Results indicated no statistically significant differences among the non-

completers in the study vs. the non-study group based up gender $X^2(1, N = 227) = .001, p$

= .981, race, X^2(7, N = 227) = 9.191, p = .239, and age (U = 6258.0, p = .713).

Statistically significant differences were found to exist with regards to treatment duration

and number of treatment days attended with the tested non-completers demonstrating

longer treatment durations (U = 2493.00, p = .000) and more treatment days (U =

2527.00, p = .000) than the non-completers not tested for the study.

Descriptive Statistics of Study Sample

Descriptive statistics are reported on the entire sample and can be found in Tables

2-5. Additionally, the tables are broken down according to completion status since this

study looked to determine predictors of treatment completion and drop-out. Statistically

significant differences between treatment completers and treatment drop-outs are noted in

the Tables by asterisks. Statistically significant differences were determined by running

chi-square analyses for categorical variables, and t-tests for continuous variables that

were normally distributed and Mann-Whitney U tests for continuous variables without

normal distributions.

Client Demographic Characteristics

Basic client demographic information on the sample was collected through the

ASI and is included in Table 2. The average age for the sample of 273 clients was 39.77

years (SD = 11.80 years). The participant's ages ranged from 18 to 77 years. The majority

of the study sample was male (62.3%). Additionally, a large majority of the sample

identified as Caucasian (86.4%). The sample completed an average of 13.62 years of

education (SD=2.35), with a minimum of 8 years, to a maximum of 24 years. Almost half

of the participants reported being married (44.7%) and 17.6% of the sample reported

being divorced. A majority of the sample (65.9%) reported having a full-time

employment pattern (i.e., working 35+ hours/per week) for the three year period prior to entering this specific treatment episode. On the other hand, 7.7% of the sample reported being primarily unemployed for the three years prior to entering treatment. The average income generated 30 days prior to entering treatment was $1,977.73 ($SD=2947.663$), with a minimum income of $0, up to a maximum of $25,000.

Treatment completers and drop-outs demonstrated statistically significant differences in terms of age, marital status, and income earned in the 30 days prior to treatment entry. Treatment drop-outs were younger than treatment completers (t (271) = -4.43, p = .000). Additionally, treatment drop-outs were found not to be married more often than treatment completers (X^2(1, N = 258) = 10.433, p = .001). Finally, treatment drop-outs were found to make less money during the month prior to treatment intake than treatment completers (t (271) = -2.17, p = .03).

Table 2

Demographic Characteristics at Intake

	Treatment Completion Status		
Demographic Characteristic	Completer (n=161)	Drop-out (n=112)	Total Sample (N=273)
Age (Years)	42.32 (SD=11.0)	36.10 (SD=11.98)**	38.77 (SD=11.80)
Gender (%)			
Male	63.4	60.7	62.3
Female	36.6	39.3	37.7
Race (%)			
White	87.6	84.8	86.4
African American	8.7	8.0	8.4
Native American	1.2	1.8	1.5
Hispanic	2.5	4.5	3.3
Asian/Pacific Islander	0	0.9	0.4

Years of Education (%)	13.89 (*SD*=2.51)	13.24 (*SD*=2.03)	13.62 (*SD*=2.35)
Marital Status (%)			
Married	52.8	33.0*	44.7
Never Married	26.1	44.6	33.7
Divorced	17.4	17.9	17.6
Separated	1.9	4.5	2.9
Widowed	1.9	0.0	1.1
Employment Pattern (%) (Prior 3 three years)			
Full-time (35+ hours)	65.2	65.2	65.9
Part-time	12.5	12.5	12.5
Student	4.5	4.5	3.3
Retired/Disability	3.6	3.6	4.8
Unemployed	8.0	8.0	8.1
Missing	5.4	5.4	5.5
Monthly Income ($)	2298 (*SD*=3483)	1517 (*SD*=1856)*	1977 (*SD*= 2947.66)

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

Substance Use Characteristics

As outlined in Table 3, during the 30 days prior to being interviewed for the study, 74.1% of participants reported using alcohol to the point of intoxication, 30.8% used marijuana, 24.9% used cocaine, 10.3% used sedatives (not as prescribed by a physician), 5.9% used heroin, 3.7% used methadone, 1.5% used barbiturates, 2.2% used amphetamines, and 2.2% used hallucinogens. Approximately 45.4% used more than one substance during the 30 day period prior to being interviewed. As indicated, alcohol was the most commonly used substance. According to the Form 90 assessment, the average number of days that individuals spent consuming alcohol during the 90 days prior to abstaining was 40.77 (*SD*=33.57), with an average weekly standard drink consumption of 44.49 (*SD*=59.91), and an average peak blood alcohol level of .26 (*SD*=.24).

Treatment completers and drop-outs were found to statistically significantly differ in terms of their marijuana ($U = 7077.5$, $p = .000$), cocaine ($U = 7322.0$, $p = .001$), heroin ($U = 8266.5$, $p = .004$), and hallucinogen use ($U = 8533.0$, $p = .003$). Treatment drop-outs were found to use all four of these substances on more days during the 30 prior to treatment intake than treatment completers.

Table 3

Substance Use Characteristics

	Treatment Completion Status		
	Completer (n=161)	Drop-out (n=112)	Total Sample (N=273)
Use 30 Days Prior to Intake Interview (%)			
Alcohol	68.3	75.9	74.1
Marijuana	21.7	43.7**	30.8
Cocaine	17.4	35.7*	24.9
Sedatives	7.5	14.3	10.3
Heroin	2.5	10.7*	5.9
Methadone	0.9	6.2	3.7
Barbiturates	0.6	2.7	1.5
Amphetamines	1.9	2.7	2.2
Hallucinogens	0.0	5.4*	2.2
Inhalants	0.0	0.0	0.0
Ave # of Drinking Days in Previous 90	43.64 (*SD*=33.73)	36.63 (*SD*=33.05)	40.77 (*SD*=33.57)
Ave Weekly Drinks	45.44 (*SD*=52.64)	43.13 (*SD*=69.26)	44.48 (*SD*=59.91)
Ave Peak BAC	.25 (*SD*=.22)	.27 (*SD*=.27)	.26 (*SD*=.24)

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

Clinical Characteristics at Intake

In addition to basic demographic and substance use information, diagnostic information about the participants was also collected through the use of M.I.N.I., and is

outlined in Table 4 below. The most common clinical syndrome found within the sample was Major Depressive Disorder, with 42.5% of the participants meeting diagnostic criteria. An anxiety disorder (e.g., panic disorder, social anxiety disorder, post-traumatic stress disorder, obsessive-compulsive disorder, generalized anxiety disorder) was also not uncommon with 28.6% of the sample meeting criteria for at least one of listed syndromes. These results indicated that having a co-morbid psychiatric diagnosis was high in this sample; indeed, 51.6% of the sample met the criteria for both a psychiatric and substance use disorder.

Regarding substance use diagnoses (including substance abuse and substance dependence), 74% of the sample met criteria for an alcohol use disorder, and 49.1% met criteria for a drug use disorder. More specifically, 14.7% of the sample met criteria for a marijuana use disorder, 19.8% for an opiate use disorder, 22% for a cocaine use disorder, 2.9% for a sedative use disorder, 1.1% for a hallucinogen disorder, and .4% for an amphetamine use disorder. Approximately 48.4% met criteria for only an alcohol use disorder, 23.4% for only a drug use disorder, and 25.6% for both an alcohol and drug use disorder. Over two-thirds of the sample (68.1%) reported having engaged in substance abuse treatment prior to the present treatment episode.

Over half of the sample (60.8%) reported a history of sexual, physical, or emotional abuse over the course of their lifetime and taking psychiatric medication at some point in their life (64.5%). Having a history of suicidal thoughts and/or attempts was also not uncommon. At the time of treatment intake, approximately 33% reported a presence of suicidal ideation.

Treatment completers and treatment drop-outs were found to demonstrate statistically significant differences in terms of meeting criteria for an anxiety (X^2(1, N = 273) = 10.68, p = .001), cocaine (X^2(1, N = 273) = 11.443, p = .001), or opiate disorder (X^2(1, N = 273) = 4.47, p = .03), whereby participants who met criteria for these disorders were more likely to drop-out of treatment. Additionally, participants who met criteria for only an alcohol disorder were more likely to complete treatment (X^2(1, N = 273) = 12.15, p = .000), and those who met criteria for both an alcohol and drug disorder were more likely to drop out of treatment (X^2(1, N = 273) = 8.40, p = .004). Finally, treatment drop-outs were more likely to carry a dual diagnosis (X^2(2, N = 273) = 7.74, p = .02) and have a positive history of psychiatric treatment than treatment completers (X^2(1, N = 273) = 4.36, p = .04).

Table 4

Axis I Diagnoses and Psychiatric Symptoms at Treatment Intake

	Treatment Completion Status		
Sample	Completer (n=161)	Drop-out (n=112)	Total (N=273)
Major Depressive Disorder	37.9	49.1	42.5
Anxiety (OCD, PTSD, Social Panic)	21.1	39.3*	28.6
Alcohol Disorder	76.4	70.5	74
Drug Disorder			
Cocaine Disorder	14.9	32.1*	22
Opiate Disorder	15.5	25.9*	19.8
Marijuana Disorder	13.0	17	14.7
Sedative Disorder	2.5	3.6	2.9
Hallucinogen Disorder	0.6	1.8	1.1
Amphetamine Disorder	0.6	0.0	.4
Alcohol-Only Disorder	57.1	35.7*	48.4

Drug-Only Disorder	20.5	27.7	23.4
Alcohol and Drug Disorder	19.3	34.8*	25.6
Previous AODA Treatment	67.7	68.8	68.1
History of Abuse	59.6	62.5	60.8
Emotional Abuse	48.4	54.5	50.9
Physical Abuse	29.2	30.4	29.7
Sexual Abuse	24.2	21.4	23.1
Suicidal Ideation	31.1	36.6	33.3
Psych Treatment History	53.4	66.1*	58.6
Psych Medication History	61.5	68.8	64.5
Dual Diagnosis	44.7	61.6*	51.6

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

Treatment Variables

For the purpose of this study, treatment variables were identified as the primary dependent variables and investigated as they potentially relate to treatment retention. There were three treatment variables included in this study: treatment completion/non-completion status, treatment duration, and number of treatment sessions attended. The average treatment duration of the entire sample was 27 days ($SD = 11.40$). The average number of treatment sessions attended by participants was 14 ($SD = 5.06$). Based upon the criteria described in Chapter III, 41% of the participants were classified as treatment drop-outs and 59% were classified as treatment completers. Of those clients who dropped out of treatment, their average treatment duration lasted 20.46 days ($SD = 10.65$) and the average number of treatment days attended was 11.17 ($SD = 5.40$). On the other hand, for treatment completers, the average treatment duration lasted 31.63 days ($SD = 9.52$) and

the average number of treatment days attended was 16.29 ($SD = 3.54$). It needs to be

stressed, however, that the 59% completion rate is based upon the 273 participants tested

for this study. When the 171 clients who were not tested for this study are included, the

completion rate decreases to 49% and the drop-out rate increases to 51%, which is a more

accurate representation of the retention rates for all the clients who matriculated through

the treatment program during the data collection process.

Table 5

Treatment Variables

	Treatment Completion Status		
	Completer (n=161)	Drop-out (n=112)	Total Sample (N=273)
Treatment Duration	31.63 (*SD*=9.52)	20.46(*SD*=10.65)**	27.05(*SD*=11.40)
Treatment Days	16.28 (*SD*=3.54*)*	11.17 (SD=5.40)**	14.19 (*SD*=5.06)

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

Approach to Regression Analyses

The process utilized for the selection of covariates to be included in the regression

analyses is an approach put forth by Hosmer and Lemeshow (2000). The type of

approach used is one that is recommended for studies such as this one, which are

primarily exploratory in nature. In order to determine the group of covariates that would

be used in the regression models, a series of exploratory bivariate analyses (i.e., Chi-

square, t-tests, and correlations) were conducted. For each of the dependent variables to

be used in the regression models (i.e., treatment duration, number of treatment days, and

treatment completion status), exploratory analyses were run investigating the strength of

the relationships between the potential covariates and dependent variables. Variables

found to be statistically significantly related to the dependent variable were retained for the regression analysis. A more liberal significance level cut-off was used of $p = .10$, to determine the initial group of covariates to be used in the regression models (Hosmer & Lemeshow, 2000). This liberal cut-off was utilized as a means to identify covariates that, by themselves, may not have been traditionally statistically significant (e.g., $\leq.05$) in the bivariate analyses, but could, as part of a more complex predictive model, contribute as a statistically significant predictor (Hosmer & Lemshow, 2000).

Of the potential covariates examined, 32 were found to be statistically significantly related to treatment completion status. This final list was then broken down according to broad categories of the covariates (see Table 6) and again explored to determine which of the variables within each set were found to have the strongest relationship with the dependent variable. In order to cap the total number of predictor variables around 20-25 for the initial analysis, some of the variables were combined/collapsed. For example, instead of running recent drug use for each drug separately (e.g., heroin, cocaine, marijuana etc.) a new variable representing recent drug use spanning across type of drug was created. All the predictor variables listed in Table 6 were found to have the strongest relationship to the dependent variable and hence were retained and included in the initial multivariate logistic model as predictors. The original logistic regression analysis included all the predictors listed in Table 6. The covariates that evidenced the weakest relationship to treatment completion status were removed and the analysis was run again. This approach to testing the significance of the coefficient(s) helps to address the following question: "Does the model that includes the variable in question tell us more about the outcome variable than a model that does not include that

variable?" (Hosmer & Lemeshow, 2000, p. 11). This approach was used iteratively until only the strongest and most parsimonious predictive model remained. This same method was utilized in the other two regression analyses and the tables with the corresponding significant predictors used in the initial analyses are listed accordingly.

Table 6

Covariates Included in Binary Logistic Regression Analyses

Variable	Significance (p)	Category
Marital Status	.001	Demographics
Years of Education	.013	Demographics
Age	.000	Demographics
Opiate Use Disorder	.034	Drug/Alcohol Disorder
Cocaine Use Disorder	.001	Drug/Alcohol Disorder
Drug use Disorder	.000	Drug/Alcohol Disorder
Alcohol Only Disorder	.000	Drug/Alcohol Disorder
Alcohol and Drug Disorder	.004	Drug/Alcohol Disorder
ASI Drug Composite Score	.000	Drug/Alcohol Disorder
Psych Treatment History	.037	Dual Diagnosis
Depressive Disorder	.065	Dual Diagnosis
Anxiety Disorder	.001	Dual Diagnosis
Eating Disorder	.093	Dual Diagnosis
Dual Diagnosis	.021	Dual Diagnosis
Regularly take prescription med for a physical problem	.072	Health Problem

Lifetime Alcohol Use	.012	Alcohol/Drug Use
Recent Drug Use (30 days prior to intake)	.010	Alcohol/Drug Use
Historic Drug Use	.011	Alcohol/Drug Use
# of times treated for drug abuse	.008	Alcohol/Drug Use
Socrates D Total Score	.018	Motivation
Socrates A Total Score	.004	Motivation
InDUC Responsibility	.028	Drug Use Consequences
Admission prompted by legal system	.071	Legal Problems
Positive Legal History	.005	Legal Problems
ASI Legal Composite Score	.03	Legal Problems

Research Question 1

The first research question was to determine predictor variables associated with treatment completion status. It was hypothesized that pre-treatment client characteristic variables (e.g., age, marital status, drug and alcohol use) would help predict treatment completion and drop-out status. Logistic regression was utilized to examine this question since the dependent variable of treatment completion status is a dichotomous variable. As mentioned, Table 6 includes the predictor variables that were used in the initial logistic regression analyses. Based upon the significance level of each covariate within the model, those that contributed the least amount of variance, and had the lowest level of significance, were removed from the model one by one until the most parsimonious model with the strongest predictors were remaining (Hosmer & Lemeshow, 2000).

Like other regression analyses, logistic regression is susceptible to collinearity issues, whereby when two variables are highly correlated to one another it can make determining the unique contribution of each predictor variable, and thus any interpretation the meaning of the results, very difficult (Hair et al., 1998). To investigate any multicollinearity problems, collinearity diagnostics were run. Both the tolerance and variance inflation factor (VIF) were examined for each variable. The recommended cut-off is commonly a tolerance value of .10, which corresponds to a VIF value of above 10 (Hair et al., 1998). The tolerance and VIF values were examined for each of the variables and all fell in the range demonstrating no multicollinearity problems, with no tolerance levels falling below .97 and no VIF values above 1.03.

Table 7 depicts the final model utilized to address research question 1. The overall effect of the predictor variables upon the dependent variable of treatment completion status was statistically significant $X^2(4, N = 258) = 42.805, p = .000$. The model accurately classified treatment completion status for 70.2% of the participants, with 55% sensitivity and 81% specificity for treatment completion. It demonstrated a 33% false positive rate and a 28% false negative rate at predicting treatment completion. Among the clients tested for this study, the documented rate of completion was 59%. Therefore, this model demonstrated an increase in correctly identifying treatment completion status from what would have been determined simply by "chance" by increasing this probability to 70.2%.

Table 7

Logistic Regression Model for Treatment Completion Status

Variable						95% C.I for OR	
	B	S.E.	df	Sig.	OR	Lower	Upper
Age	.046	.012	1	.000	1.047	1.022	1.073
Anxiety Disorder	-.913	.296	1	.002	.401	.225	.718
Cocaine Use Disorder	-.56	.172	1	.001	.571	.408	.801
Admission prompted by Legal system	-.856	.465	1	.07	.425	.171	1.057

As indicated by the inverting the adjusted odds ratios, for those clients who did not meet criteria for an anxiety disorder, there was a 2.5 increase in the odds of staying in treatment compared to those clients who were found to meet criteria for an anxiety disorder. Similarly, for those clients who did not meet criteria for a cocaine use disorder, there was a 1.75 increase in the odds of staying in treatment compared to those clients who were found to meet criteria for a cocaine disorder. Age was also found to be a statistically significant predictor. Because the adjusted odds ratio reported in the table indicates the change in odds with each one year increase in age, it was determined that a more meaningful indicator would be the change in odds with each decade increase in age (Norusis, 2003). The proper exponentiation was taken to calculate this more meaningful odds ratio. The resulting odds ratio demonstrated that the odds of staying in treatment increase by about 1 ½ times (OR = 1.58) for every decade increase in age. Although it was not statistically significant, by including the variable of "treatment prompted by the legal system", the successful prediction of completion status increased by 3% (from 67%

to 70.2%). While there was not a substantial increase in the predictive power of the model, the slight increase, coupled with previous literature implicating legally prompted treatment as being related to retention, resulted in a decision to keep this variable in the model. Some of the participants in the study enrolled in treatment in large part because the legal system prompted them to do so (e.g., mandatory substance abuse treatment following a driving while intoxicated infraction). For those clients whose admission into treatment *was* prompted by the legal system, the odds of staying in treatment were slightly less than half when compared to those clients who were not prompted by the legal system.

Research Question 2

The second research question examined if time to dropout could be predicted by various predictors. Survival analysis was used in order to describe the proportion of cases for which the event dropout occurred at various time points by assessing the relationship between survival time and a set of predictor variables. Survival analysis is utilized to investigate the occurrence of an event (in this case, treatment dropout) taking place and allows one to determine the point of time at which most individuals are most likely to drop out of treatment. Survival analysis is used to examine how covariates may change the odds of individuals dropping out of treatment (Norusis, 2005).

Similar to the approach taken in the logistic regression model, exploratory analyses investigating the strength of the relationships between the potential covariates and the dependent variable (treatment duration) were conducted. All significant covariates that were then used in the initial survival analysis are listed below in Table 8. The Cox Proportional Hazards (PH) Model was the model chosen for the survival

analysis. It is considered a *semiparametric* approach as it does not require assumptions about the multivariate normality, linearity, or homoscedasticity (Norusis, 2005). On the other hand, the model does assume "that covariates are additive and linearly related to the log of the hazards function" (p. 137-138), known as the *proportional hazards function*. It is assumed that for all cases and across points in time, the shape of the survival function will essentially remain the same. The assumption of the proportional hazards function was tested and only predictors that did not violate this assumption were maintained in the analysis.

Table 8

Covariates Evaluated for Cox PH Model

Variable	Significance	Category
Marital Status	.019	Demographics
Age	.000	Demographics
Opiate Use Disorder	.031	Drug/Alcohol Disorder
Cocaine Use Disorder	.077	Drug/Alcohol Disorder
Drug use Disorder	.003	Drug/Alcohol Disorder
Alcohol Only Disorder	.005	Drug/Alcohol Disorder
Alcohol and Drug Disorder	.022	Drug/Alcohol Disorder
ASI Drug Composite Score	.001	Drug/Alcohol Disorder
Anxiety Disorder	.002	Dual Diagnosis
Dual Diagnosis	.023	Dual Diagnosis
Regularly take prescription med for a physical problem	.024	Health Problem

Recent Drug Use (30 days prior to intake)	.003	Alcohol/Drug Use
Socrates D Total Score	.009	Motivation
Socrates A Total Score	.10	Motivation

The variables that were used for the analysis are listed in Table 9. Based upon recommendations put forth by Eliason (1993), when five or fewer covariates are used in a Cox regression analysis a sample size of at least 60 is required. Given these guidelines, a sample of 273 provides adequate statistical power to detect statistical effects. It should also be noted that like other types of regression analyses, Cox PH method is sensitive to high correlations between covariates. To address any issues of multicollinearity, collinearity diagnostics were conducted. Both the tolerance and variance inflation factor (VIF) were examined for each variable. As previously indicated, the recommended cut-off is commonly a tolerance value of .10, which corresponds to a VIF value of above 10 (Hair et al., 1998). The tolerance and VIF values were examined for each of the predictors and all fell in the range demonstrating no multicollinearity problems, with no tolerance levels falling below .97 and no VIF values above 1.03.

Table 9

Covariates Used in the Cox PH Regression Analysis

Variable	Category
Age	Demographics
Marital Status	Demographics
Opiate Use Disorder	Drug Disorder

Cocaine Use Disorder	Drug Disorder
Recent Drug Use	Alcohol/Drug Use
SOCRATES A Total Score	Motivation

Cox Regression Survival Analysis Final Model

Table 10 depicts the final Cox regression model utilized to address research question 2. The overall effect of the predictor variables upon the dependent variable of treatment duration was statistically significant $X^2(3, N = 273) = 45.05, p = .000$. The table below provides additional information about the covariates that are statistically significant and how they relate to the dependent variable of treatment duration. If the odds ratios are less than 1.0 the direction of the effect is toward reducing the hazard rate. The hazard rate function represents the risk that exists for dropping out of treatment on that specific day and provides information on the average number of people who drop out of treatment over the course of the study period. When hazard rates are plotted over time it allows one to view the risk of dropping out over a specific duration and determine if there are any peaks or troughs in the graph indicating an increased or decreased risk of dropout for that period of time in treatment (Kleinbaum, & Klein, 2005). The survival function is also used to assess the point at which most people are likely to drop out. It is common for researchers to look at the time point when the survival function equals .50 (i.e., the median lifetime) to make this determination.

Table 10

Cox Regression Model for Time to Treatment Drop-out

Variable							95% C.I for EXP(B)	
	B	S.E.	Wald	df	Sig.	EXP(B)	Lower	Upper
Anxiety Disorder	.713	.194	13.46	1	.000	2.04	1.394	2.99
Cocaine Use Disorder	.594	.203	8.55	1	.000	1.81	1.217	2.7
Age	-.043	.009	23.11	1	.000	.958	.942	.98

As the results indicate, those individuals meeting criteria for an anxiety disorder have an increased risk of about 100% to drop-out compared to those without an anxiety disorder. Similarly, those clients meeting criteria for a cocaine disorder have an increased risk of drop-out of 81% compared to those clients who did not meet criteria for a cocaine disorder. Finally, for every year increase in age, the risk of drop-out was found to decrease by about 4%. As indicated earlier, 41% of the sample dropped out of treatment and 59% completed it, with 112 participants experiencing the event of drop-out and 161 cases censored, since they were classified as treatment completers. The figure below depicts how the "survival" rate of hypothetical individuals with mean values on the covariates decreases over time, with survival time represented on the X axis. Note that the risk of drop-out tends to be fairly linear across the time span, as opposed to having any sharp peaks or troughs.

Figure 1

Survival Function at Mean of Covariates

Survival Function at Mean of Covariates
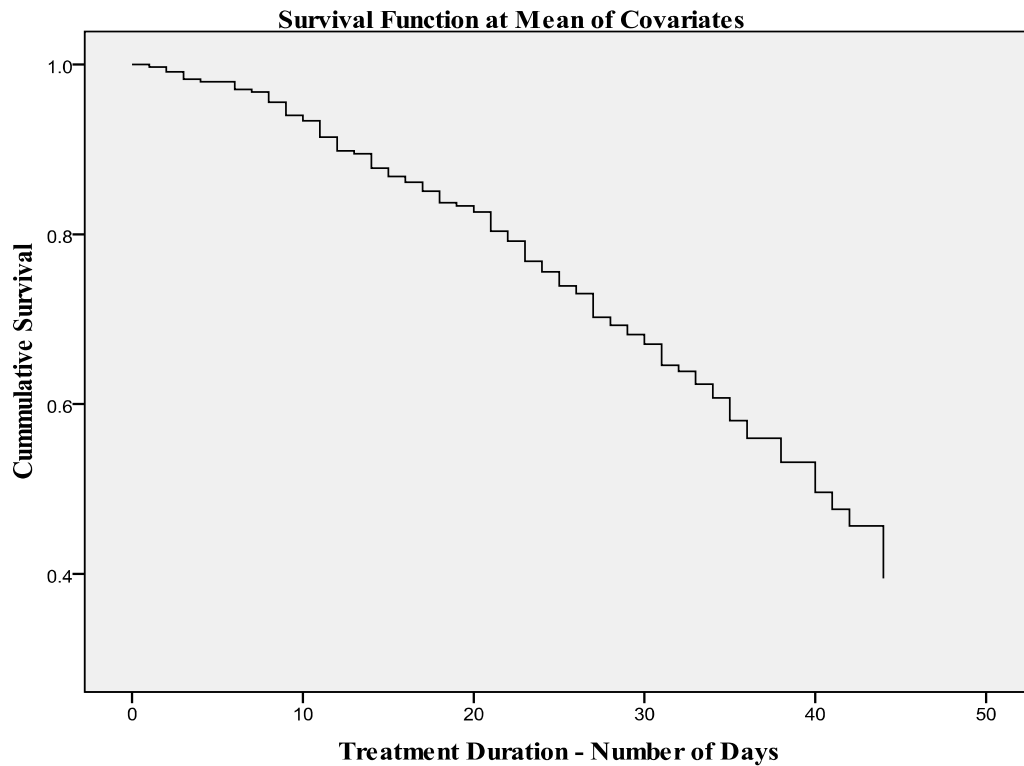
Research Question 3

The third research question investigated whether any client characteristics at the point of treatment intake were statistically significant predictors of the number of treatment sessions attended. Originally a Poisson Regression analysis was going to be conducted since count data in the social sciences are not typically normally distributed, a violation of an assumption of the Ordinary Least Squares regression model (Licht, 1995). Upon investigating the data, it was discovered that number of treatment days attended was normally distributed, and as such, a linear multiple regression analysis was conducted. Prior to conducting the regression analysis, exploratory analyses were again

conducted, investigating the relationships between the dependent variable and various predictors. The initial list for the regression analysis can be found in Table 12. Prior to running the regression analysis, each continuous predictor was evaluated to ensure that it was linearly related to the dependent variable (Licht, 1995; Norusis, 2003). All predictors used were found to be linearly related to the dependent variable "treatment days", barring four outliers in the ASI drug composite score and recent drug use. To ensure that the outliers were not skewing the results in anyway, the analyses were run both including and excluding the outliers and the results were not found to differ.

Table 11

IVs Included in Initial Multiple Regression Model

Variable	Significance	Category
Marital Status	.01	Demographics
Age	.00	Demographics
Opiate Use Disorder	.03	Drug/Alcohol Disorder
Cocaine Use Disorder	.10	Drug/Alcohol Disorder
Drug use Disorder	.01	Drug/Alcohol Disorder
Alcohol only disorder	.01	Drug/Alcohol Disorder
Alcohol and drug disorder	.06	Drug/Alcohol Disorder
ASI Drug composite score	.01	Drug/Alcohol Disorder
Years used alcohol regularly	.10	Drug/Alcohol Disorder
Anxiety Disorder	.01	Dual Diagnosis
Recent Drug use (30 days prior to intake)	.06	Alcohol/Drug Use

Socrates D Total Score	.01	Motivation
Socrates A Total Score	.06	Motivation
Socrates A Recognition Scale	.02	Motivation

Final Regression Model

The final regression model resulted in a total of three statistically significant predictors. Before finalizing the model however, any potential problems of multicollinearity were assessed. To assess for any problems of multicollinearity both the tolerance and variance inflation factor (VIF) was examined for each variable. The recommended cut-off is commonly a tolerance value of .10, which corresponds to a VIF value of above 10 (Hair et al., 1998). The tolerance and VIF values were examined for each of the variables and all fell in the range demonstrating no multicollinearity problems, with no tolerance levels falling below .61 and no VIF values above 1.6.

The final regression model was found to be statistically significant $F(3, N = 273)$ $= 11.58, p = .000$, with the predictor variables accounting for approximately 35% of the variance. The beta weights and statistical significance for each predictor variable can be found below in Table 12. The results indicate that age is positively associated with the number of days in treatment, meaning, older clients were found to attend more treatment days than their younger counterparts. Both having an anxiety disorder and total number of years using alcohol were negatively related to number of treatment days attended. Clients diagnosed with an anxiety disorder spent less time in treatment than those without that disorder. Finally, those clients who used alcohol regularly for more years over the

course of their lifetime attended fewer treatment days than those who used alcohol

regularly for fewer years.

Table 12

Multiple Regression Model for Number of Treatment Sessions Attended

Variable	B	S.E.	β	t	Sig.	95% C.I for B	
						Lower	Upper
Age	.160	.032	.378	5.053	.00	.097	.222
Anxiety Disorder	-1.532	.651	-.139	-2.352	.019	-2.814	-.249
Years of Alcohol Use	-.074	.031	-.177	-2.376	.018	-.135	-.013

Chapter V: Discussion

Overview

The purpose of this chapter is to discuss and integrate the findings reported in

Chapter IV with the existing substance abuse treatment retention literature. Each research

question is reviewed and the corresponding results are discussed. The clinical

implications of the findings are presented, as well as this study's limitations.

Recommendations for future research and closing remarks are included. This chapter

concludes with Table 13, which is a summarization of the statistically significant findings

and interpretation of these results. This table can be found at the end of the chapter along

with a summary of the clinical implications and how the findings fit with existing

literature.

Rationale for the Study

This study set out to investigate how client characteristics, at the point of

treatment intake, are related to retention at a local substance abuse treatment program.

The purpose of this study was two-fold. First, a variety of client characteristics were

examined to investigate whether they could help predict drop-out of treatment. The

clinical implications of these findings will be shared with the treatment program with the

goal of increasing the program's retention rates. Retention has been linked to client

attributes that are amenable to change through the therapeutic process. Although "static"

demographic characteristics (i.e., gender, age, and ethnicity) appear to be related to

treatment retention and outcomes, other "dynamic" client characteristics that can be

impacted in the therapeutic milieu (i.e., psychiatric distress, social support, and

employment problems) are also directly linked (Klag et al., 2004). Importantly, whether

dynamic or static client characteristics are identified as being related to retention, the treatment program could look to alter their treatment approach to help improve drop-out rates (i.e., offering mentoring to younger clients in an effort to help keep them engaged in treatment). Therefore, the results of this investigation could be used by the treatment program to develop an intake "at risk" screen for new clients entering their program, and in response, possibly tailor treatment to help improve the retention rates of those more prone to drop-out. Second, this study also sought to investigate how well the existing literature base "fits" with the findings associated with the treatment program utilized for this investigation, since there have been such conflicting results reported in substance abuse treatment retention literature.

Research Questions

The research questions and the results of those questions will be briefly reviewed in this section. As indicated in Chapter IV, there was a fair amount of overlap in the statistically significant predictors associated with all three research questions. Two of the variables, age and meeting criteria for an anxiety disorder, were statistically significant predictors in all three regression models. One variable, meeting criteria for a cocaine disorder, was a statistically significant predictor in two of the three models. Therefore, instead of including an in-depth discussion of the statistically significant variables when describing the results of each research question, each statistically significant variable will be discussed in separate subsequent sections to avoid redundancy.

Completers Compared to Non-Completers

Before the main research questions were investigated, analyses were run comparing treatment completers and non-completers on demographic, psychiatric, and

substance use characteristics. Statistically significant differences were found to exist

between completers and non-completers in terms of: age, marital status, income, drug use

just prior to treatment entry, meeting criteria for an anxiety disorder, having a dual

diagnosis, meeting criteria for a cocaine or opiate disorder, and being diagnosed with

only an alcohol disorder. Compared to treatment completers, treatment drop-outs were

more likely to be younger; unmarried; report lower incomes; use drugs more prior to

intake; have met criteria for an anxiety, cocaine, or opiate disorder; and have a dual

diagnosis. Treatment completers were more likely to be diagnosed with an alcohol-only

disorder than treatment drop-outs. Each of these statistically significant variables will be

discussed in the subsequent section after the results of the research question are reviewed.

Research Question 1

The first research question investigated whether client characteristics could help

predict treatment completion status. The results indicated that younger age and meeting

criteria for an anxiety disorder and/or a cocaine disorder were statistically significant

predictors of treatment drop out. The final logistic regression model was found to

accurately predict treatment completion status about 70% of the time. Although the

predictive ability of the model was found to be better than chance (59%), it still did not

demonstrate excellent predictive ability of treatment completion status among this

sample. This may have been the result of the fact that only client characteristics were

included as variables. Had treatment variables (i.e., therapeutic alliance, intensity of

service allotment) also been included in this study, the predictive power of the model

may have improved. This hypothesis is based on previous literature which has implicated

program factors as impacting client retention (Broome et al., 1999; Chou et al, 1998;

Marrero et al., 2005). Still, the clinical implications of the model can help to inform

current treatment practices, as well as future research investigations that could take place

as a follow-up to this study.

At the very least, this program is now aware that, at the point of treatment intake,

younger clients and those with an anxiety and/or cocaine disorder are at an increased risk

for dropping out of treatment. One way to utilize this information is for counselors and

intake workers to be aware of these risk factors and use them as an alert system to more

closely work with such clients. For example, clinicians may meet with these "at risk"

clients and employ a brief motivational intervention to help solidly engage them in

treatment early on. In fact, if such a method is useful with those at risk for drop-out it

may also be helpful with other client presentations as well. Additionally, employing

treatment approaches specifically designed to address cocaine disorders may also help to

decrease the risk of drop out. Motivational enhancement strategies have been found to be

useful with this type of population and can be easily implemented into existing

approaches (Bernstein et al., 2005; Secades-Villa et al., 2004). Finally, working to

provide more holistic or integrated treatment to clients with co-morbid anxiety disorders

could also help to decrease the risk of drop-out (Hesse, 2009). These recommendations

will be expanded on in subsequent sessions discussing the individual variables.

It should also be noted that although the model did not demonstrate promising

sensitivity (true positive) for treatment completion, it demonstrated much higher

specificity (true negative). This suggests that the treatment program can be more

confident in predicting who is going to drop-out of treatment as opposed to who is going

to complete it. This has positive clinical implications as treatment adjustments can be

targeted at these specific characteristics. In other words, there does not appear to be a down side to adjusting treatment based on some of the recommendations found here even for those clients who would end up completing treatment without such adjustments. For example, employing a brief motivational interviewing intervention early on in treatment at the very least would not hurt any of the clients and in fact, may be found to improve retention rates among those at-risk.

Future investigations could look to improve the predictive accuracy of the model by including both the statistically significant variables from this study, while incorporating additional variables such as program factors and other client characteristics not measured in this study. By doing so, the predicative power of the logistic regression model could improve, providing a more illustrative picture of those at-risk for drop-out. Ultimately by improving the predictive model the treatment program would be able to develop an at-risk screen that could identify those clients at greatest risk of dropping out. Altering treatment approaches to improve retention rates of these clients could be an ensuing step in research.

Research Question 2

The second research question investigated whether client characteristics could predict time to drop out. Mirroring the results of the first research question, younger age and meeting criteria for an anxiety and/or cocaine disorder were found to predict shorter stays in treatment. Treatment drop out was found to take place gradually over time, without what appears to be any specific periods of increased risk. Previous research identifies the beginning of treatment as a particularly vulnerable time for drop out (Justus et al., 2006; Sayre et al., 2002; Siqueland et al., 2002; Veach et al., 2000); however, the

sample utilized for this investigation does not support that finding. Still, it should be noted that the group of clients who were not tested for this study may have impacted this result. A variety of practical issues were found to impact the number of clients tested, including early drop-out. Some clients did not return for treatment after intake and therefore were not assessed for this project. The average duration of time from treatment entry to assessment appointment was five calendar days. There were a number of clients that dropped out of treatment between the point of intake and when they were to be tested. As such, data on these clients are not represented in these results. Consequently, there is a possibility that the results of this research question may be underestimating the risk of early drop-out since a number of clients who dropped out early were not included in the survival analysis.

Research Question 3

The third research question investigated if client characteristics could predict the number of treatment sessions attended. Results indicated that younger age, meeting criteria for an anxiety disorder, and greater number of years using alcohol regularly were statistically significant predictors of fewer treatment sessions attended. The next section will look more closely at the statistically significant variables and discuss possible interpretations of the results.

<div align="center">

Treatment Completers versus Non-completers

</div>

Demographic Characteristics

In terms of demographic characteristics, younger clients, those not married, and those with lower incomes were more likely to drop out of treatment than clients who were older, those married, and those with higher incomes. Similar findings are found in

the existing literature base. In fact, one of the most robust findings in the treatment

retention literature is the positive relationship between age and treatment drop-out (Chou

et al., 1998; Green et al., 2002; Kavanagh et al., 1996; Mammo & Weinbaum, 1993;

Mitchell-Hampton, 2006; Roffman et al., 1993; Rowan-Szal et al., 2000; Satre et al.,

2004; Stark, 1992). Considering that age was also a statistically significant predictor in

each of the three regression analyses, the subject of age and retention will be expanded

upon in the section specifically devoted to discussing the statistically significant

predictors that held up in the regression models to avoid redundancy. The statistically

significant client characteristics associated with the bivariate analyses that were not found

to hold up in the regression models will be discussed in this section.

Although much research has been conducted on age, a more limited number of

studies have implicated marital status as being related to treatment retention. Siqueland et

al. (2002) reported that among their Caucasian participants, those who were married or

lived with a significant other were found to remain in treatment for a longer period. Other

studies have replicated this finding that not being married is associated with treatment

drop-out (Broome et. al., 1999; Curran, Stecker, Han, & Booth, 2009). Theories put forth

explaining this relationship include the notion that clients may be more likely to remain

in treatment if there is a supportive partner at home reinforcing the engagement in

treatment. Related, spouses may put significant pressure on their partners to attend

treatment and threaten to leave if treatment is not completed. This type of "external

motivation" has been found to prompt initial attendance in substance abuse treatment

(DiClemente et al., 1999; Weisner et al., 2001). Also related, those clients who are

unmarried adults may have fewer people to whom they are held accountable to, including

children, which also could impact treatment retention. For example, a client could be more committed to a treatment regimen if s/he has young children at home who depend on him/her. A phenomenon coined *role incompatibility* illustrates the conflict between certain social roles (e.g., parenting) and certain types of behavior (e.g., heavy drinking resulting in the role of heavy drinker). These types of role incompatibilities could act at as strong motivators to keep clients in treatment. Typically speaking, younger and unmarried clients tend to have fewer role incompatibilities as it relates to their substance use (Littlefield, Sher, & Wood, 2009), hence possibly making it less difficult to drop-out of treatment and continue using.

Finally, clients who reported receiving lower monthly incomes were more likely to drop out of treatment. This positive relationship has been replicated in the literature across samples (Roffman et al.,1993; Siqueland, 2002), as well as specifically with female clients (Green et al., 2002; Mertens & Weisner, 2000; Weisner et al., 2001). Explanations for this phenomenon may include that individuals with higher incomes generally have greater access to resources that individuals with lower incomes may not be able to afford. For example, those clients with higher incomes may also be able to pay for a psychotherapeutic add-on if co-morbid psychiatric distress was an issue, or cover child-care costs in order to attend treatment. Similarly, if insurance only allots for a limited number of sessions, individuals with higher incomes may have more latitude to select to pay out of pocket for additional sessions in order to complete the treatment they started. On the flip side, those clients with lower incomes may not be in a position to miss numerous days of work to attend treatment, especially intensive outpatient treatment that meets every (or almost every) day of the week.

The clinical implications of these findings suggest that when this treatment program enrolls clients who are young, not married, and/or have lower incomes they could be at an increased risk of dropping out of treatment. One useful strategy may be to work with those clients who are not married to identify motivating factors to remain in treatment. This could include identifying someone close to them who supports their sobriety to act as the accountability factor typically associated with a spouse. Additionally, clients who present with lower incomes may benefit from meeting with a social worker on staff to learn about financial assistance or other types of community programs (e.g., affordable child care, employment placement) that might assist them in managing the additional stressors outside of their recovery process.

Recent Drug Use and Type of Drug Disorder

In addition to demographic characteristics, drug use just prior to treatment intake was associated more often among those clients who dropped out of treatment. More specifically, treatment drop-outs were found to have used marijuana, cocaine, heroin, and hallucinogens more in the 30 days prior to intake than those clients who completed treatment. Heavier drug use has been implicated as being related to retention in previous research as well. For example, Stark (1992) has claimed that "the fact that clients who use more drugs have higher attrition rates is true almost by definition and is overwhelmingly confirmed by the evidence" (p. 102). Drug use close to the point of intake can be indicative of both the severity and intensity of clients' substance use, higher degrees of which have been found to negatively impact retention in treatment (Alterman et al., 1996; Lang & Belenko, 2000; Maglione et al., 2000b; Marrero et al., 2005; Mertens & Weisner, 2000; Westreich et al., 1997). Additionally, entering treatment when one is

using both alcohol and drugs has been associated with increased rates of drop-out (Easton

et. al., 2007). Other studies have supported the finding that when clients are using drugs

directly around, or 30 days before, treatment intake, they are less likely to remain in

treatment (Alterman et al., 1996; Paraherakis et al., 2000; White et al., 1998).

Using drugs close to the point of treatment intake may negatively impact retention

for a variety of reasons. As previously stated, the variability in treatment approaches is

the rule rather than the exception and some treatment approaches may not be addressing

the needs of those using drugs. For example, the treatment program associated with this

study is based upon tenets of the Minnesota Model of treatment, including the

incorporation of a 12-step approach rooted in the treatment of alcohol dependence

(Owen, 2003). Clients who enter treatment with recent drug use may have idiosyncratic

treatment needs not associated with those who only use alcohol. For example, before

treating clients who are addicted to opiates, it has been suggested that first such clients

may benefit from stabilizing on methadone and then subsequently being exposed to more

traditional substance abuse treatment. Still, a call for alternative interventions for specific

drug using populations has been recommended (Paraherakis et al., 2000). Further

complicating matters may be that clients who are using illicit drugs just prior to and

around treatment intake are not necessarily functioning at an optimal cognitive level.

Decision making and judgment is often impaired, which has implications for engaging

and remaining in treatment (Stark, 1992). Additionally, if a client is having a difficult

time abstaining from their use of drugs in a program that requires absolute abstinence in

order to participate, such a client may simply make a decision to leave before being

discharged due to violating treatment rules. The treatment program associated with this

study employs an abstinence-based treatment approach such that if abstinence is broken clients are mandatorily discharged from the program.

Research has also suggested that type of drug used can negatively impact treatment retention; cocaine and opiate use being cited in numerous studies for the adverse relationship it appears to have with treatment retention (Fletcher et al., 1997; Paraherakis, et al., 2000; Sapadin, 2006; Sinqueland et al., 2002; Veach et al., 2000). In this study, in addition to recent use of cocaine and heroin, meeting criteria for a cocaine or opiate disorder was also associated with higher treatment drop-out. In this study, meeting criteria for a cocaine disorder was found to be a statistically significant predictor of treatment drop-out and time spent in treatment; therefore, this topic will be expanded upon when the statistically significant predictors of the regression analyses are discussed. However, since opiate use was not implicated in the regression analyses it will be covered in this section.

Individuals addicted to opiates have been found to demonstrate higher levels of cognitive impairment than clients who enter treatment using other types of drugs (Paraherakis et al., 2000). Cognitive impairment, especially its potential effect on a client's ability to attend, has been found to impact retention, whereby greater impairment is related to increased risk of drop-out (Aharonovich, et al., 2006). Furthermore, Paraherakis et al., (2000) reported that when comparing clients according to alcohol, cocaine, and opiate use, those clients addicted to opiates were found to attend treatment sessions less often and demonstrated lower abstinence rates. It is difficult to ascertain exactly why one addicted to opiates might demonstrate lower retention rates. It may be, again, idiosyncratic treatment needs associated with such a population. It may be related

to the cognitive impairment associated with opiate use which was cited earlier. Finally, the lower rates of retention associated with opiate use may be related to the fact that younger clients have been found to use opiates a higher rates than their older counterparts (Paraherakis et al., 2000). Seen this way, since age is implicated consistently in retention, opiate use may simply be a confounding variable. Still, when clients present with an opiate disorder or at the very least, use opiates just prior to treatment, this can be an indicator of a risk for drop-out.

Interestingly, in the present study, treatment completers demonstrated higher rates of an alcohol-only disorder. Similar findings have been shown in previous research which has suggested that when clients present for treatment with only alcohol use, their retention rates have been found to be higher than for clients who present with a co-morbid drug disorder or a single drug disorder (Joe et al., 1999; McKellar et al., 2006). There are a few potential explanations of this finding. One explanation may be related to the treatment philosophy employed by the program. As mentioned, the treatment program associated with this study is based upon the Minnesota Model of treatment; one that has a history of, and roots in, the treatment of alcoholism. It would seem logical to conclude that this program likely meets the treatment needs of those clients addicted to alcohol, perhaps contributing to such clients demonstrating higher retention rates. Similarly, if a client presents with a co-morbid drug use disorder this may be indicative of more severe substance abuse. This more severe pattern of use, coupled with a treatment program that may not be tailored for such individuals, could result in higher drop-out rates for such clients.

Dual Diagnosis

Treatment completers and non-completers were found to demonstrate statistically significant differences based on psychiatric distress and diagnoses. Treatment non-completers demonstrated higher rates of meeting criteria for an anxiety disorder, being dually diagnosed, and having a history of psychiatric treatment. Because meeting criteria for an anxiety disorder was a statistically significant predictor in each of the regression analyses, the discussion around this finding will be expanded upon in the subsequent section.

Substance abuse treatment clients presenting with a dual diagnosis are a common occurrence with documented rates around 63-69% (Castel et al., 2006; Chareny et al., 2005). Slightly more than half (51.6%) of the total sample of this study met criteria for both a substance abuse and other psychiatric disorder, but a higher rate was demonstrated specifically among treatment drop-outs (61%). Although this rate is slightly below what has been reported in the literature, it still indicates high levels of dual diagnosis. This is a noteworthy finding considering clients with a co-morbid psychiatric diagnosis also have been found to demonstrate more severe substance use disorders (Kessler et al., 1996). Co-morbid psychiatric problems among substance abuse treatment populations are an important area of study as this population continues to grow (Osher, 2000), and yet, it remains a significant challenge to dissect the etiology and relationship between substance use disorders and co-morbid psychiatric disorders (Gossop, Marsden, & Stewart, 2006).

In the present study, it was not investigated whether the clients with a dual diagnosis demonstrated more severe substance abuse problems, but it is not uncommon for individuals with psychiatric distress to cope with such symptoms by using drugs or

alcohol. In turn, the use of such substances often exacerbates the psychiatric distress they are attempting to manage. It would not seem unlikely then, that the substance use also decreases one's ability to manage both the withdrawal effects of the substance and the psychiatric distress, resulting in a more severe substance use disorder. Such clients might be more difficult to retain for a variety of reasons. First, clients with co-morbid psychiatric diagnoses are typically not provided specialized substance use treatment that also incorporates the treatment of the psychiatric disorder (Hesse, 2009; Petrakis et al., 2002). Such individuals likely have unique treatment needs that may not be met when substance abuse and psychiatric treatment remain distinct (Charney, Paraherakis, & Gill, 2001). The finding that clients with histories of psychiatric treatment were more likely to drop-out of treatment is not entirely surprising. Having a history of psychiatric treatment suggests that such clients have struggled with both substance use and other psychiatric disorders; again, relating to the hypotheses postulated above that having such a history could increase one's risk of drop-out.

The explanation for higher attrition rates among those who present for treatment with a dual diagnosis is likely due to a constellation of factors. The factors may be related, but not limited to some of the following. When clients are focused on alleviating intense psychological distress they may be less engaged and/or invested in substance use treatment. Further exacerbating this problem is the fact that people often abuse substances in an effort to alleviate psychological distress (albeit temporarily). Engaging in substance abuse treatment, abstaining from substance use, and identifying the reasons underlying one's use can be a stressful undertaking. Additionally, if the psychiatric distress is intense a client may be less apt to remain in treatment as it may simply feel too

overwhelming to manage severe psychiatric distress while attempting to abstain from substance use. In fact, previous research has demonstrated that more severe psychiatric distress can negatively impact retention (Haller et al., 2002; Mertens & Weisner, 2000).

Furthermore, psychological symptoms may interfere with a client's ability to self-regulate their behavior thereby making it more difficult to both remain in treatment and abstain from using substances. Finally, if the treatment program itself does not formally address a client's co-morbid psychiatric distress they may be dissatisfied and drop out feeling as though their treatment needs were not adequately addressed. Indeed, clients who met criteria for a dual diagnosis in the treatment program for this study may not have fared well, in part, due to the Minnesota model employed. This model has been contra-indicated for clients who present with a dual diagnosis when the psychiatric distress has not been stabilized (Owen, 2003). When a client presents with active co-morbid psychiatric distress it might therefore be useful to immediately refer them to another department for add-on psychotherapeutic treatment of the co-morbid psychiatric distress while also utilizing the addictionologist on staff to remediate symptoms more rapidly, if possible, through the use of pharmacology. This way, three treatments could be taking place simultaneously, more holistically treating the client, while also potentially contributing to increased treatment retention if symptom remediation is successful.

Significant Predictors in Regression Analyses

There were two predictors, age and anxiety disorder, that were found to be statistically significant predictors in all three regression analyses. One predictor, meeting criteria for a cocaine disorder, was a statistically significant predictor in the logistic regression and survival analyses. One final predicator, total years of consistent alcohol

use, was a significant predictor in the multiple regression analysis. As was previously stated, due to the considerable overlap in findings, each predictor will be examined in subsequent sections based upon how they may relate to time spent in treatment. The findings, as they apply specifically to the treatment program associated with this study, will be discussed in each of the following sections as well.

Age and Treatment Drop-out

Age was found to be a statistically significant predictor as it relates to treatment completion status, number of treatment days attended, and treatment duration. More specifically, it was found that with each decade increase in age the odds of dropping out of treatment dropped by about 1 ½ times. This is a significant finding when one considers that there was a 6 decade range among the sample. Similar findings have been reported in other studies. For example, one study indicated that in regards to age, "for each one-year increase in age, there was a 2.8% increase in the likelihood of completing treatment" (Siqueland at al., 2002, p. 29). A similar, decrease in risk was associated with this sample, in that with every year increase in age the risk of drop-out fell by 4%. These results suggest that the sample for this study is similar to the population in that younger age represents an increased risk for drop-out.

With people continuing to live longer, there will likely be a wider range of ages represented in substance abuse treatment; therefore, being aware of retention patterns related to age is important (Satre et al., 2004). The positive relationship between age and time spent in treatment has been one of the most robust findings in substance abuse treatment literature. Consistent with the findings of this study, older clients are found to be retained in treatment for statistically significantly longer periods and prematurely

dropout of treatment less frequently than younger clients, regardless of the treatment modality (Chou et al., 1998; Green et al., 2002; Kavanagh et al., 1996; Mammo & Weinbaum, 1993; Mitchell-Hampton, 2006; Roffman et al., 1993; Rowan-Szal et al., 2000; Satre et al., 2004; Stark, 1992).

There are a number of possible explanations for younger clients being at an increased risk of dropping out of this treatment program. First, younger individuals have been found to use more substances, use a wider variety of substances, are less likely to have children who rely on them, and often are thought to possess a behavioral impulsivity not typically associated with more mature populations (Satre et al., 2004; Stark, 1992). Additionally, younger individuals may not have experienced as many problems as a result of their drug and alcohol use, and therefore may not see their use as a chronic problem (McKellar et. al, 2006). Being surrounded by many young people who also use alcohol and drugs would likely only exacerbate this perception. Conversely, older individuals who have demonstrated chronicity of substance use may be more aware of the toll that drug and alcohol use can have on one's life by likely having experienced such effects, reinforcing the messages heard in treatment about consequences of use. Furthermore, older individuals may be more aware of the potential risks associated with relapse from having more recovery attempts than their younger counterparts (Bishop, Jason, Ferrari, & Chen-Fang, 1998). One noteworthy conclusion regarding age and retention is the positive concept that older adults are more likely to be retained. And although older adults are likely to represent a smaller percentage of substance abuse treatment clients (Satre et al., 2004), their presence in the therapeutic milieu could be used as a positive model for their younger counterparts. A real-world application of this

conclusion is that the treatment program could implement a mentoring program as a way for older clients to work closely with younger clients and model more favorable treatment attendance patterns.

In summary, the positive relationship between age and retention appears to be a generalizable finding across populations and treatment centers, and has been coined the "indisputable factor" related to substance abuse retention (Saarnio & Knuuttila, 2003). Consequently, the relationship between age and treatment drop-out has noteworthy clinical implications. The results of this study (and others) suggest that this treatment program can be fairly confident in assuming that when younger clients present for treatment they are automatically at an increased risk for dropping out of treatment. Incorporating a mentoring approach with some of the older clients in treatment could assist younger individuals in engaging and remaining in treatment. Additionally, following up with younger clients who dropped out of treatment could provide some useful information as to the reasons behind it. No literature could be found on specific treatment approaches geared towards younger populations. Studying and developing a unique treatment approach for younger substance abusing populations could have a significant directional impact on the future of substance abuse treatment.

Moreover, future research could look to compare and contrast effective substance abuse treatment approaches for adolescents and adults to inform the development of a specific approach with young adults. Working with younger clients to retain them in treatment could have far-reaching positive effects. Improved retention rates for younger clients should improve the outcomes associated with the treatment episodes. Improved treatment outcomes earlier in the clients' lives will mitigate the ill effects of long-term

substance abuse. A good starting point in this approach would be to identify methods for establishing a solid therapeutic alliance as early as possible with younger clients. Additionally, linking younger clients with community support could also be beneficial. Historically, AA and NA support groups have been attended by older populations (Saarnio & Knuuttila, 2003). It may be beneficial to determine an approach for engaging younger clients in these groups so as to provide an additional protective factor for recovery (Saarnio & Knuuttila, 2003). A potential positive shift is that it appears as though younger individuals are beginning to tap into community 12-step programs at higher rates. For example, Narcotics Anonymous reported that most of their attendants are between the ages of 30-50 (NA World Services, 2007), however, it has also been reported that the median age of its members is decreasing (South Coast Recovery, 2008). Identifying community support options that attract younger members could help keep them engaged in the recovery process. Indeed, this recommendation aligns particularly well with the guiding principles of the treatment program associated with this study since it encourages the seeking out and attending of AA and other community support groups.

Anxiety and Treatment Drop-out

Being diagnosed with an anxiety disorder was found to be predictive of treatment drop-out, fewer treatment sessions attended, and a shorter duration of treatment. These results suggest that having an anxiety disorder is a significant risk factor for clients seeking treatment at the program utilized for this study. Although a fair amount of research has been conducted on co-occurring substance use and psychiatric disorders, a substantial portion of this research has focused primarily on depressive disorders coupled with substance use disorders (Gossop et al., 2006). This largely singular focus on

depression has persisted despite the fact that substance abuse treatment populations commonly demonstrate anxiety disorders, paranoid ideation, and even psychoticism (Gossop et al., 2006). And although a high percentage of clients in this sample met criteria for a depressive disorder, this was not found to be related to treatment duration or drop-out. On the other hand, those who met criteria for an anxiety disorder demonstrated statistically significantly shorter stays and were more likely to drop out.

Anxiety is commonly reported among substance abuse treatment populations as it has been found to be related to both alcohol and cocaine use. For example, the National Epidemiologic Survey on Alcohol and Related Conditions (2006) indicated that about 20% of Americans with a current anxiety disorder also have a current alcohol or other substance use disorder. Co-morbid anxiety was common in this sample as well. Almost a third (29.6%) of the total sample for this study met criteria for an anxiety disorder and almost two-fifths (39.3%) of those who dropped out of treatment met criteria for an anxiety disorder. The common affiliation of anxiety and substance use is perhaps due in part to the "bidirectional" relationship that exists between the two. For example, alcohol is commonly used to manage anxiety symptoms and then in turn results in additional anxiety symptoms during periods of withdrawal (Brady, Tolliver, & Verduin, 2007). Even though fewer studies have been conducted investigating anxiety and treatment retention, other studies have found anxiety to be related to time spent in treatment. For example, Doumas, Blasy, and Thacker (2005) reported that clients in an intensive outpatient program with co-morbid anxiety were more likely to drop out of treatment than those clients free of anxiety. Other studies have reported different findings whereby a diagnosis of an anxiety disorder was associated with longer treatment episodes and

treatment completion (Curran, et. al., 2002). Despite limited research being conducted on anxiety and retention, this study suggests that anxiety and participation in substance use treatment are tied. At the very least it can be assumed that the anxiety often triggered or exacerbated by the ceasing of regular substance use could in turn result in avoidance strategies (i.e., leaving treatment), especially when a common requirement of treatment is abstinence.

An additional explanation of this finding may be related to the treatment modality employed at the treatment center. As was noted, all treatment takes place in group format, often in the upwards of 10-12 members per meeting (depending on census). If a client is struggling with symptoms of anxiety, being in a group setting may only exacerbate this. Further, symptoms of anxiety are generally much higher during the early phase of abstinence (Brady et al., 2007). This increase in symptoms, coupled with entering a group before rapport can be built, would likely only aggravate the anxiety disorder while also negatively impacting treatment effect. For example, if a client is struggling to manage acute anxiety symptoms s/he will not be able to focus appropriately on group content compromising positive treatment effects.

Still, some of the difficulty in deciphering the meaning behind the lower retention rates among the sample for this study may be due to the variety of anxiety disorders represented by this variable (e.g., OCD, PTSD, Panic Disorder, and Social Anxiety). It is unknown if clients with a particular anxiety disorder were more likely to drop-out than those with a different anxiety disorder. It would not seem unreasonable to assume that clients who present with a co-morbid PTSD disorder may likely have distinct treatment needs from another client who presented with co-morbid social anxiety. Related, because

the treatments of different anxiety disorders are often distinct, such clients are not likely

to receive this type of treatment in an intensive outpatient substance abuse program. If

these clients do not also seek out a psychotherapeutic add-on treatment, removing the

substance use, which is likely a primary coping mechanism, might only exacerbate the

anxiety disorders symptoms; in turn they may cope by avoiding treatment, putting them

at risk for drop-out. The finding that meeting criteria for an anxiety disorder is predictive

of shorter stays in treatment has applied value for the treatment program as this can be

viewed as a risk factor indicating possible premature treatment drop-out. At the very

least, this information can be used by clinicians to assist their clients in developing a plan

to address both their substance use and anxiety.

It should be noted that the best treatment approach for co-occurring substance use

and mood and anxiety disorders has yet to be determined. The industry has seen a

forward movement to integrate substance abuse and psychiatric treatment, as opposed to

keeping them distinct as historically has been the case (Hesse, 2009). This is in part due

to the fact that substance abuse treatment seeking individuals fare better when substance

abuse treatment addresses underlying psychiatric disturbance that does not remit when

abstinence is achieved (Rounsaville & Kleber, 1985; Woody et al., 1984). Furthermore,

as was indicated in Chapter 3, the treatment program utilized for this study employs an

abstinence based program adopting components of the Minnesota Model of treatment.

The Minnesota Model treats chemical dependency as the primary problem (Winters,

Stinchfield, Opland, Weller, & Latimer, 2000). Not surprisingly, this treatment program

also treats the substance use disorder as the primary problem. Although it is certainly

understandable that a substance abuse treatment program would consider the SUD as the

primary issue to address, this does not mean that co-morbid psychiatric distress will not interrupt this process. Indeed this hypothesis may be why the Minnesota Model of treatment has been contraindicated for individuals with un-stabilized co-morbid psychiatric distress (Owen, 2003). This notion, coupled with this study's finding of the relationship between anxiety and dropout suggests that the program may want to consider altering components of their treatment approach. If the program has sufficient resources available to provide integrated treatment, it is hypothesized that it could be extremely beneficial for clients. If resources are not available to facilitate integrated treatment, the program could still make efforts to ensure that clients with a co-morbid anxiety disorder have a psychotherapeutic add-on treatment. Considering the treatment program associated with this study has on-site departments that treat other types of psychiatric disorders, it may be beneficial to refer clients with a co-occurring anxiety disorder to another department in the hospital. This way, even if the treatment itself is not integrated, staff could consult and work together in the planning and delivering of treatment to such clients.

Finally, an additional useful pursuit may be working with clients to tolerate the distress often associated with anxiety. Clients in general could benefit from learning behavioral techniques that have been found to assist with distress tolerance, which might also be a useful skill in relapse prevention. For example, individuals with lower levels of distress tolerance have been found to demonstrate shorter periods of abstinence from cigarettes (Brown, Lejuez, Kahler, & Strong, 2002). If the primary coping strategy of substance use is taken away, a new coping strategy is not provided, and distress tolerance training is not implemented, then individuals experiencing symptoms of anxiety may

begin to avoid treatment. This is noteworthy as when substance abusing individuals

demonstrate avoidant coping strategies it has been found to predict negative outcomes

(Ireland, McMahon, Malow, & Kouzekanani, 1994). Assisting clients by both (1)

replacing the unhealthy coping strategy of substance use with an alternative, while (2)

also teaching them to tolerate stressful and uncomfortable emotions could be helpful.

Clients suffering from anxiety disorders may particularly benefit from distress tolerance

training due to the bidirectional mechanism associated with anxiety and substance use

described earlier. Teaching distress tolerance to clients may improve retention.

Individuals who demonstrate higher degrees of distress tolerance have been found to

persist in treatment for longer periods than those demonstrating lower distress tolerance

(Daughters et al., 2005).

Cocaine Disorder and Risk of Drop-out

In the sample for this study, meeting criteria for a cocaine disorder was found to

be predictive of treatment drop-out status and a shorter time spent in treatment. This

finding has emerged in previous research, which has suggested that having a cocaine

addiction is related to decreased retention (Alterman et al., 1996; Fletcher et al., 1997;

Sapadin, 2006; Veach et al., 2000; White, Winn, & Young, 1998). It may not just be the

type of drug disorder, but the type of treatment program attended by people with distinct

drugs of choice that impacts retention. For example, research has indicated that clients

engaged in intensive inpatient substance abuse treatment, whose primary substance of

abuse was not alcohol, were statistically significantly more likely to drop out of treatment

than those clients with alcohol as their primary drug of choice (Wickizer, et al., 1994).

The reasons behind why clients in this sample who met criteria for a cocaine disorder were at an increased risk of drop-out remain elusive. Explanations of this phenomenon in other treatment populations have focused primarily on treatment approaches that are deeply rooted in the AA model, which is associated with a large number of substance abuse treatment centers in the United States (Sapadin, 2006; Veach et al., 2000). Although a large number of centers, like the one utilized for this study, employ treatment models that are grounded in AA theory and approach, they still treat clients with drug disorders, expanding the model to include illicit drugs. Individuals with cocaine disorders may very well have specific treatment needs that are distinct from those individuals only addicted to alcohol. For example, it may be that the impulsivity often linked to cocaine use impacts one's ability to remain focused in treatment. Addressing a unique characteristic such as impulsivity might improve their retention rates. The theory that retention can be impacted by exposing clients with drug disorders to a treatment approach not specifically designed to treat such clients could apply to the sample of this study since the treatment method is rooted in the principles of AA. Not surprising, AA principles were designed to specifically treat alcohol use disorders, therefore, they may not be automatically applicable to individuals with a drug use disorder. . Indeed, alcohol dependent individuals have been found to be retained for longer periods than drug dependent individuals when a Minnesota Model of treatment (an approach based on principles of AA) was employed (Veach et al., 2000). A similar finding was uncovered in this study whereby those clients who were diagnosed with only an alcohol disorder were more likely to complete treatment Again, this supports the hypothesis that treatment

programs rooted in AA may meet the treatment needs of those clients who present with an alcohol use disorder better than those with a drug use disorder.

Furthermore, a majority of the clients in this sample met criteria for an alcohol disorder (74%) and a minority for a cocaine addiction (22%). Being in the minority, those clients with a cocaine disorder may find it challenging to identify with other clients in the treatment program who struggle with an alcohol addiction. This lack of universality among cocaine dependent individuals, coupled with a treatment approach rooted in treated alcohol disorders, could potentially relate to their increased risk of drop-out. Finally, considering that cocaine use is illegal, it may be that those individuals who met criteria for a cocaine disorder lead a more antisocial lifestyle than clients addicted to alcohol. Antisocial personality traits and/or lifestyle characteristics are not likely to mesh well with the regimented treatment approach associated with most centers (White et al., 1998). Antisocial personality disorder has been found to be linked to lower treatment completion rates (Mueller & Wyman, 1997). This is not to say that someone with a cocaine disorder will automatically have an antisocial personality or traits, but using an illicit substance does demonstrate a tendency to operate outside of accepted social norms, in this case legal boundaries. Seen this way, such individuals may have a more difficult time "buying into" a treatment process that they perceive is based upon a misplaced cultural value that the use of illicit substances is inappropriate.

Treatment implications of these findings suggest that it may be useful to link clients up with others who use and are addicted to similar substances for support. The finding that clients who met criteria for an opiate disorder were more likely to drop-out of treatment may also support this recommendation. It may be useful to provide periodic

brief motivational interviewing interventions with clients who meet criteria for a cocaine and/or opiate disorder. Such a brief approach has been found to improve drug use rates among cocaine and heroin addicted individuals (Bernstein et al., 2005), and could assist with treatment retention efforts. Additionally, reinforcing the importance of attending NA or CA (Cocaine Anonymous) meetings outside of the regular treatment meetings may help individuals with cocaine addictions to connect with a larger community of those in recovery that may be more similar to themselves. Talking with individuals who meet criteria for a cocaine disorder about their treatment needs may also be helpful, especially during times when such clients might feel as though their treatment needs are not being met. "Resistant behaviors" might be indicative of clients feeling as though treatment is not working for them (Teyber, 2005). This type of behavior could include sporadic attendance or decreased contribution and engagement during group session. When clinicians note such behaviors, an individual session could be scheduled with the client to discuss potential concerns. A useful client-centered approach to explore such concerns would be motivational interviewing, as a way to both gain information while also minimizing defensive reactions from clients. Any identified themes derived from such interviews could be implemented into practice if feasible.

Years of Alcohol Use and Drop-out

The total number of years that individuals used alcohol regularly (i.e., 3 or more days per week for at least 6 months out of the year), was found to be negatively associated with the number of days spent in treatment. Previous research has also indicated a negative relationship between chronic use of substances and retention in treatment (Alterman et al., 1996; Lang & Belenko, 2000; Maglione et al., 2000b; Marrero

et al., 2005; Mertens & Weisner, 2000; Westreich et al., 1997). There are a number of speculations that could be made about the link between long-term alcohol use and decreased retention. First, it would not seem unreasonable to assume that the more years spent drinking, the more chronic the drinking problem. The more chronic the drinking problem, the greater the difficulty in remaining abstinent from the drug, and in turn, the greater challenge inherent in remaining engaged in treatment. Chronic and persistent alcohol use, especially among individuals with previous substance use treatment histories, may represent a subgroup of treatment resistant alcohol dependent clients. Substance abuse treatment populations have long been associated with words like "unmotivated" and "in denial", connoting a theme that such populations, in general, are difficult to treat. Despite this stereotype, there may very well be pockets of substance users that do not respond to treatment as favorably as we might like. An analogy in the general psychiatric treatment realm might be *treatment resistant depression.* Chronic alcoholics seeking treatment have been described as *treatment resistant* when demonstrating decreased treatment responsiveness (Ehrenreich et al., 1997).

It is possible that the subgroup of individuals who used alcohol more chronically and spent fewer days in treatment demonstrated less treatment responsiveness. Similar hypotheses have been tested before with opiate abusing clients, indicating that multiple previous opiate detoxifications are associated with less treatment responsiveness (Malcolm, Roberts, Wang, Myrick, & Anton, 2000). The reasoning behind this possible decreased treatment responsiveness is unknown. Again, working with clients who present with histories of chronic alcohol use may help clinicians gain a better understanding of why previous treatment episodes were unsuccessful. Additionally, it is likely that some

components of treatment appeal to these individuals, or they would not be initiating treatment in the first place. As such, gaining a better understanding of what has also worked well during previous treatment episodes might be useful. A unique treatment approach that spans a two-year period moving from daily individual treatment doses to one weekly group exposure has been found to work well with treatment resistant alcoholics. By employing such an approach, 60% of the clients were retained and abstinent throughout the two-year period (Ehrenreich et al., 1997). Although a number of practical issues may prevent clients from remaining in treatment for a two-year period (e.g., insurance coverage, counselor availability), it may prove useful to intensify treatment early on by supplementing with individual therapy sessions.

The concept of sustained brain damage contributes to another hypothesis regarding why clients with more chronic alcohol histories demonstrated shorter stays in treatment. Cognitive impairment secondary to substance abuse cannot be ruled out as a possible implicating factor of this finding. It is well known that the longer one uses alcohol and/or drugs, the greater the negative impact on the brain and cognitive functioning. The importance of being able to attend during substance abuse treatment was described earlier, and can also be applied here. Chronic alcohol use has been found to impact one's ability to attend to, store, and recall information (National Institute on Alcohol Abuse and Alcoholism, 2001). Further, cognitive impairment has been found to be most severe during the first couple weeks of abstinence (National Institute on Alcohol Abuse and Alcoholism, 2001). For those individuals demonstrating chronic alcohol use, the biological impact of doing so could negatively impact their ability to pay attention during sessions, store the information shared, and recall it after treatment sessions end.

These difficulties, coupled with the increased risk of experiencing such symptoms during the first two weeks of abstinence, could easily put such individuals at an increased risk of attending fewer treatment sessions. The clinical implications of cognitive decline among substance abusing treatment populations has not received much attention in the literature and yet it remains an important area of future study due to the far reaching effects it may have on treatment engagement and retention (Aharonovich, et al., 2006)

Variance Not Accounted For

Despite the findings that age, meeting criteria for a cocaine or anxiety disorder, and years of alcohol use were all predictors of treatment drop-out, there is a significant amount of variance that was not accounted for with the variable set utilized for this study. The rather limited amount of variance accounted for was surprising when one considers the wide array of client variables included, many of which have been implicated in previous research as being related to retention. For example, client motivation has consistently been implicated as being positively related to retention and time spent in treatment (Brocato, 2004; Broome et al., 1999; Simpson & Joe, 2004; Simpson et al., 1997). And although there are a variety of ways in which motivation is defined (i.e., external vs. internal), this study included a motivation measure of "readiness for change", which was not found to be predictive of treatment drop-out. This then begs the question: what else is predictive of individuals dropping out of treatment that the current variable set is not revealing? There are a number of possibilities and few of the potential factors will be described below.

Program Factors

First, an unknown in this study is the impact of treatment variables on client retention. Program specific and treatment specific factors have recently gained attention in research efforts as potentially relating to client retention. The link appears clear: if clients are not satisfied with the treatment program in which they are engaged, they are not likely to continue with treatment. Certainly client satisfaction with service offerings can impact premature drop-out. In fact, Hser et al. (2004) reported strong relationships between treatment intensity, client satisfaction and, in turn, treatment retention. Interestingly, clients who entered treatment with greater problem severity reported greater satisfaction with treatment services rendered. The authors hypothesized that this increased satisfaction was directly related to the fact that clients with greater problem severity received more services; when clients were offered and utilized more services, they reported greater satisfaction with treatment.

Intensity of service offerings and satisfaction with treatment services has also been investigated among injection drug users. Marrero et al. (2005) discovered that those clients who received more intensive comprehensive services (i.e., two or more kinds of treatment services) were statically significantly more likely to remain in treatment than clients who did not receive such comprehensive services. Furthermore, when clients reported a low level of satisfaction with the services received, they were two and half times more likely to prematurely drop out of treatment (Marrero et al., 2005). Related, when clients were more actively engaged in treatment (i.e., demonstrated more consistent attendance in treatment) they reported a greater commitment to treatment three months after treatment began (Broome et al., 1999). These results point to the importance of

programs offering treatment that is both high in quality and quantity to help retain clients and improve their outcomes. These types of treatment factors were not investigated in this study, but may very well have accounted for some of variance associated with time spent in treatment.

Therapeutic Alliance

As other psychotherapeutic research has demonstrated (Martin, Garske & Davis, 2000), the therapeutic alliance is important in improving treatment retention and outcomes. Meier, Donmall, McElduff, Barrowclough, and Heller (2006) reported that substance abuse treatment clients often leave treatment prematurely and outcomes suffer when they are unable to establish a solid therapeutic relationship early on with their therapists. Meier et al. (2006) determined that clients who had weaker alliance ratings with their counselor were more likely to prematurely drop out of treatment than those clients who rated their alliance as strong. Furthermore, the counselors' rating of the therapeutic alliance was found to be the strongest predictor of treatment drop-out. Meier, Barrowclough, and Donmall's (2005) review of the literature on the role of the therapeutic alliance in drug treatment found moderate effect sizes of the alliance (accounting for 5%-15% of the variance) in predicting retention. It appears that the therapeutic alliance is a particularly important component of drug treatment when the client enters treatment while experiencing psychiatric distress. When clients entered treatment with no or minimal psychiatric distress the therapeutic alliance did not appear to be related to treatment completion. On the other hand, when clients entered treatment with moderate or severe psychiatric symptoms, those who had a good alliance with their counselor were retained until completion 75% of the time versus 25% of the time for

those with weak alliances. Even when the therapeutic alliance has not been found to be a direct predictor of retention, studies have suggested that it plays a mediating role impacting clients' motivation to change, which in turn is positively related to retention (Brocato & Wagner, 2008). The aforementioned findings may be particularly noteworthy as they relate to this sample considering such a large percentage of the clients were dually diagnosed and/or met criteria for an anxiety disorder, which was consistently linked to treatment dropout.

These studies point to the importance of offering treatment program services that are perceived as helpful by clients. When clients are satisfied with the services they receive, it can directly impact a program's ability to retain them. After all, substance abuse treatment is a service provided to consumers, and if the consumers are not satisfied with that service they are not likely to continue participating in it. Programs that offer services that adequately address the needs of clients by reducing distress and improving functioning stand to improve retention rates. One way in which programs can focus on improving client retention and possibly program satisfaction is by utilizing counselors who are able to establish solid, positive therapeutic alliances with their clients. This is an area of future research that warrants additional study.

Interactions of Client and Program Factors

It is evident from the cited literature in this section that client and program factors are both related to retention. It is important to note, however, that neither exists in a vacuum; different program characteristics will likely impact clients differently. Unfortunately, little research has examined this interaction. Chou et al. (1998) investigated how client and program characteristics interact to impact overall retention.

They included three client attributes (e.g., gender, age, drug use level) and three program characteristics (e.g., service provision, funding, staff-client gender matching). Results demonstrated that younger male clients with increased drug severity were more likely to prematurely drop out of drug-free outpatient treatment. Additionally, female clients were more likely to remain in programs that accepted both public and private funding (versus simply public funding). These results imply that the interactions between client and program characteristics that are linked to retention are complex and, as the authors suggest, future research should look to include more variables since this is a significantly understudied area.

Readiness for Treatment

Although this study investigated motivation as it relates to readiness to change, readiness for treatment was not investigated. A large portion of previous research has focused on readiness for treatment rather than readiness to change, and although these two constructs are likely related, they remain distinct (DiClemente et al., 1999). For example, a client may want to change a specific behavior but may not be open to the idea of treatment assisting in that process. Although the way in which motivation was measured for this study was not found to be predictive, it does not mean that motivation is not related to retention among the sample used for this study. It may be helpful for future research to investigate if both readiness for treatment and readiness for change are related to substance abuse treatment retention.

Cognitive Functioning

Another area that was not assessed in this study was the cognitive functioning of the clients in the program. Research has consistently documented the negative impact

substance use can have on the brain. Clients who demonstrate more impaired cognitive functioning especially as it relates to their ability to attend are more likely to drop-out of substance abuse treatment (Aharonovich, et al., 2006). This could be a particularly interesting area for future study, especially in intensive outpatient programs like the one utilized for this study. Intensive outpatient programs that have adapted the Minnesota Model to fit outpatient settings tend to offer primarily group treatment, which meets for a few hours at a time. If clients are struggling to attend, this could be exacerbated by a format that includes numerous people meeting for an extended period of time. Furthermore, if individuals are struggling to attend it could be perceived by treatment staff as if they are unmotivated or not engaged in the treatment program; such tensions could likely contribute to early drop-out.

Client Impulsivity

Impulsivity has been defined as "a predisposition towards rapid, unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or others" (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001, p. 1783). Impulsivity has been linked to substance abuse in the literature, and is believed to be both a facilitator and result of drug use (DeWit, 2009). The link between impulsivity and substance abuse treatment retention is less clear however. Nonetheless, impulsivity has increasingly become a focus in the general arena of substance abuse and may very well be related to length of stay in treatment. At the very least, impulsivity has been found to be associated with chronic substance use and a contributor to relapse (Ersche, Roiser, Robbins, & Sahakian, 2008; Perry & Carroll, 2008).

Further, impulsivity has been found to be related to age; the younger individuals are, the more impulsive they tend to be, which has been found to predict alcohol use disorders (Littlefield et al., 2009). Impulsivity has also been implicated as a risk factor associated with developing a cocaine addiction (Lejuez, Bornovalova, Reyonlds, Daughters, & Curtin, 2007). Exacerbating the problem, the earlier one develops a cocaine disorder and the more chronic their use, the more impulsive such individuals tends to be, and the more intense withdrawal effects they tend to experience (Ahmadi, Kampman, Dackis, Sparkman, & Pettinati, 2008). The link seems reasonable; if younger clients and those who met criteria for a cocaine disorder are found to be more impulsive, relapse becomes more probable and therefore, so does treatment drop-out. Individuals with higher levels of impulsivity may simply decide that treatment is no longer necessary and are more likely to relapse. Younger impulsive clients may struggle with sobriety, especially when surrounded by peers, who are also using, increasing the likelihood of dropping out of treatment. The bottom line is that for a younger individual addicted to cocaine, the rewards associated with substance abuse treatment may appear insignificant when compared to the immediate gratification associated with cocaine use (Potenza, 2007). Perhaps exacerbating the problem, cocaine use has also been found to result in enduring impulsive decision making even after the drug is no longer being used (Simon, Mendez, & Setlow, 2007). This suggests that even clients with only historical use of cocaine could still be presently at-risk for making impulsive decisions about remaining in treatment.

Limitations

There were a number of limitations associated with this project. First, the percentage of clients that dropped out of treatment (41%) is lower than what has generally been reported in the literature for outpatient treatment, which has been found to range from around 60% to 75% (Justus et al., 2006; Sayre et al., 2002; Siqueland et al., 2002; Wickizer et al., 1994). Even though some investigations have reported retention rates of around 50%, this is a minority of the literature focused on intensive outpatient populations (Dobkin, De Civita, Paraherakis, & Gill, 2002; Green et al., 2002; Mammo & Weinbaum, 1991). It should also be reiterated however, that the 444 clients who matriculated through the program during the data collection process (i.e., those tested and *not* tested for the study) demonstrated an overall drop-out rate of 51%. This percentage is closer to the cited averages found above, but again, still lower than what is generally associated with outpatient treatment.

The lower rate of drop-out in this sample may be resultant from a variety of factors. First, it could be that the lower rates of drop-out among those tested were simply an artifact of early client attrition prior to being tested. In fact, 67% of the non-tested clients drop-out of treatment. Treatment investigations rely on adequate recruitment of participants and also retention of those participants throughout the course of the investigation to achieve reliable and valid results. It is not uncommon for research efforts to lose participants when they prematurely drop out of treatment (Vaughn, Sarrazin, Saleh, Huber, & Hall, 2002). Another hypothesis that should be noted, however, is that the higher rates of treatment completion could be related to having undergone the testing process itself. A number of clients reported to assessors that the assessment procedure

was quite helpful in gaining a better understanding of their substance use patterns, and saw the opportunity to meet one on one with an assessor as therapeutic.

The fact that those clients who were not tested for this study demonstrated higher rates of drop-out does limit the generalizability of the findings. The interpretation of the results should be done with this in mind. Also compromising the generalizability of the findings is the issue of "overfitting" of the regression models – this is a common issue with regression analyses as "usually, the model will fit the sample from which it is estimated better than it will fit the population from which the sample is selected. Another sample from the same population will often result in a different model" (Norusis, 2003, p. 157).

A further limitation of this study may be the manner with which the data was collected. All information was gathered based upon client report/recall and there have been limitations noted with such an approach. Inherent within the method of self-report is an assumption that participants' recall is accurate, and yet researchers have noted that recall bias can negatively influence the accuracy with which clients report their substance use (Caldwell, Rodgers, Power, Clark, & Stansfeld, 2006, as cited in Keyes et al., 2008; Moyer, Finney, & Swearingen 2002). Theoretically, recall bias and inaccurate reporting of substance use can come from a variety of sources. For example, brain damage as a result of consistent substance abuse can impact the ability with which participants can recall substance use patterns. But it is not just past use that can impact recall. At the time that self-reported data is requested clients may be under the influence of alcohol or drugs, significantly impairing their ability to access memories accurately. Furthermore, mandated clients may falsely report data for fear of significant legal consequences

(Brocato & Wagner, 2008). Although the accuracy of self-report data has been questioned, some authors maintain that self-report information tends to be a valid source of data especially when obtained independently of the treatment providers coupled with assurances of confidentiality, which is consonant with the approach used for this investigation (Moos & Moos, 2003).

Another limitation associated with this study was the dichotomization of the dependent variable, treatment completion. Although such a dichotomization is a common approach in retention studies, what constitutes a treatment completer has been found to vary considerably (Wickizer, et al., 1994). Even though more than half of this sample completed treatment, how well they were engaged and performed throughout their tenure was not assessed. Being labeled a "treatment completer" only indicates who has remained in treatment through completion; it does not provide a very illustrative picture of how well one was engaged in and devoted to the treatment process. A useful analogy may be that even though a group of students all passed a course, their understanding of the material and what they took away from the course cannot necessarily be determined through simply a pass/fail model. A possible solution to this limitation is for studies to more broadly define treatment retention by avoiding a simple dichotomization.

A final limitation of this study was the lack of programmatic variables investigated, which was expanded upon in the section hypothesizing about variance unaccounted for. Although historically only client characteristics were thought to be related to retention, there was a shift in perspective a few years ago indicating that programmatic factors also likely play a large role (Brocato & Wagner, 2008; Simpson, 2001). Clearly client factors are not the only contributor to premature drop-out. As

previously stated, the limited variance that was accounted for in this study is likely related to the fact that programmatic factors were not measured and included in the analysis. Future retention research would benefit from including both client and program factors.

<div align="center">*Future Directions*</div>

Despite the fact that a substantial amount of research has been conducted on substance abuse treatment retention, there is still much that is unknown. The conflicting findings associated with this research area have simply led to more questions than answers, and suggest that there is much heterogeneity among treatment programs and clientele. As such, substance abuse treatment retention remains a promising area of study. By improving retention rates, programs can help improve their clients' outcomes while also making their program more attractive to potential clients. Although a fair amount of previous research focused on how client characteristics might be related to treatment retention, there has been a growing movement to include programmatic factors in retention research. This movement could be an important step towards gaining a better understanding of the predictors of treatment retention, while also possibly helping to provide a more complete picture of the phenomenon of substance treatment drop-out. As was demonstrated in this study, a limited amount of variance predicting treatment drop-out was accounted for by only using client characteristics. If programmatic factors had also been included they likely would have helped account for more of the variance in the predictive models.

Still, a research challenge exists to begin to tease out *how* program and client characteristics interact to impact retention within *specific* programs. For example,

employed, alcohol-dependent clients with increased problem severity have been found to be retained for longer periods than other clients in a Minnesota Model-based intensive outpatient program (Veach et al., 2000). Clearly not all programs are intensive outpatient and further, not all treatment programs are based upon the Minnesota Model; it begs the questions: Does the Minnesota Model simply work well for that specific subgroup of clients? Perhaps outpatient programs are more sensitive to the needs of employed clients? Or perhaps employed clients are more motivated to engage in treatment since they may have more reasons to achieve and maintain sobriety? Do different interventions work better with, and therefore improve the retention of, a different subset of clients? These questions help support the idea for treatment programs to conduct in-house investigations to help uncover the idiosyncratic retention dynamics taking place in their treatment program. For example, this investigation helped to shed light on the hypothesis that the Minnesota Model may *not* be the ideal treatment approach for a pocket of drug users.

Future research can also look to include client and program factors that have not been investigated as thoroughly in previous research. For example, very limited research has been conducted on how a client's cognitive functioning might impact retention. Further investigations including this variable could be useful since cognitive impairment is typically associated with substance use. Additionally, although research has linked impulsivity and substance use, the relationship between impulsivity and treatment retention has not been investigated. Finally, since age has been found to be one of the most findings in the retention literature, future research efforts could look to implement programmatic or therapeutic approaches targeted at younger clients.

It should also be noted that there is a paucity of qualitative investigations in the area of substance abuse treatment retention. Although qualitative investigations have had a prominent existence in social science and anthropological research, they have been much less pronounced in the field of addictions research. For example, of 291 investigations published between 1995-1996 in the journals *Addiction, Drug and Alcohol Review,* and *Addiction Research,* only 6% (17) cited studies that at least partially utilized qualitative methods and only three qualitative studies were published by the journal *Addiction* (Neale, Allen, & Coombes, 2005). Still, qualitative studies, which attempt to study phenomena in their natural environments, have a place in retention research. Employing a qualitative component to a quantitative investigation could prove quite useful in determining factors related to retention. For example, by interviewing clients who prematurely drop-out of treatment programs could gain to better understand where in the treatment process things begin to break down for their clients increasing the risk of them leaving before treatment is completed.

Conclusions

The results of this investigation indicate that some clients of the associated treatment program are at an increased risk of dropping out of treatment based upon characteristics demonstrated at the point of treatment intake. Meeting criteria for an anxiety and/or cocaine disorder and being younger were consistently implicated as placing someone at an increased risk for leaving treatment. Armed with this knowledge, the treatment program can look to identify new clients who share these at-risk characteristics and work closely with them to help improve retention perhaps through some of the suggestions presented earlier. The results of this study also point to the

feasibility of conducting research at the program level, which has many benefits

including contributing to the larger research base, while also gaining knowledge about

the unique characteristics and challenges associated with a specific treatment program.

Table 13

Statistically Significant Results, Clinical Implications and Fit with Literature

Statistically Significant Variables	Findings	Clinical Implications and Recommendations	"Fit" with Previous Research
Demographic Characteristics			
Age	Younger clients dropped out of treatment more than older clients. Age was a positive predictor of treatment completion status, number of treatment days attended, and total duration in treatment.	The treatment program can be quite confident that young clients are at increased risk of drop-out. Meet with young adults early on one-on-one to establish strong working alliance. Establish a mentoring approach in treatment whereby younger clients are paired up with older adults who have demonstrated abstinence and treatment commitment.	The positive relationship between age and treatment duration is one of the most robust findings in substance abuse treatment retention literature (Chou et al., 1998; Green et al., 2002; Kavanagh et al., 1996; Mammo & Weinbaum, 1993; Mitchell-Hampton, 2006; Roffman et al., 1993; Rowan-Szal et al., 2000; Satre et al., 2004; Stark, 1992).
Marital Status	Unmarried clients dropped out of treatment more often than married clients.	Help unmarried clients identify a supportive person in their life that can act as an accountability source. For example, a spouse could act as a motivational source to stay in treatment.	Being married has been associated with better retention in previous research (Broome et. al., 1999; Curran et al., 2007; Siqueland et al.).
Income	Clients with lower incomes (30 days prior to intake) dropped out of treatment more often than clients with higher incomes.	Clients with lower incomes may not be able to miss work to attend an intensive outpatient program regularly. Similarly, such clients may not have enough income to supplement treatment or pay for things like child care. Setting up lower income clients with a staff social worker could assist with peripheral planning.	Income has been found to be positively related to time spent in treatment in other research efforts (Green et al., 2002; Mertens & Weisner, 2000; Roffman et al.,1993; Siqueland, 2002; Weisner et al., 2001).

Statistically Significant Variables	Findings	Clinical Implications and Recommendations	"Fit" with Previous Research
Recent Drug Use			
Recent Use of: • Marijuana • Cocaine • Hallucinogens • Heroin	Clients who used marijuana, cocaine, hallucinogens, or heroin during the 30 days prior to treatment were more likely to drop out of treatment than those who did not use those drugs.	Recent drug use could indicate a more severe disorder. Increased drop-out might be related to Minnesota treatment model employed. Connecting new clients who use drugs with other drug using clients who have demonstrated good attendance could help increase universality with this minority group.	Drug use close to the point of treatment intake has been found to negatively impact client retention (Alterman et al., 1996; Paraherakis et al., 2000; White, Winn, & Young, 1998).
Alcohol Use			
Years of Regular Alcohol Use	Years of regular alcohol use was negatively predictive of number of treatment sessions attended.	Chronic alcohol use can impair cognitive functioning perhaps resulting in decreased ability to attend. The group may also represent a "treatment resistant" group that does not respond as favorably to treatment.	Literature confirms that chronic substance use has been found to be negatively related to time spent in treatment (Alterman, McKay, Mulvaney & McLellan, 1996; Lang & Belenko, 2000; Maglione et al., 2000b; Marrero et al., 2005; Mertens & Weisner, 2000; Westreich, Heitnre, Cooper, Galanter & Gued, 1997).
Drug Use Disorder			
Cocaine or Opiate Disorder	Meeting criteria for a cocaine or opiate disorder was associated with increased risk of drop-out and shorter stays in treatment.	Increased drop out might be related to the treatment program's philosophy. Clients with a cocaine or opiate disorder may demonstrate cognitive impairment or increased impulsivity, which may impact drop-out. Clients who meet criteria for a drug use disorder might benefit from motivational interviewing strategies.	Cocaine and Opiate use disorders have been indicated as negatively influencing time spent in treatment (Fletcher et al., 1997; Paraherakis, et al., 2000; Sapadin, 2006; Sinqueland et al., 2002; Veach et al., 2000).

Statistically Significant Variables	Findings	Clinical Implications and Recommendations	"Fit" with Previous Research
Psychiatric Co-Morbidity			
Dual-Diagnosis	Clients who met criteria for a dual diagnosis were more likely to drop out of treatment.	Dual diagnosis could impact retention if the psychiatric symptoms are not stabilized or treated concurrently with the substance use disorder. If integrated treatment cannot be offered, retention may be improved by: (1) referring clients to other departments at the hospital (2) have such clients meet with the addictionologist on staff for pharmacology add-on.	Previous research demonstrates conflicting results, with some researchers finding decreased retention rates among dually diagnosed clients (Curran et al., 2002) and other studies reporting higher retention/completion rates among those dually diagnosed (Broome et al., 1999; Justus et al., 2006).
Anxiety Disorder	Meeting criteria for an anxiety disorder was predictive of treatment drop-out, shorter treatment stays, and fewer treatment days attended.	Anxiety and substance use have a bidirectional relationship whereby one negatively influences the other. Treatments that ID the SUD as the primary problem have been contraindicated for dually diagnosed clients if psychiatric distress is not stabilized. This suggests that integrated treatment may be a positive future direction this treatment program could consider.	Previous research has demonstrated conflicting results suggesting that having an anxiety disorder is associated with shorter (Doumas et al., 2005), and longer stays (Curran et al., 2007) in treatment. More research has been conducted on substance abuse treatment retention and co-morbid depressive disorder.
History of Psychiatric Treatment	Clients with a positive history of psychiatric treatment were more likely to drop out of treatment.	Having a history of psychiatric treatment suggests that these clients may also be at-risk of co-morbid psychiatric distress which could negatively impact treatment retention. Additionally, individuals with psychological distress also tend to demonstrate more severe substance use disorders, which could be related to the increased risk of such clients dropping out.	No literature could be found linking previous psychiatric treatment to retention problems, but the literature listed previously in the dual diagnosis and anxiety sections likely also apply here since having a history of psychiatric treatment could likely be linked to dual diagnosis issues.

References

Aharonovich, E., Hasin, D. S., Brooks, A. C., Liu, X., Bisaga, A., & Nunes, E. V. (2006). Cognitive deficits predict low treatment retention in cocaine dependent patients. *Drug and Alcohol Dependence, 81,* 313-322.

Ahmadi, J., Kampman, K., Dackis, C., Sparkman, T., & Pettinati, H. (2008). Cocaine withdrawal symptoms identify "Type B" cocaine-dependent patients. *The American Journal on Addictions, 17,* 60-64.

Aiken, L.R. (2003). *Psychological testing and assessment* (11th ed.). Boston: Allyn & Bacon.

Alterman, A I., Brown, L. S., Zaballero, A., & McKay, J. R. (1994). Interviewer severity ratings and composite scores of the ASI: A further look. *Drug and Alcohol Dependence, 34*, 201-209.

Alterman, A. I., McKay, J. R., Mulvaney, F. D., & McLellan, A. T. (1996). Prediction of attrition from day hospital treatment in lower socioeconomic cocaine-dependent men. *Drug and Alcohol Dependence, 40*, 227-233.

American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association.

Anglin, M. D., Hser, Y., & Grella, C. E. (1997). Drug addiction and treatment careers among clients in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 308-323.

Anton, R. F., Miller, W. R., O'Malley, S. S., Zweben, A., & Hosking, J. D. (2006). Combined Pharmacotherapies and Behavioral Interventions for Alcohol Dependence: The COMBINE Study: A Randomized Controlled Trial-R: Reply. *Journal of the American Medical Association, 296*, 1728-1729.

Anton, R. F., O'Malley, S. S., Ciraulo, D. A., Cisler, R. A., Couper, D., Donovan, D. M. & et al. (2006). Combined pharmacotherapies and behavioral interventions for alcohol dependence: The COMBINE study: A randomized controlled trial. *Journal of the American Medical Association, 295,* 2003-2017.

Appleby, L., Dyson, V., Altman, E., & Luchins, D. J. (1997). Assessing substance use in multiproblem patients: Reliability and validity of the addiction severity index in a mental hospital population. *The Journal of Nervous and Mental Disorders, 185*, 159-165.

Arfken, C. L., Klein, C., di Menza, S., & Schuster, C. R. (2001). Gender differences in problem severity at assessment and treatment retention. *Journal of Substance Abuse Treatment, 20*, 53-57.

Ball, S. A., Carroll, K. M., Canning-Ball, M., & Rounsaville, B. J. (2006). Reasons for dropout from drug abuse treatment: Symptoms, personality, and motivation. *Addictive Behaviors, 31*, 320-330.

Battjes, R. J., Onken, L. S., & Delany, P. J. (1999). Drug abuse treatment entry and engagement: Report of a meeting on treatment readiness. *Journal of Clinical Psychology, 55*, 643-657.

Bernstein, J., Bernstein, E., Tassiopoulos, K., Heeren, T., Levenson, S., & Hingson, R. (2005). Brief motivational intervention at a clinic visit reduces cocaine and heroin use. *Drug and Alcohol Dependence, 77,* 49-59.

Bishop, P. D., Jason, L. A., Ferrari, J. R., & Chen-Fang, H. (1998). A survival analysis of communal-living, self-help, addiction: Recovery participants. *American Journal of Community Psychology, 26,* 803-821.

Blacker, D. & Endicott, J. (2008). Psychometric properties. In A. J. Rush, M. B. First, & D. Blacker (Eds.), *Handbook of Psychiatric Measures* (pp. 7-13) (2nd ed.). Washington, DC: American Psychiatric Publishing, Inc.

Blanchard, K. A., Morgenstern, J., Morgan, T. J., Labouvie, E. W., & Bux, D. A. (2003). Assessing consequences of substance use: Psychometric properties of the Inventory of Drug Use Consequences. *Psychology of Addictive Behaviors, 17,* 328-331.

Booth, B. M., Blow, F. C., Cook, C. A. L., Bunn, J. Y., & Fortney, J. C. (1997). Relationship between inpatient alcoholism treatment and longitudinal changes in health care utilization. *Journal of Studies on Alcohol, 58*, 625-637.

Booth, B. M., Yates, W. R., Petty, F., & Brown, K. (1991). Patient factors predicting early alcohol-related readmissions for alcoholics: Role of alcoholism severity and psychiatric co-morbidity. *Journal of Studies on Alcohol, 52*, 37-43.

Brady, K. T., Tolliver, B. D., & Verduin, M. L. (2007). Alcohol use and anxiety: Diagnostic and management issues. *The American Journal of Psychiatry, 164,* 217-221.

Brecht, M., Anglin, D. M., & Whang, J. (1993). Treatment effectiveness for legally coerced versus voluntary methadone maintenance clients. *American Journal of Drug and Alcohol Abuse, 19,* 89-106.

Bride, B. E. (2001). Single-gender treatment of substance abuse: Effect on treatment retention and completion. *Social Work Research, 25*, 223-232.

Brocato, J. (2004). Predictors of client retention in alternative-to-prison substance abuse programs. (Doctoral dissertation, Florida International University). *Dissertation Abstracts International: Section B: The Sciences and Engineering, 65,* 1963. Abstract retrieved January 9, 2008 from PsycINFO database.

Brocato, J. & Wagner, E. F. (2008). Predictors of retention in an alternative-to-prison substance abuse treatment program. *Criminal Justice and Behavior, 35,* 99-119.

Broome, K. M., Flynn, P. M., & Simpson, D. D. (1999). Psychiatric comorbidity measures as predictors of retention in drug abuse treatment programs. *Health Services Research, 34*, 791-798.

Broome, K. M., Simpson, D. D., & Joe, G. W. (1999). Patient and program attributes related to treatment process indicators in DATOS. *Drug and Alcohol Dependence, 57,*127-135.

Broome, K. M., Simpson, D. D., & Joe, G. W. (2002). The role of social support following short-term inpatient treatment. *The American Journal on Addictions, 11*, 57-65.

Brown, R. A., Lejuez, C. W., Kahler, C., Strong, D. R. (2002). Distress tolerance and duration of past smoking cessation attempts. *Journal of Abnormal Psychology, 111,* 180-185.

Cacciola, J. S., Koppenhaver, J. M., McKay, J. R., & Alterman, A. I. (1999). Test-retest reliability of the lifetime items on the Addiction Severity Index. *Psychological Assessment, 11,* 86-93.

Caldwell, T. M., Rodgers, B., Power, C., Clark, C., & Stansfeld, S. A. (2006). Drinking histories of self-identified lifetime abstainers and occasional drinkers: Findings from the 1958 British Birth Cohort Study. *Alcohol, 41*, 650-654.

Cannon, D. S., Keefe, C. K., & Clark, L. A. (1997). Persistence predicts latency to relapse following inpatient treatment for alcohol dependence. *Addictive Behaviors, 22*, 535-543.

Carey, K. B., Cocco, K. M., & Correia, C. J. (1997). Reliability and validity of the Addiction Severity Index among outpatients with severe mental illness. *Psychological Assessment, 9,* 422-428.

Carroll, K. M., Ball, S. A., Nich, C., Martino, S., Frankforter, T. L., Farentinos, C., et al. (2006). Motivational interviewing to improve treatment engagement and outcome in individuals seeking treatment for substance abuse: A multisite effectiveness study. *Drug and Alcohol Dependence, 81*, 301-312.

Carroll, K. M., Libby, B., Sheehan, J., & Hyland, N. (2001). Motivational interviewing to enhance treatment initiation in substance abusers: An effectiveness study. *The American Journal on Addictions, 10*, 335-339.

Castel, S., Rush, B., Urbanoski, K., & Toneatto, T. (2006). Overlap of clusters of psychiatric symptoms among clients of a comprehensive addiction treatment service. *Psychology of Addictive Behaviors, 20*, 28-35.

Center on Alcoholism, Substance Abuse, and Addictions. (n.d.) Retrieved September 7, 2007, from http://casaa.unm.edu/.

Charney, D. A., PalaciosBoix, J., Negrete, J. C., Dobkin, P. L., & Gill, K. J. (2005). Association between concurrent depression and anxiety and six-month outcome of addiction treatment. *Psychiatric Services, 56*, 927-933.

Charney, D. A., Paraherakis, A. M., & Gill, K. J. (2001). Integrated treatment of comorbid depression and substance use disorders. *Journal of Clinical Psychiatry, 62,* 672-677.

Charter, R. A. (2003). A breakdown of reliability coefficients by test type and reliability method, and the clinical implication of low reliability. *The Journal of General Psychology, 130,* 290-304.

Charter, R. A. & Feldt, L. S. (2001). Meaning of reliability in terms of correct and incorrect clinical decisions: The art of decision making is still alive. *Journal of Clinical and Experimetnal Neuropsychology, 23,* 530-537.

Chen, S., Barnett, P. G., Sempel, J. M., & Timko, C. (2006). Outcomes and costs of matching the intensity of dual-diagnosis treatment to patients' symptom severity. *Journal of Substance Abuse Treatment, 31*, 95-105.

Chou, C., Hser, Y., & Anglin, M. D. (1998). Interaction effects of client and treatment program characteristics on retention: An exploratory analysis using hierarchical linear models. *Substance Use & Misuse, 33*, 2281-2301.

Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6,* 284-290.

Claus, R. E. & Kindleberger, L. R. (2002). Engaging substance abusers after centralized assessment: Predictors of treatment entry and dropout. *Journal of Psychoactive Drugs, 34*, 25-31.

Corse, S. J., Zanis, D. & Hirschinger, N. B. (1995). The use of the Addiction Severity Index with people with severe mental illness. *Psychiatric Rehabilitation Journal, 19,* 9-18.

Curran, G. M., Kirchner, J. E., Worley, M., Rookey, C., & Booth, B. M. (2002). Depressive symptomatology and early attrition from intensive outpatient substance use treatment. *Journal of Behavioral Health Services & Research, 29*, 138-143.

Curran, G. M., Stecker, T., Han, Xiaotong, Booth, B. M. (2009). Individual and program predictors of attrition from VA substance use treatment. *The Journal of behavioral Health Services & Research, 36,* 25-34.

Daeppen, J-B., Burnand, B., Schnyder, C., Bonjour, M., Pecoud, A., & Yersin, B. (1996). Validation of the Addiction Severity Index in French-speaking alcoholic patients. *Journal of Studies on Alcohol, 57,* 161-167.

Daughters, S. B., Lejuez, C. W., Bornovalova, M. A., Kahler, C. W., Strong, D. R., & Brown, R. A. (2005). Distress tolerance as a predictor of early treatment dropout in a residential substance abuse treatment facility. *Journal of Abnormal Psychology, 114*, 729-734.

De Wit, H. (2009). Impulsivity as a determinant and consequence of drug use: A review of underlying processes. *Addiction Biology, 14,* 22-31.

DiClemente, C. C. (2003). *Addiction and change*. New York: Guilford Press.

DiClemente, C. C., Bellino, L. E., & Neavins, T. M. (1999). Motivation for change and alcoholism treatment. *Alcohol Research & Health, 23*, 86-92.

DiClemente, C. C., Carbonari, J. P., Montgomery, R. P. G., & Hughes, S. O. (1994). The alcohol abstinence self-efficacy scale. *Journal of Studies on Alcohol, 55,* 141-148.

Dobkin, P. L., De Civita, M., Paraherakis, A., & Gill, K. (2002). The role of the functional social support in treatment retention and outcomes among outpatient adult substance abusers. *Addiction, 97,* 347-356.

Donovan, D. M. (2003). Assessment to aid in the treatment planning process. In J. Allen & V. (Eds.), *Assessing alcohol problems: A guide for clinicians and researchers* (2nd ed). (NIH ublication No. 03-3745, pp. 125-188). Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism.

Doumas, D. M., Blasy, C. M., & Thacker, C. L. (2005). Attrition from alcohol and drug outpatient treatment: Psychological distress and interpersonal problems as indicators. *Alcoholism Treatment Quarterly, 23,* 55-67.

Drake, R. E., McHugo, G. J., & Biesanz, J. C. (1995). The test-retest reliability of standardized instruments among homeless people with substance use disorders. *Journal of Studies on Alcohol, 56,* 161-167.

Easton, C. J., Mandel, D., Babuscio, T., Roundsaville, B. J., Carroll, K. M. (2007). Differences in treatment outcome between male alcohol dependent offenders of domestic violence with and without positive drug screens. *Addictive Behaviors, 32,* 2151-2163.

Ehrenreich, H., Mangholz, A., Schmitt, M., Lieder, P., Volkel, W., Ruther, E., & Poser, W. (1997). OLITA: An alternative in the treatment of therapy-resistant chronic alcoholics. *European Archives of Psychiatry and Clinical Neuroscience, 247,* 51-54.

Eliason, S. R. (1993). *Maximum likelihood estimation: Logic and practice.* Newbury Park: Sage Press.

Ersche, K. D., Roiser, J. P., Robbins, T. W., & Sahakian, B. J. (2008). Chronic cocaine use not chronic amphetamine use is associated with perseverative responding in humans.

Etheridge, R. M., Hubbard, R. L., Anderson, J., Craddock, S. G., & Flynn, P. M. (1997). Treatment structure and program services in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 244-260.

Fiorentine, R., Nakashima, J., & Anglin, M. D. (1999). Client engagement in drug treatment. *Journal of Substance Abuse Treatment, 17*, 199-206.

Fletcher, B. W., Tims, F. M., & Brown, B. S. (1997). Drug abuse treatment outcome study (DATOS): Treatment evaluation research in the United States. *Psychology of Addictive Behaviors, 11*, 216-229.

Flynn, P. M., Craddock, S. G., Hubbard, R. L., Anderson, J., & Etheridge, R. M. (1997). Methodological overview and research design for the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 230-243.

Gerstein, D. R., & Harwood, H. J. (Eds.) (1990). *Treating drug problems. Vol 1. A study of evolution, effectiveness, and financing of public and private drug treatment systems.* Washington, DC: National Academy Press.

Gillaspy, Jr., J. A., & Campbell, T. C. (2006). Reliability and validity of scores from the Inventory of Drug Use Consequences. *Journal of Addictions & Offender Counseling, 27,* 17-27.

Gossop, M., Marsden, J., & Stewart, D. (2006). Remission of psychiatric symptoms among drug misusers after drug dependence treatment. *The Journal of Nervous and Mental Disease, 194,* 826-832.

Gossop, M., Marsden, J., Stewart, D., Edwards, C., Lehmann, P., Wilson, A., et al. (1997). The national treatment outcome research study in the United Kingdom: Six-month follow-up outcomes. *Psychology of Addictive Behaviors, 11*, 324-337.

Gossop, M., Marsden, J., Stewart, D., & Kidd, T. (2003). The national treatment outcome research study (NTORS): 4-5 year follow-up results. *Addiction, 98*, 291-303.

Green, C. A. (2006). Gender and use of substance abuse treatment services. *Alcohol Research & Health, 29*, 55-62.

Green, C. A., Polen, M. R., Dickinson, D. M., Lynch, F. L., & Bennett, M. D. (2002). Gender differences in predictors of initiation, retention, and completion in an HMO-based substance abuse treatment program. *Journal of Substance Abuse Treatment, 23*, 285-295.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). New Jersey: Prentice-Hall.

Haller, D. L., Miles, D. R., & Dawson, K. S. (2002). Psychopathology influences treatment retention among drug-dependent women. *Journal of Substance Abuse Treatment, 23*, 431-436.

Hesse, M. (2009). Integrated psychological treatment for substance use and co-morbid anxiety or depression vs. treatment for substance use alone. A systematic review of the published literature. *BMC Psychiatry, 9, 6.*

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied statistics for the behavioral sciences* (5th ed.). Boston, MA: Houghton Mifflin Company.

Hosmer, D. W. & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New Jersey: John Wiley and Sons, Inc.

Hser, Y., Evans, E., Huang, D., & Anglin, D. M. (2004). Relationship between drug treatment services, retention, and outcomes. *Psychiatric Services, 55*, 767-774.

Hser, Y., Evans, E., & Huang, Y. (2005). Treatment outcomes among women and men methamphetamine abusers in California. *Journal of Substance Abuse Treatment, 28*, 77-85.

Hser, Y., Huang, D., Teruya, C., & Anglin, M. D. (2003). Gender comparisons of drug abuse treatment outcomes and predictors. *Drug and Alcohol Dependence, 72*, 255-264.

Hser, Y., Polinsky, M. L., Maglione, M., & Anglin, M. D. (1999). Matching clients' needs with drug treatment services. *Journal of Substance Abuse Treatment, 16*, 299-305.

Hubbard, R. L., Craddock, S. G., Flynn, P. M., Anderson, J., & Etheridge, R. M. (1997). Overview of 1-year follow-up outcomes in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 261-278.

Hubbard, R. L., Marsden, M. E., Rachal, J. V., Harwood, H. J., Cavanaugh, E. R., & Ginzburg, H. M. (1989). *Drug abuse and treatment: A natural study of effectiveness*. Chapel Hill: University of North Carolina Press.

Huck, S. W. (2000). *Reading statistics and research.* 3rd ed. New York: Addison Wesley Longman, Inc.

Ireland, S. J., McMahon, R. C., Malow, R. M., & Kouzekanani, K. (1994). Coping style as a predictor of relapse to cocaine abuse. *NIDA Research Monograph, 141*.

Jackson, K. R., Booth, P. G., McGuire, J., & Salmon, P. (2006). Predictors of starting and remaining in treatment at a specialist alcohol clinic. *Journal of Substance Use, 11*, 89-100.

Jarvis, T. J. (1992). Implications of gender for alcohol treatment research: A quantitative and qualitative review. *British Journal of Addiction, 87*, 1249-1261.

Joe, G. W., Broome, K. M., Rowan-Szal, G. A., & Simpson, D. D. (2002). Measuring patient attributes and engagement in treatment. *Journal of Substance Abuse Treatment, 22*, 183-196.

Joe, G. W., Simpson, D. D., & Broome, K. M. (1998). Effects of readiness for drug abuse treatment on client retention and assessment of process. *Addiction, 93*, 1177-1190.

Joe, G. W., Simpson, D. D., & Broome, K. M. (1999). Retention and patient engagement models for different treatment modalities in DATOS. *Drug and Alcohol Dependence, 57*, 113-125.

Joe, G. W., Simpson, D. D., Dansereau, D. F., & Rowan-Szal, G. A. (2001). Relationships between counseling rapport and drug abuse treatment outcomes. *Psychiatric Services, 52*, 1223-1229.

Justus, A. N., Burling, T. A., & Weingardt, K. R. (2006). Client predictors of treatment retention and completion in a program for homeless veterans. *Substance Use & Misuse, 41*, 751-762.

Kavanagh, D. J., Sitharthan, T., & Sayer, G. P. (1996). Prediction of results from correspondence treatment for controlled drinking. *Addiction, 91*, 1539-1545.

Kayman, D. J., Goldstein, M. F., Deren, S., & Rosenblum, A. (2006). Predicting treatment retention with a brief "opinions about methadone" scale. *Journal of Psychoactive Drugs, 38,* 93-100.

Kessler, R. C., Nelson, C. B., McGonagle, K. A., Edlund, M. J., Frank, R. G., & Leaf, P. J. (1996). The epidemiology of co-occurring addictive and mental disorders: Implications for prevention and service utilization. *American Journal of Orthopsychiatry, 66*, 17-31.

Keyes, K. M., Grant, B. F., & Hasin, D. S. (2008). Evidence for a closing gender gap in alcohol use, abuse, and dependence in the United States population. *Drug and Alcohol Dependence, 93,* 21-29.

King, A. C., & Canada, S. A. (2004). Client-related predictors of early treatment dropout in a substance abuse clinic exclusively employing individual therapy. *Journal of Substance Abuse Treatment, 26*, 189-195.

Klag, S., O'Callaghan, F., & Creed, P. (2004). The role and importance of motivation in the treatment of substance abuse. *Therapeutic Communities: International Journal for Therapeutic and Supportive Organizations, 25*, 291-317.

Kleinbaum, D. G., & Klein, M. (2005). Survival analysis: A self learning text. New York: Springer-Verlag Publishers.

Kosten, T. R., Rounsaville, B. J., & Kleber, H. D. (1983). Concurrent validity of the Addiction Severity Index. Journal of Nervous and Mental Disease, 171, 606-610.

Lang, M. A., & Belenko, S. (2000). Predicting retention in a residential drug treatment alternative to prison program. *Journal of Substance Abuse Treatment, 19*, 145-160.

Lawrence, A., Dyson, V., Edward, A., & Luchins, D. J. (1997). Assessing substance use in multiproblem patients: Reliability and validity of the addiction severity index in a mental hospital population. *The Journal of Nervous and Mental Disorders, 185,* 159-165.

Lejuez, C. W., Bornovalova, M. A., Reyonlds, E. K., Daughters, S. B., & Curtin, J. J. (2007). Risk factors in the relationship between gender and crack/cocaine. *Experimental and Clinical Psychopharmacology, 15,* 165-175.

Licht, M. H. (1995). Multiple Regression and Correlation. In L. G. Grimm & P. R. Yarnold (Eds.) , *Reading and Understanding Multivariate Statistics* (pp. 19-64). American Psychological Association: Washington D.C.

Longabaugh, R., Donovan, D. M., Karno, M. P., McCrady, B. S., Morgenstern, J., & Tonigan, J. S. (2005). Active ingredients: How and why evidence-based alcohol behavioral treatment interventions work. *Alcoholism: Clinical and Experimental Research, 29*, 235-247.

Littlefield, A. K., Sher, K. J., & Wood, P. K. (2009). Is "maturing out" of problematic alcohol involvement related to personality change? *Journal of Abnormal Psychology, 118,* 360-374.

Maglione, M., Chao, B., & Anglin, D. (2000a). Residential treatment of methamphetamine users: Correlates of dropout from the California alcohol and drug data system (CADDS), 1994-1997. *Addiction Research*, 65-79.

Maglione, M., Chao, B., & Anglin, M. D. (2000b). Correlates of outpatient drug treatment dropout among methamphetamine users. *Journal of Psychoactive Drugs, 32*, 221-228.

Maisto, S. A., McKay, J. R., & Tiffany, S. T. (2003). Diagnosis. In J. Allen & V. Wilson (Eds.), Assessing alcohol problems: A guide for clinicians and researchers (2nd ed). (NIHPublication No. 03-3745, pp. 55-73). Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism.

Malcolm, R., Roberts, J. S., Wang, W., Myrick, H., & Anton, R. F. (2000). Multiple previous detoxifications are associated with less responsive treatment and heavier drinking during an index outpatient detoxification. *Alcohol, 22,* 159-164.

Mammo, A., & Weinbaum, D. F. (1993). Some factors that influence dropping out from outpatient alcoholism treatment facilities. *Journal of Studies on Alcohol, 54*, 92-101.

Mäkelä, K. (2004). Studies of the reliability and validity of the Addiction Severity Index. *Addiction, 99,* 398-410.

Marin Institute (2006). *Health care costs of alcohol*. Retrieved June 6, 2007, from http://www.marininstitute.org/alcohol_policy/health_care_costs.htm

Marrero, C. A., Robles, R. R., Colon, H. M., Reyes, J. C., Matos, T. D., Sahai, H., et al. (2005). Factors associated with drug treatment dropout among injection drug users in Puerto Rico. *Addictive Behaviors, 30*, 397-402.

Martin, D. J., Garske, J. P., & Davis, K. M. (2000). Relation of the therapeutic alliance with outcome and other variables: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 68,* 438-450.

McCaul, M. E., Svikis, D. S., & Moore, R. D. (2001). Predictors of outpatient treatment retention: Patient versus substance use characteristics. *Drug and Alcohol Dependence, 62*, 9-17.

McKellar, J. D., Harris, A. H., & Moos, R. H. (2006). Predictors of outcome for patients with substance-use disorders five years after treatment dropout. *Journal of Studies on Alcohol, 67*, 685-693.

McKenzie, H. (2007). The relationship between neurocognitive impairment and residential substance abuse treatment retention. (Doctoral dissertation, The Wright Institute). *Dissertation Abstracts International: Section B: The Sciences and Engineering, 68,* 1313. Abstract retrieved January 9, 2008 from PsycINFO database.

McLellan, A. T., Alterman, A. I., Metzger, D. S., & Grissom, G. R. (1994). Similarity of outcome predictors across opiate, cocaine, and alcohol treatments: Role of treatment services. *Journal of Consulting and Clinical Psychology, 62*, 1141-1158.

McLellan, A. T., Cacciola, J. S., Alterman, A. I., Rikoon, S. H., & Carise, D. (2006). The Addiction Severity Index at 25: Origins, contributions, and transitions. *American Journal of Addiction, 15,* 113-124.

McLellan, A. T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., et al. (1992). The fifth edition of the addition severity index. *Journal of Substance Abuse Treatment, 9,* 199-213.

McLellan, A. T., Luborsky, L., Cacciola, J. S., & Griffin, J.E. (1985). New data from the Addiction Severity Index: Reliability and validity in three centers. Journal of Nervous and Mental Disease, 163, 412-423.

McLellan, A. T., Luborsky, L., Woody, G. E., & O'Brien, C. P. (1980). An improved diagnostic evaluation instrument for substance abuse patients: The Addiction Severity Index. Journal of Nervous and Mental Disease, 168, 26-33.

Meier, P. S., Barrowclough, C., & Donmall, M. C. (2005). The role of the therapeutic alliance in the treatment of substance misuse: A critical review of the literature. *Addiction, 100*, 304-316.

Meier, P. S., Donmall, M. C., McElduff, P., Barrowclough, C., & Heller, R. F. (2006). The role of the early therapeutic alliance in predicting drug treatment dropout. *Drug and Alcohol Dependence, 83*, 57-64.

Mertens, J. R., & Weisner, C. M. (2000). Predictors of substance abuse treatment retention among women and men in an HMO. *Alcoholism: Clinical and Experimental Research, 24*, 1525-1533.

Miller, W. R. *Form90: A structured assessment interview for drinking and related behaviors,* Volume 5, NIAAA Project MATCH Monograph Series, NIH Publication No. 96-4004, Washington: Government Printing Office, 1996.

Miller, W. R., & DelBoca, F. K. (1994). Measurement of drinking behavior using the Form 90 family of instruments. *Journal of Studies on Alcohol*, Suppl. 12, 112-118.

Miller, W. R., & Rollnick, S. (2002) *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.

Miller, M. R., & Tonigan, S. J. (1996). Assessing drinkers' motivation for change: The stages of change readiness and treatment eagerness scale (SOCRATES). *Psychology of Addictive Behaviors, 10,* 81-89.

Miller, W., Tonigan, J., & Longabough, R. (1995). *The Drinker Inventory of Consequences (DrInC): An instrument for assessing adverse consequences of alcohol abuse. Test manual* (Vol. 4, Project MATCH Monograph Series). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Milligan, C. O., Nich, C., & Carroll, K. M. (2004). Ethnic differences in substance abuse treatment retention, compliance, and outcome from two clinical trials. *Psychiatric Services, 55*, 167-173.

Miranda, F. J., Gonzales M. P., Perez, M. M., Gonzalez, D. T., Cienfuegoes, G. E., Diaz, A. M., & Garcia, B. J. (2007). Topiramate as add-on therapy in non-respondent alcohol dependant patients: A 12 month follow-up study. *Actas Espanolas de Psiquiatria, 35,* 236-242.

Mitchell-Hampton, T. M. (2006). Factors associated with the retention of urban uninsured adult African Americans in outpatient substance abuse treatment. (Doctoral dissertation, Morgan State University). *Dissertation Abstracts International: Section B: The Sciences and Engineering, 67,* 214. Abstract retrieved January 9, 2008 from PsycINFO database.

Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001). Psychiatric aspects of impulsivity. *American Journal of Psychiatry, 158,* 1783-1793.

Moos, R. H., & Moos, B. S. (2003). Long-term influence of duration and intensity of treatment on previously untreated individuals with alcohol use disorders. *Addiction, 98*, 325-337.

Moyer, A., Finney, J. W., & Swearingen, C. E. (2002). Methodological characteristics and quality of alcohol treatment outcome studies, 1970-98: An expanded evaluation. *Addiction, 97*, 253-263.

Mueller, M. D. & Wyman, J. R. (1997). Study sheds new light on the state of drug abuse treatment nationwide. National Institute on Drug Abuse, NIDA Notes. www.drugabuse.gov/Nida_Notes/NNVol12N5/Study.html. Accessed January 15th, 2007.

Mullins, S. M., Suarez, M., Ondersma, S. J., & Page, M. C. (2004). The impact of motivational interviewing on substance abuse treatment retention: A randomized control trial of women involved with child welfare. *Journal of Substance Abuse Treatment, 27*, 51-58.

National Institute on Alcohol Abuse and Alcoholism (NIAAA) (1992). *National epidemiologic survey on alcohol and related conditions (NESARC), 1991 and 1992.* Retrieved June 6, 2007, from http://niaaa.census.gov/.

National Institute on Alcohol Abuse and Alcoholism (NIAAA) (2001). Cognitive impairment and recovery from alcoholism. *U.S. Department of Health and Human Services.*

National Institute on Alcohol Abuse and Alcoholism (NIAAA) (2006). National epidemiologic survey on alcohol and related conditions. *Alcohol: Research & Health*.

National Institute on Drug Abuse (NIDA) (1992). *The economic costs of alcohol and drug abuse in the United States – 1992*. Retrieved June 6, 2007, from http://www.drugabuse.gov/EconomicCosts/Index.html.

National Institutes of Health (NIH) (2006). *Alcohol – related traffic deaths*. Retrieved June 6, 2007, from http://www.nih.gov/about/researchresultsforthepublic/AlcoholRelatedTrafficDeaths.pdf.

Neale, J., Allen, D., & Coombes, L. (2005). Qualitative research methods within the addictions. *Addiction, 100*, 1584-1593.

Norusis, M. J. (2003). *SPSS 12.0 statistical procedures companion*. New Jersey: Prentice Hall Inc.

Norusis, M. J. (2005). *SPSS 14.0 advanced statistical procedures companion*. New Jersey: Prentice Hall Inc.

Nunes, E. V., & Levin, F. R. (2004). Treatment of depression in patients with alcohol or other drug dependence: A meta-analysis. *JAMA: Journal of the American Medical Association, 291*, 1887-1896.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

Office of Applied Studies, Substance Abuse and Mental Health Services Administration (SAMHSA). (2004). *Admissions with co-occurring disorders: 1995 and 2001.* Retrieved June/6, 2007, from http://www.oas.samhsa.gov/2k4/dualTX/dualTX.cfm

Office of Applied Studies, Substance Abuse and Mental Health Services Administration (SAMHSA). (2007). *Co-occurring major depressive episode (MDE) and alcohol use disorder among adults.* Retrieved June/6, 2007, from http://www.oas.samhsa.gov/2k7/alcDual/alcDual.cfm

Onken, L. S., Blaine, J. D., & Battjes, R. (1997). Behavioral therapy research: A conceptualization of a process. In S. W. Henggeler & A. B. Santos (Eds.), *Innovative Approaches for Difficult-to-Treat Populations* (pp. 477-485). Washington, DC: American Psychiatric Press.

Osher, F. C. (2000). *Co-occurring addictive and mental disorders.* Retreived June 12th, 2009, from: http://mentalhealth.samhsa.gov/publications/allpubs/SMA01-3537/chapter10.asp

Owen, P. (2003). Minnesota model: Description of counseling approach. *Nation Institute on Drug Abuse*, retrived June 18, 2009 from: http://drugabuse.gov/ADAC/ADAC11.html

Paraherakis, A., Charney, D. A., & Gill, K. (2001). Neuropsychological functioning in substance-dependent patients. *Substance Use and Misuse, 36,* 257-271.

Paraherakis, A., Charney, D. A., Palacios-Boix, J., & Gill, K. (2000). An abstinence-oriented program for substance use disorders: Poorer outcome associated with opiate dependence. *Canadian Journal of Psychiatry, 45*, 927-931.

Pearson, F. S. & Lipton, D. S. (1999). A meta-analytic review of the effectiveness of corrections-based treatments for drug abuse. *The Prison Journal, 79,* 384-410.

Peduzzi, P. N., Concato, J. E., Kemper, E., T., Holford, R., & Feinstein, A. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology, 99*, 1373-1379.

Perron, B. E. & Bright, C. L. (2008). The influence of legal coercion on dropout from substance abuse treatment: Results from a national survey. *Drug and Alcohol Dependence, 92,* 123-131.

Perry J. L. & Carroll, M. E. (2008). The role of impulsive behavior in drug abuse. *Psychopharmacology, 200,* 1-26.

Petrakis, I. L., Gonzalez, G., Rosenheck, R., & Krystal, J. H. (2002). Comorbidity of alcoholism and psychiatric disorders: An overview. *Alcohol Research & Health, 26*, 81-89. Regression models for count outcomes: Poisson, negative binomial, and gamma. (n.d.).
Retrieved July 14, 2000, from http://wizard.ucr.edu/~rhannema/soc271/count.html

Potenza, M. N. (2007). To do or not to do? The complexities of addiction, motivation, self-control. *The American Journal of Psychiatry, 164,* 4-7.

Rice, C. (2007). Retest reliability of self-reported daily drinking: Form 90. Journal of Studies on Alcohol, 68, 615-618.

Rikoon, S. H., Cacciola, J. S., Carise, D., Alterman, A. I., & McLellan, A. T. (2006). Predicting DSM-IV dependence diagnoses from Addiction Severity Index composite scores. *Journal of Substance Abuse Treatment, 31,* 17-24.

Roffman, R. A., Klepsch, R., Wertz, J. S., & Simpson, E. E. (1993). Predictors of attrition from an outpatient marijuana-dependence counseling program. *Addictive Behaviors, 18*, 553-566.

Rosenthal, R., & Rosnow, R.L. (2008). *Essentials of behavioral research: Methods and data analysis* (3rd ed.). Boston: McGraw-Hill.

Ross, H. E., Cutler, M., & Sklar, S. M. (1997). Retention in substance abuse treatment: Role of psychiatric symptom severity. *The American Journal on Addictions, 6*, 293-303.

Rounsaville, B. J. (1993). Overview: Rational and guidelines for using comparable measure to evaluate substance abusers. In *Diagnostic Source Book on Drug Abuse Research and Treatment,* Ed. B. J. Rounsaville, F. M. Rims, A. M. Horton, Jr., and B. J. Sowder, pp. 1-10. Rockville, MD: Department of Health and Human Services.

Rounsaville, B. J., Carroll, K. M., & Onken, L. S. (2001). A stage model of behavioral therapies research: Getting started and moving from stage I. *Clinical Psychology: Science and Practice, 8,* 133-142.

Rounsaville, B. J. & Kleber, H. (1985). Psychotherapy/counseling for opiate addicts: Strategies for use in different treatment settings. *International Journal of Addiction, 20,* 869-896.

Rowan-Szal, G. A., Joe, G. W., & Simpson, D. D. (2000). Treatment retention of crack and cocaine users in a national sample of long term residential clients. *Addiction Research, 8*, 51-64.

Rush, A. J., First, M. B., & Blacker, D. (2008). *Handbook of psychiatric measures* (2nd ed.). Washington, DC: American Psychiatric Publishing, Inc.

Saarnio, P. & Knuuttila, V. (2003). A study of risk factors in dropping out from inpatient treatment of substance abuse. *Journal of Substance Use, 8,* 33-38.

Sapadin, K. B. (2006). Initial urine screens as predictor of treatment retention across three different drug of abuse. (Doctoral dissertation, Temple University). *Dissertation Abstracts International: Section B: The Sciences and Engineering, 67,* 560. Abstract retrieved January 9, 2008 from PsycINFO database.

Satre, D. D., Mertens, J. R., Arean, P. A., & Weisner, C. (2004). Five-year alcohol and drug treatment outcomes of older adults versus middle-aged and younger adults in a managed care program. *Addiction, 99*, 1286-1297.

Sayre, S. L., Schmitz, J. M., Stotts, A. L., Averill, P. M., Rhoades, H. M., & Grabowski, J. J. (2002). Determining predictors of attrition in an outpatient substance abuse program. *American Journal of Drug and Alcohol Abuse, 28*, 55-72.

Schmidt, L., Greenfield, T., & Mulia, N. (2006). Unequal treatment: Racial and ethnic disparities in alcoholism treatment services. *Alcohol Research & Health, 29*, 49-54.

Secades-Villa, R., FernandeHermida, J. R., & ArnaezMontaraz, C. (2004). Motivational interviewing and treatment retention among drug user patients: A pilot study. *Substance Use & Misuse, 39*, 1369-1378.

Sheehan, D., Lecrubier, Y., Sheehan, K., Amorim, P., Janavas, J., Weiller, E., et al. (1998). The Mini-International Neuropsychiatric Interview (MINI): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry, 59* (Suppl. 20), 22-33.

Simon, N. W., Mendez, I. A., & Setlow, B. (2007). Cocaine exposure causes long-term increases in impulsive choice behavior. *Behavioral Neuroscience, 121,* 543-549.

Simpson, D. D. (1993). Drug treatment evaluation research in the United States. *Psychology of Addictive Behaviors, 7*, 120-128.

Simpson, D. D. (2001). Modeling treatment process and outcomes. *Addiction, 96*, 207-211.

Simpson, D. D. (2002). Understanding clinical processes to improve treatment. *Research Summary: Focus on Treatment Process and Outcomes.* Institute of Behavioral Research. Special Issue. www.ibr.tcu.edu. Accessed September 10, 2007.

Simpson, D. D. (2004). A conceptual framework for drug treatment process and outcomes. *Journal of Substance Abuse Treatment, 27*, 99-121.

Simpson, D. D., & Joe, G. W. (2004). A longitudinal evaluation of treatment engagement and recovery stages. *Journal of Substance Abuse Treatment, 27*, 89-97.

Simpson, D. D., Joe, G. W., Broome, K. M., Hiller, M. L., Knight, K., & Rowan-Szal, G. A. (1997). Program diversity and treatment retention rates in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 279-293.

Simpson, D. D., Joe, G. W., & Brown, B. S. (1997). Treatment retention and follow-up outcomes in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 294-307.

Simpson, D. D., Joe, G. W., & Rowan-Szal, G. A. (1997). Drug abuse treatment retention and process effects on follow-up outcomes. *Drug and Alcohol Dependence, 47*, 227-235.

Simpson, D. D., Joe, G. W., Rowan-Szal, G. A., & Greener, J. M. (1997). Drug abuse treatment process components that improve retention. *Journal of Substance Abuse Treatment, 14*, 565-572.

Simpson, D. D., Joe, G. W., Rowan-Szal, G., & Greener, J. (1995). Client engagement and change during drug abuse treatment. *Journal of Substance Abuse, 7*, 117-134.

Simpson, D. D. & Sells, S. B. (1982). Effectiveness of treatment for drug abuse: An overview of the DARP research program. *Advances in Alcohol and Substance Abuse, 2,* 7-29.

Singer, J. D. & Willett, J. B. (1991). Modeling the days of our lives: Using survival analysis when designing and analyzing longitudinal studies of duration and the timing of events. *Psychological Bulletin, 110,* 268-290.

Siqueland, L., Crits-Christoph, P., Gallop, R., Barber, J. P., Griffin, M. L., Thase, M. E., et al. (2002). Retention in psychosocial treatment of cocaine dependence: Predictors and impact on outcome. *The American Journal on Addictions, 11*, 24-40.

Sobell, L. C., & Sobell, M. B. (2003). Alcohol consumption measures. In J. Allen & V. Wilson (Eds.), *Assessing alcohol problems: A guide for clinicians and researchers* (2nd ed). (NIH Publication No. 03-3745, pp. 75-99). Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism.

Stark, M. J. (1992). Dropping out of substance abuse treatment: A clinically oriented review. *Clinical Psychology Review, 12*, 93-116.

Sternberg, R. J. (Ed.) (1994). *Encyclopedia of human intelligence* (Vol. 2.). New York: Macmillan.

Stoffelmayr, B. E., Mavis, B. E., & Kasim, R. M. (1994). The longitudinal stability of the Addiction Severity Index. Journal of Substance Abuse Treatment, 11, 373-378.

Substance Abuse and Mental Health Services Administration. (2006). Results from the 2005 National Survey on Drug Use and Health: National Findings (Office of Applied Studies, NSDUH Series H-30, DHHS Publication No. SMA 06-4194). Rockville, MD.

Sun, A. (2006). Program factors related to women's substance abuse treatment retention and other outcomes: A review and critique. *Journal of Substance Abuse Treatment, 30*, 1-20.

Teyber, E. (2005). *Interpersonal process in therapy: An integrative model* (5th ed.). Brooks Cole.

Tonigan, J. S., & Miller, W. R. (2002). The Inventory of Drug Use Consequences (InDUC): Test-retest stability and sensitivity to detect change. *Psychology of Addictive Behaviors, 16,* 165-168.

Tonigan, J. S., Miller, W. R., & Brown, J. M. (1997). The reliability of Form 90: An instrument for assessing alcohol treatment outcome. *Journal of Studies on Alcohol, 58,* 358-364.

Treatment Research Institute. (n.d.) *ASI training.* Retrieved September 7, 2007, from http://www.tresearch.org/training/asi_train.htm.

Tucker, J. A., & Roth, D. L. (2006). Extending the evidence hierarchy to enhance evidence- based practice for substance use disorders. *Addiction, 101*, 918-932.

Vaughn, T., Sarrazin, M. V., Saleh, S. S., Huber, D. L., & Hall, J. A. (2002). Participation and retention in drug abuse treatment services research. *Journal of Substance Abuse Treatment, 23*, 387-397.

Veach, L. J., Remley, T. P. J., Kippers, S. M., & Sorg, J. D. (2000). Retention predictors related to intensive outpatient programs for substance use disorders. *American Journal of Drug and Alcohol Abuse, 26*, 417-428.

Verdurmen, J. E., Smit, F., Toet, J., Van Driel, H. F., & Van Ameijden, E. J. (2004). Under-utilisation of addiction treatment services by heroin users from ethnic minorities: Results from a cohort study over four years. *Addiction Research and Theory, 12,* 285-298.

Weisner, C., Mertens, J., Tam, T., & Moore, C. (2001). Factors affecting the initiation of substance abuse treatment in managed care. *Addiction, 96*, 705-716.

Westreich, L., Heitner, C., Cooper, M., & Galanter, M. (1997). Perceived social support and treatment retention on an inpatient addiction treatment unit. *The American Journal on Addictions, 6*, 144-149.

White, J. M., Winn, K. I., & Young, W. (1998). Predictors of attrition from an outpatient chemical dependency program. *Substance Abuse, 19*, 49-59.

Wickizer, T., Maynard, C., Atherly, A., & Frederick, M. (1994). Completion rates of clients discharged from drug and alcohol treatment programs in Washington State. *American Journal of Public Health, 84*, 215-221.

Woody, G. E., McLellan, A. T., Luborsky, L., O'Brien, C. P., Blaine, J., Fox, S., Herman, I., & Beck, A. T. (1984). Psychiatric severity as a predictor of benefits from psychotherapy: The Penn-VA study. *American Journal of Psychiatry, 141,* 1172-1177.

Wright, R. E. (1995). Logistic regression. In L Grimm & P Yarnold (Eds.), *Reading and understanding multivariate statistics* (217-244). Washington, DC: American Psychological Association.

Zanis, D. A., McLellan, T. A., Corse, S. (1997). Is the addiction severity index a reliable and valid assessment instrument among clients with severe and persistent mental illness and substance abuse disorders? *Community Mental Health Journal, 33,* 213-227.

Appendix A

Running head: CICLR: TREATMENT RETENTION

A Comprehensive-Integrative Critical Literature Review in the Area of Substance Abuse

Treatment Retention

Shauna Fuller

Marquette University

Comprehensive-Integrated Critical Literature Review

Introduction

The primary purpose of this paper is to provide a critical review of the literature as it relates to substance abuse treatment evaluations and client treatment retention. More specifically, the review will include a brief summary of the current status of large-scale drug and alcohol treatment evaluations, providing a solid framework which supports the notions that substance abuse treatment is effective in producing positive treatment outcomes (i.e., increasing abstinence, decreasing severity of use) and that treatment programs would benefit from conducting substance abuse treatment research on-site. Additionally, a critical analysis of the methodologies employed, including research designs, will be included for both efficacy and effectiveness investigations. Unanswered research questions that have been spurred as a result of the large- and small-scale studies will be described. Despite investigations consistently indicating that substance abuse treatment is effective, questions remain regarding which specific components of treatment impede and/or facilitate change. In recent years, studies have begun focusing on treatment processes that are thought to impact outcomes. It has been found that engaging and retaining clients in substance use treatment is an especially important consideration since large numbers of clients have been found not to return to treatment after their initial assessment, or remain in treatment once it has begun (Weisner, Mertens, Tam and Moore, 2001). This point, coupled with the fact that research has demonstrated that the length of time one spends in treatment is positively associated with more favorable treatment outcomes (Simpson, 1993), indicates a need to better understand the factors related to clients remaining in treatment.

As such, a detailed case will be made stressing the importance of investigating and maximizing client treatment retention, specifically as it relates to the documented longer retention rates associated with producing more favorable client treatment outcomes. Treatment engagement will also be described since it is a documented phenomenon linked to treatment retention. As such, a critical analysis of the treatment engagement literature will be included. Reviewing specific variables that have been found to be related to treatment retention was removed from this appended version to avoid redundancy since it was included in Chapter II of this document. Finally, a case will be made emphasizing the call for additional research on treatment retention as it relates to the need for treatment programs to bridge the gap between science and practice through on-site investigations. It will be argued that by continuing to conduct research on retention in naturalistic treatment settings, programs stand to improve their retention rates while joining forces in the evidence-based practice movement. One viable model to guide this process will be explained.

In order to achieve these ends, a comprehensive literature search was conducted through Marquette University's library system. Searches on PsychInfo, ERIC, and Medline were completed in an effort to thoroughly explore the literature base in the areas of substance abuse treatment engagement, retention, and outcomes. Article bibliography lists were also utilized to identify pertinent articles not located through the main search engines. Both published and unpublished work was included and no specific exclusionary criteria were employed, although an effort was made to ensure that the most up to date literature was included.

History of Drug Treatment Evaluations

Introduction

Over time, perspectives on drug abuse have changed. Once deemed an inherent character flaw or inability to control one's behavior, drug abuse began to be recognized as a disease by the 1960s (Simpson, 1993). In part, this shift was a result of society no longer associating drug use only with minorities and criminals (Simpson, 1993). The use of illicit drugs began to move its way outside of the inner city and into the suburbs among non-minorities (Simpson, 1993). Up to, and during this time, there was limited drug abuse treatment available. It wasn't until the 1970s when drug use skyrocketed and a heroin epidemic ensued that community-based treatment even became a viable option to those outside of the prison system (Fletcher, Tims, & Brown, 1997; Simpson, 1993). As the need for drug abuse treatment became increasingly recognized, treatment options grew. By the late 1970s more community-based programs addressing illegal drug use became available and the delivery of drug abuse treatment emerged as a "new" field (Simpson, 2004). As the field grew, different treatment modalities began to be offered to address differences in drug use severity, drugs of choice, and beliefs about rehabilitation. Three main types of drug treatment emerged: methadone maintenance, therapeutic communities, and outpatient drug-free programs (Etheridge, Hubbard, Anderson, Craddock, & Flynn, 1997).

Drug Abuse Reporting Program (DARP)

Although drug treatment options increased, whether the treatments were effective in reducing drug use remained in question. Additionally, whether there were any differences in the effectiveness associated with the different treatment modalities and

settings remained to be determined. Therefore, during the 1970s the National Institute on

Drug Abuse (NIDA) sponsored the first long-term national drug treatment evaluation, the

Drug Abuse Reporting Program (DARP). DARP spanned 20 years of data collection on

almost 44,000 clients in an attempt to better understand the clients who were entering

into community drug treatment centers, the treatments being provided there, and client

drug use patterns during and after treatment (Simpson, 1993). Data collected included

intake assessments, treatment improvement measures while in treatment, and follow-up

evaluations up to 12 years post-treatment (Fletcher et al., 1997). DARP was conducted

across various treatment sites and treatment modalities including methadone

maintenance, therapeutic communities, outpatient drug-free programs, and detoxification

sites.

The results showed that methadone maintenance, therapeutic communities and

outpatient drug-free programs were effective in reducing daily opioid use and criminal

activity. Perhaps more promising, treatment effects remained even after treatment ended;

the key, however, appeared to be time spent in treatment. Clients who remained in

treatment for a period of 90 days or more demonstrated statistically significantly better

outcomes at a one-year follow-up than those who only attended an intake session or

engaged in detoxification (Simpson & Sells, 1982). It was the first time that large-scale

addiction research evaluated outcomes by demonstrating follow-up rates of 83% of

participants from the first to third year following treatment and 80% of participants 12

years after initial admission (Simpson, 1993).

The DARP investigation faced numerous challenges including a lack of

"operational standards and definition for conducting treatment evaluations" (Simpson,

1993, p. 121) as well as criticisms surrounding the self-report data generated from the unreliable source of drug addicts. Additionally, problems with the study design being naturalistic and quasi-experimental rather than carefully controlled and randomized raised questions about the true efficacy of treatment. Challenges also existed in achieving high compliance rates with respondents due to the multi-site design. Additionally, the investigators faced difficulties in managing and analyzing such a large data set with primitive computers and limited statistical programs. Despite these obstacles, the results of DARP did assist future research efforts by pointing to the importance of standardizing outcome assessments and moving research towards the utilization of more objective behaviorally-based evaluation approaches rather than relying on clinical impressions. DARP has been hailed as "one of the longest and most productive studies of drug abuse treatment outcomes ever conducted" (Fletcher et al., 1997, p. 219) providing initial evidence that drug abuse treatment is not only effective, but that the longer a client remains in treatment, the more favorable their outcomes (Simpson & Sells, 1982).

Treatment Outcome Prospective Study (TOPS)

Later, in 1979, NIDA launched the Treatment Outcome Prospective Study (TOPS), which was the second large national investigation of community drug treatment centers. Its research questions mirrored DARP's and included investigating the effectiveness, duration, organization, and intensity of different types of treatment programs associated with 11,182 clients who entered treatment from 1979-1981. The TOPS study looked to expand the goals of DARP by including additional client and program attributes in its evaluation (Fletcher et al., 1997) and focused on treatment offered in methadone maintenance, outpatient drug free, and long-term residential

programs. The results of the TOPS analyses provided evidence that clients entering treatment often experience co-morbid psychiatric distress, specifically symptoms of depression, and that those who enter treatment with extensive, or long-term addictive histories, have poorer treatment prognoses (Fletcher et al., 1997). TOPS also demonstrated that, since DARP, drug use patterns had changed. In the TOPS sample there was less daily heroin use, yet more participants demonstrated polysubstance use as compared to DARP (Hubbard et al., 1989). Furthermore, the results provided additional evidence to support the previous finding that length of stay in treatment was positively associated with more favorable treatment outcomes in terms of reducing daily drug use, suggesting that drug treatment can both be cost-effective and valuable (Simpson, 1993; Fletcher et al., 1997).

Drug Abuse Treatment Outcome Studies (DATOS)

The late 80s and early 90s witnessed significant cultural and policy changes that continued to emphasize the need for quality drug treatment. These changes included but were not limited to: decreased funding for treatment sources, the growing AIDS epidemic, shifts in patterns of drug use including significant increases in cocaine and poly-substance abuse, decreased coverage of drug treatment from insurance companies, and the increased awareness of clients entering treatment with comorbid psychiatric disorders. Furthermore, the early 1990s saw significant decreases in length of stay in treatment due to slashed funding and increased pressure for clinics to demonstrate accountability (Etheridge et al., 1997). These significant cultural shifts resulted in questions about the generalizability of the DARP and TOPS findings, which NIDA addressed by launching a third study in 1989, the Drug Abuse Treatment Outcome

Studies (DATOS). Whereas previous investigations maintained a strict focus on how treatment outcomes are related to client characteristics, DATOS shifted this focus away from the client and attempted to investigate how well treatment programs, both public and private, served specific drug use populations and addressed their needs. The included treatment programs were purposefully selected as those deemed to have "long-term stable operating histories to ensure their viability as research sites" over the two year data collection period (Etheridge et al., 1997, p. 247). Although DATOS investigated client outcomes, it was distinct from the other large-scale investigations by exploring outcomes as they related to various programmatic factors ranging from the overall program modality down to counselor-client factors (Etheridge et al., 1997). To this end, the DATOS investigation collected data from long-term residential, short-term residential, outpatient drug-free, and methadone maintenance programs (Leschner, 1997).

Mirroring, as well as building upon DARP and TOPS, DATOS data was collected on clients as well as on treatment-related factors, at the point of treatment engagement, throughout the treatment process, and post-treatment (Flynn, Craddock, Hubbard, Anderson & Etheridge, 1997). The DATOS research initiative involved the collaboration of various sites, each maintaining a specific focus. The goals of the respective sites included: (1) health services research, (2) retention and engagement, (3) life course of treated addicts, and (4) policy-relevant drug abuse treatment (Fletcher et al., 1997, p. 222).

Results suggested that across treatment modalities, the most common treatment approach was supportive psychotherapy, which was delivered in both individual and group settings and stressed abstinence goals. Treatment programs were found to

individualize service delivery based on specific client needs. Matching strategies to appropriately connect clients with counselors were found to be employed in most of the programs included in the study. Unfortunately, the offering of more widespread services, including ancillary support, was found to decrease over time (Etheridge et al., 1997). The decrease in ancillary services was likely symptomatic of the dramatic cuts in funding that were noted as taking place during this time.

Regarding treatment settings, outpatient drug-free programs demonstrated the greatest amount of client heterogeneity in terms of type of diagnosed substance dependence. Furthermore, DATOS data confirmed that clients in treatment settings often demonstrated long-term treatment "careers"; characterized by more severe drug use patterns and criminality over time coupled with repeated treatment seeking due to high relapse rates. Results suggested that having extensive treatment histories was related to more severe addiction behaviors as well as more legal difficulties and employment problems (Anglin, Hser & Grella, 1997). Programs found to have difficulty retaining clients tended to treat clients who presented with more severe problems. This increased problem severity was reflective of clients who were diagnosed with antisocial personality disorder, who demonstrated more severe substance use diagnoses (e.g., dependence vs. abuse), were addicted to cocaine, and abused heroin as well as crack-cocaine. According to Dwayne Simpson, "these programs are dealing with some tough people. Programs with the highest concentration of these problem patients naturally tend to have low retention" (Mueller & Wyman, 1997, p. 1). Nonetheless, the results of the DATOS investigation continued to provide support to the finding that across treatment modalities substance abuse treatment is beneficial to clients and society in reducing drug use and illegal

activity. Fittingly, Leschner (1997) purports that the most valuable finding of the DATOS investigation "is that patients who enter drug abuse treatment do significantly reduce their illicit drug use" (p. 211). Together, DARP, TOPS, and DATOS suggest that drug treatment appreciably decreases drug use while people are in treatment as well as over a decade after treatment is completed.

Despite this important finding, these large-scale drug treatment evaluations faced methodological challenges. The utilization of a multi-site design created significant complexities associated with aggregating data across a broad range of treatment modalities and client populations (Simpson, Joe, & Brown, 1997; Simpson et al., 1997). According to Etheridge 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" (p. 259). Furthermore, there are limitations associated with making direct comparisons of findings between the different treatment modalities since the modalities demonstrated a fair amount of variability related to treatment approaches, average length of stay, and clientele (Broome, Simpson, & Joe, 1999). Despite these challenges, the multi-site design did allow for general conclusions to be drawn about treatment effectiveness across a variety of therapeutic settings (Joe, Simpson, & Broome, 1999). In addition, DATOS incorporated more sophisticated data analytic techniques than were employed in the DARP and TOPS investigations (Simpson et al., 1997).

Large-Scale Alcohol Research

Project MATCH

There have also been large-scale studies investigating alcohol treatment programs and treatment matching efforts; Project MATCH and Project COMBINE are two such investigations. In contrast to the large-scale drug evaluations, which were effectiveness studies conducted in naturalistic settings, Project MATCH was an efficacy study, carefully controlled and randomized. This study was conducted with the notion that clients diagnosed with alcohol dependence are not a homogenous group in terms of both their treatment needs and responses. Because one specific treatment approach has not been identified as resulting in superior treatment outcomes, treatment matching based on client needs/presentations has gained interest in recent years (Project MATCH Research Group, 1997a). Project MATCH utilized a randomized control trial (RCT) method to investigate how client-treatment factors interact to influence treatment outcomes. There were two parallel studies conducted at the same time pulling clients from two separate treatment modalities: outpatient treatment and clients receiving aftercare treatment following an inpatient stint. With the goal of investigating treatment matching, clients were randomly assigned to one of three treatment approach groups: Twelve-Step Facilitation Therapy (TSF), Cognitive Behavioral Coping Skills Therapy (CBT), or Motivational Enhancement Therapy (MET) (Project MATCH Research Group, 1997a).

Investigators hypothesized that clients who presented with specific characteristics would be more or less likely to have better outcomes depending on the treatment modality to which they were assigned. The researchers postulated that clients who presented with a greater degree of alcohol dependence would demonstrate more favorable

outcomes when matched to the TSF model since this model stresses absolute abstinence. Further, it was thought that clients who presented to treatment with higher levels of anger or hostility would demonstrate better outcomes when matched to MET since this method is designed to increase treatment readiness and reduce "resistance". Finally, investigators suspected that clients who met DSM-III-R criteria for antisocial personality disorder would demonstrate better outcomes when matched to CBT since this approach focuses less upon the therapist-client relationship and are more behaviorally structured/focused (Project MATCH Research Group, 1997c).

Clients were evaluated at 3-month intervals for up to year after completing treatment in an effort to monitor their drinking patterns, quality of life reports, and the utilization of treatment services (Project MATCH Research Group, 1997b). Results pointed to two statistically significant findings related to treatment matching, one for the outpatient group that entered treatment with a high degree of anger, and the other for the aftercare group that presented with more severe alcohol dependence. More specifically, the outpatient clients with high levels of anger, when placed in the MET treatment modality, were found to demonstrate statistically significantly lower post-treatment drinking rates than clients who entered treatment with high levels of anger yet were matched to the CBT group. Additionally, aftercare clients who presented with more severe alcohol dependence, demonstrated statistically significantly more favorable post-treatment outcomes when matched with the TSF. Despite these findings, the overall results did not demonstrate clear and robust conclusions that treatment matching significantly improves post-treatment drinking outcomes (Project MATCH Group, 1997a; 1997b).

A separate analysis utilizing the Project MATCH data suggested that when the treatment focus is on quickly and significantly reducing alcohol use and negative associated consequences CBT or TSF were most useful (Project MATCH Group, 1998a). Nonetheless, by and large, the results supported earlier findings suggesting that "when the results of the Project MATCH primary and secondary matching findings are considered together, no strong conclusions can be drawn that matching clients to specific treatment modalities can improve post-treatment drinking patterns" (Project MATCH Group, 1997c, p. 1690). Regardless of the notion that treatment matching may not play a significant role in treatment outcomes, the results lend support that the three treatment modalities can be appropriate options for a wide variety of clients seeking treatment for alcohol addiction (Project MATCH Group, 1998b). It should be noted that the generalizability of the results is limited since the randomized control design was intended to maximize internal validity. The researchers noted that the observed treatment outcomes could have been inflated, due to the rigorous efforts made to ensure that therapists followed the study protocols with the manualized treatment. In the event that treatment outcomes were inflated the effects associated with treatment mismatching could have been mitigated (Project MATCH Group, 1998b)

Project COMBINE

Project COMBINE set out to investigate the efficacy of behavioral therapies, pharmacological treatments, and the combination of both in the treatment of alcohol dependence (The COMBINE Study Research Group, 2003). The study was one of the first designed to investigate whether treatment was more efficacious when pharmacological and behavioral approaches are combined. Both naltrexone and

acamprosate are drugs that have been used to treat alcohol dependence. The potential

outcome of combining these two drugs (with the addition of psychotherapeutic

interventions) however, had never been investigated. More specifically, the goals of the

COMBINE project included: (1) to determine how individuals with alcohol dependence

respond to treatment involving medication coupled with counseling, (2) to determine if

counseling would be enhanced by clients taking placebo medication while also seeing a

health care professional, and (3) to determine if any improvements made over the 16-

week period of the investigation would extend to one year after treatment cessation

(Anton, Miller, O'Malley, Zweben, & Hosking, 2006). There were two behavioral

treatment approaches included in the study. The first, medical management (MMT), was

a manualized intervention focused on improving medication compliance and abstinence

rates that could be implemented in primary care settings. The second behavioral approach

was a cognitive behavioral intervention (CBI) which was also guided by a manual and

intended to provide specialized treatment of alcohol dependence (The COMBINE Study

Research Group, 2003).

Like Project MATCH, COMBINE was an RCT. The investigation included 1383

adults drinking at harmful levels (21 or more drinks/week for men, or 14 or more

drinks/week for women) who also met criteria for alcohol dependence. Treatment groups

were formed based upon various combinations of the interventions previously listed for a

total a nine possible treatment conditions. Participants were randomly assigned to one of

these nine conditions. More specifically, a total of eight groups received MMT; four of

the groups receiving MMT were also exposed to the CBI. All of the participants in the

eight groups were also assigned to a medication condition (e.g., placebo, acamprosate,

naltrexone, or acamprosate plus naltrexone). This then resulted in four distinct

medication conditions for each of the two behavioral interventions (e.g., MMT or MMT

plus CBI). A ninth group, that was exposed only to the CBI, was included to investigate

possible placebo effects.

Results indicated that all groups in the study demonstrated a statistically

significant decrease in drinking. More specifically, "all treatment groups experienced a

large increase in percent days abstinent, from 25 prestudy to 73 during treatment" (Anton

et al., 2006, p. 2013). Furthermore, when medical management was combined with

cognitive behavioral interventions or naltrexone, participants demonstrated more

favorable outcomes. On the other hand, combining the behavioral interventions and

naltrexone was not found to further enhance treatment outcomes (Anton et al., 2006).

The COMBINE investigation demonstrated high internal validity due to the

similarities between the groups on baseline characteristics, medication and treatment

compliance rates, and the collection of drinking data. There were limitations associated

with the study however. External validity was compromised due to the study's

exclusionary criteria (e.g., participants with significant mo-morbid psychiatric

disturbances and/or co-occurring drug abuse) and the fact that study locations only

included academic sites (Anton et al., 2006). The limited time of treatment exposure (16

weeks) was an additional limitation, given that individuals diagnosed with alcohol

dependence often demonstrate a high probability of relapse (Anton et al., 2006). Despite

these limitations, the results of the COMBINE investigation further point to the notion

that treatment of alcohol disorders is effective both with the use of behavioral

interventions and medical management. Because many treatment programs include the

use of addictionologists in the treatment of alcohol disorders medical management is often a viable option in treatment settings.

Time in Treatment and Treatment Outcomes

Although the efficacy and effectiveness of substance abuse treatment appears to be established, in order for treatment to produce favorable outcomes a client must be engaged and retained in it. This can be a challenge due to high rates of drop-outs typically associated with substance abuse treatment. Weisner, Mertens, Tam, and Moore (2001) note that approximately 29-42% of clients who are admitted for treatment do not subsequently return to receive it. Their study, and other research, has demonstrated similar results in that about a third of clients have been found not to return for treatment following the initial intake assessment (Jackson, Booth, McGuire & Salmon, 2006; King & Canada, 2004; Weisner et al., 2001). Once clients are engaged in treatment attrition rates have been reported to be around 65% (and up to 75%) and those clients who leave treatment tend to do so early on in the process (i.e., before completing even half of the treatment regimen) (Justus, Burling, & Weingardt, 2006; Sayre et al., 2002; Siqueland et al., 2002; Veach, Remley, Kippers, & Sorg, 2000). Other reported retention rates have varied depending on the treatment modality. For example, retention rates (defined as treatment completion) have been reported as being higher in intensive inpatient programs (75% for intensive inpatient alcohol treatment, 71% for intensive inpatient drug treatment) and much lower in intensive outpatient (23% for intensive outpatient alcohol treatment, 18% for intensive outpatient drug treatment) (Wickizer, Maynard, Atherly, & Frederick, 1994).

It has been hypothesized that clients need to be exposed to counseling for several months in order for their behavior to be representative of stable treatment benefits. This notion has been supported by research. According to Simpson and Joe (2004) better treatment outcomes have been found to be predicted by minimum retention thresholds associated with different treatment modalities. More specifically, if clients in residential and outpatient drug-free programs are retained for an average of at least three months, and clients in methadone outpatient treatment are retained for at least a year, their post-treatment outcomes improve compared those clients not retained for those periods.

Other research has replicated the finding that longer stays in methadone treatment are associated with more favorable outcomes. Simpson, Joe, and Rowan-Szal (1997) launched one such investigation on retention in methadone treatment. Results demonstrated statistically significant improvement in client drug use patterns and criminal behavior from intake to follow-up. As length of stay in treatment increased post-treatment outcomes also improved up to one year following discharge. The authors assert, "the magnitude of improvement over time was dependent on how long patient remained in treatment" (p. 232). Those clients retained in treatment for at least one year were five times more likely to demonstrate more favorable outcomes than those not retained as long. Treatment retention effects were statistically significantly related to all the outcomes measures including drug use, alcohol use, criminality, and problem severity.

The finding that client retention for at least 90 days in residential and outpatient treatment modalities is predictive of more favorable treatment outcomes (Simpson, 1993) has also been replicated. Hser, Evans, Huang, and Anglin (2004) investigated the relationship between drug treatment services, retention, and outcomes among clients

engaged in multi-site out-patient drug free and residential treatment programs in California. The authors analyzed the relationship between treatment processes, retention, and outcomes through path analysis. Their results demonstrated that greater treatment intensity and satisfaction was directly linked to clients remaining in treatment for a longer period or through completion. In turn, longer retention (at least 90 days) in treatment, or treatment completion, was statistically significantly associated with more positive treatment outcomes (i.e., no illicit drug use in past 30 days, no criminal activity, and were living in the community). The authors caution though that the generalizability of these findings across programs is compromised since the treatment programs were not randomly selected. Furthermore, the study excluded about half of the potential participants who were identified during the recruitment period. These were individuals who were engaged in methadone maintenance programs, incarcerated, died, or whom lost contact with the researchers during the follow-up period.

These very specific retention thresholds of three months and one year have been examined to address the criticism that such arbitrary cut-offs could be misleading. Additionally, clients cannot always be retained throughout this critical period as treatment lengths are increasingly determined by managed care requirements rather than treatment need (Leshner, 1997). To address this question Zhang, Friedmann and Gerstein (2003) investigated how well the retention thresholds predicted treatment outcomes. Their findings did not support an optimal treatment threshold across treatment modalities. They found positive linear relationships associated with time spent in treatment and overall client improvement. For outpatient and long-term residential however, if clients remained in treatment for an unusually long period of time (i.e., more than 18 months)

treatment effects had diminishing returns. The authors hypothesize that this finding could indicate "optimal" treatment lengths for different modalities. Although these findings did not substantiate the optimal treatment thresholds identified by Simpson and Joe (2004), the results do provide additional evidence to suggest that time spent in treatment is a vital factor related to overall client improvement and that retention does indeed "matter" (Zhang et al., 2003). If programs have difficultly retaining clients within a period of adequate treatment exposure, client outcomes would certainly seem to suffer. Ball, Carroll, Canning-Ball, and Rounsaville (2006) maintain that early attrition from treatment is the most profound variable associated with treatment outcomes; as cited, if clients are retained in treatment, outcomes improve. As indicated by Etheridge et al. (1997), "over the past 15 years, one of the most consistently replicated research findings is the importance of length of stay as a predictor of treatment outcome" (p. 258). Ironically, despite this highly reliable finding, it is length of stay that has been compromised most by managed care.

<p align="center">*Early Treatment Engagement and Retention*</p>

Early treatment engagement appears to be a critical factor in client retention. In other words, if a client is not engaged or connected to treatment early on, it is suspected that they would be more likely to prematurely drop out of treatment. Research suggests that when clients have a shorter wait time from intake assessment to the first treatment episode, they are more likely to engage in treatment (Claus & Kindleberger, 2002; Jackson et al., 2006). Not surprisingly, it appears that consistent contact with treatment staff early may be a factor assisting clients to engage in treatment. For example, clients referred to residential treatment have been found to be more likely to engage in and

attend treatment than those clients referred to outpatient treatment. (Claus &

Kindleberger, 2002). These results may be related to the notion that clients enrolled in

inpatient treatment are seen more often by clinical staff and have more consistent

exposure to treatment sessions. Although "decisions to seek help and to accept help are

distinct" (Claus & Kindleberger, 2002, p. 25), early engagement and retention are related

constructs.

Without early engagement retention is not likely to take place (Simpson, 2004).

Simpson describes a complex process of linked elements which interact to influence

engagement and retention. He notes client motivation or readiness for change, treatment

factors including, but not limited to, the therapeutic alliance, session attendance, social

support networks, and other client factors such as higher levels of addiction severity as all

contributing to early engagement and hence overall retention. All of these factors have

been found to be implicated in both treatment engagement and retention; unfortunately

they have not been investigated comprehensively. Although treatment engagement and

retention are related constructs, the factors associated with a client initially becoming

involved in treatment and those associated with the client then remaining in treatment

may be distinct (Weisner et al., 2001). As such, a separate section focused on the

treatment engagement literature will follow.

Treatment Engagement –Review of the Literature

Simpson and Joe (2004) have postulated that early engagement is related to two

primary factors: program participation and therapeutic relationship. Both factors and their

relationship with early recovery appear to be positively related to retention and post-

treatment recovery. For example, in the counseling and therapeutic literature, the

therapeutic alliance is often found to be at least a moderate predictor of client engagement, retention, and positive therapeutic outcome (Martin, Garske, & Davis, 2000). Although perhaps not as thoroughly, this phenomenon has also been investigated in the substance use treatment arena. Dearing, Barrick, Derman, and Walitzer (2005) focused on the relationship between different aspects of client engagement (e.g., therapeutic alliance, session attendance, and treatment expectations) from the clients' perspective and how those factors relate to outcomes. Results suggested that when clients perceive a positive working (or therapeutic) alliance, they have positive expectations about treatment, and in turn engage in treatment more, tend to report greater satisfaction in treatment, and have better treatment outcomes (Dearing et al., 2005). Supporting these findings was a review article by Meier, Barrowclough and Donmall (2005) which examined 18 studies conducted over a period of 20 years and focused on the impact of the therapeutic alliance on drug treatment processes. Although a limited number of studies focused on the link between the therapeutic alliance and early engagement, those included in the review reported a consistent positive relationship between client-therapist alliance and early engagement in treatment.

Program Participation and Treatment Intensity

Program participation and treatment intensity appear to be other critical components of treatment engagement and outcome. For example, research has suggested that clients who attend more counseling sessions while in treatment tend to have more favorable outcomes (Fiorentine & Anglin, 1996). It therefore seems reasonable to suspect that frequency of program participation can also be related to how well a client engages early on in treatment; if a client does not participate regularly at the point of treatment

onset they would likely continue with sporadic attendance or stop engaging altogether.

Related, offering more consistent opportunities to engage in treatment (i.e., treatment

intensity) may help to increase how often a client attends treatment early on. Indeed,

research has supported the notion that treatment intensity is related to treatment initiation;

clients assigned to higher levels of treatment intensity (i.e., day treatment vs. outpatient)

were more likely to return for it than those assigned to lower levels of intensity (Weisner

et al., 2001).

Client and Treatment Factors Related to Engagement

Although Simpson and Joe (2004) maintain that program participation and

therapeutic alliance are the two primary factors related to early engagement, other factors

have also been found to be related. For example, Fiorentine, Nakashima & Anglin (1999)

investigated both client and treatment factors that may be related to client early

engagement. They maintain that early treatment engagers may be those clients who are

receptive to treatment (client attribute), or it may be that the treatment regimen is one that

assists clients in becoming engaged (treatment factor). They questioned which factors

appear to be more strongly linked to treatment engagement, and because treatment

engagement factors have been thought to vary based on gender they investigated men and

women separately.

Their findings were consistent with other research results suggesting that women

were statistically significantly more likely to engage in treatment than men (Green, Polen,

Dickinson, Lynch & Bennett, 2002; Weisner et al., 2001), but for both men and women

treatment factors (e.g., perceived counselor empathy, ancillary service availability, and

utility of treatment) were more often associated with engagement than client factors were.

The authors also uncovered specific relationships between gender and engagement. For women, the most powerful predictors of treatment engagement were perceived helpfulness of medical services, intensity of pre-treatment alcohol use, and perceived care/empathy of their counselor. For men, perceived helpfulness of medical services, transportation, and relapse prevention training were the most powerful predictors of engagement. For both genders, treatment variables were more predictive of engagement than were client variables (Fiorentine et al., 1997). This was in contrast to previous research cited by the authors which historically pointed to client characteristics (e.g., marital status, employment etc.) as being more predicative of treatment engagement than program characteristics.

Other treatment variables like therapeutic approaches have been investigated as it relates to treatment engagement efforts. Client motivation, which will be discussed in greater depth when reviewing the retention literature, has been linked to early engagement. Higher levels of motivation and treatment readiness have been found to be associated with early retention (DeLeon, Melnick & Kressel, 1997). It is not surprising then that research has demonstrated that when treatment approaches include techniques to enhance client motivation (i.e., motivational interviewing), it can help to increase the chances of clients initiating and attending treatment early on (Carroll, Libby, Sheehan & Hyland, 2001).

Specific client factors have also been found to be related to treatment initiation/early engagement. For example, women who are over 30, receive an annual income over $20,000, and report a high degree of alcohol severity have been found to be statistically significantly more likely to engage in initial treatment sessions (Weisner et

al., 2001). Age has been implicated in other research as well suggesting that older clients are more likely to engage in initial treatment sessions (Green et al., 2002; Jackson et al., 2006). On the other hand, research has also demonstrated that clients who have less severe dependence on alcohol are more likely to engage in initial treatment sessions (Jackson et al., 2006). Decreased levels of treatment initiation were found to be associated with drug dependent clients versus alcohol dependent clients. Being employed was also associated with a higher level of treatment initiation following intake. Furthermore, men who enter treatment with lower levels of education, and women who are dually diagnosed have been found to demonstrate decreased treatment initiation (Green et al., 2002). On the other hand, research has also suggested that clients who present for treatment with multimorbidity (i.e., an "overlap" of psychiatric symptom clusters coupled with a substance use disorder) have demonstrated increased treatment engagement (Castel, Rush, Urbanoski & Toneatto, 2006).

Personal relationships, psychosocial functioning and level of motivation at treatment onset have also been linked to engagement. Griffith, Knight, Joe and Simpson's (1998) tested a model which indicated that when a client with poor family interactions enters into treatment they are more likely to report experiencing psychosocial distress. In turn, this distress appears to predict higher levels of motivation at treatment onset, which predicts higher engagement and more favorable outcomes (related to decreasing both opioid use and criminal activity). These results suggest that early engagement may be directly tied to treatment outcomes. Clients who enter treatment with higher levels of distress may be more motivated for treatment in an effort to reduce this distress. This increased level of motivation may help clients engage in treatment early on in turn

improving chances for recovery. Seen this way, programs that work to engage clients early on by helping clients increase their motivation may stand to see more favorable treatment outcomes.

Program Characteristics and Engagement

Program characteristics have been implicated in treatment engagement research as well. Ricketts, Bliss, Murphy and Booker (2005) hypothesized that program characteristics are stronger predictors of engagement than client characteristics. In an effort to investigate this hypothesis, they conducted a qualitative study utilizing grounded theory to investigate treatment engagement factors with a criminal population being treated for drug use. Their results did find program characteristics were related to how well clients felt they were able to fulfill program requirements. Clients' relationships with staff were identified as having a very large impact on how readily clients were able to engage in and subsequently meet program requirements. Their results suggest that clients are more likely to engage in treatment when it is well organized, the clients believe in the treatment programs, and medical interventions are available to them. Although the sample size was small and the study was conducted outside of the United States, the results still point to the potential impact that programs can have on client engagement. Factors outside of the program's control, like distance from a client's house to program location and living with others have also been linked to treatment attendance after assessment (Jackson et al., 2006). More specifically, when there was a greater distance from a client's home to the treatment center and clients did not live with others they were less likely to start treatment.

Summary of Engagement Literature

Taken together, these investigations support the notion that treatment engagement is a complex interplay of both client and program characteristics. Early treatment engagement appears to be related to how clients connect with a program, their level of motivation, and how long they are willing to remain in treatment, which has obvious implications for treatment outcomes. Early engagement has been linked to more favorable treatment outcomes (Meier et al., 2005), so factors related to it should be seriously considered when attempting to connect clients to the therapeutic milieu early on. Research has also demonstrated the intimate relationship that engagement has with retention. If a client does not engage in treatment early on they are less likely to remain in treatment. Because various client characteristics (e.g., age, marital status, gender, level of motivation) have been found to be related to, or predictive of engagement it may be prudent for programs to utilize different treatment approaches to help engage various populations. For example, efforts to assess for and interventions designed to increase client level of motivation for treatment could help to improve engagement rates in programs.

Furthermore, because the variables that are related to engagement are quite diverse additional research in this area is warranted. Investigating how program and client factors interact to impact engagement is one area that could assist programs in tailoring services to improve their client engagement rates. Once related or predicted elements of engagement at the program and client level are identified, programs would then be better equipped to identify clients at risk of not engaging in treatment and perhaps alter the intensity or frequency of treatment options.

As aforementioned, in an effort to avoid redundancy, the section devoted to literature that has focused on variables related to treatment retention can be found in Chapter II of this document. The subsequent section of this appended paper will detail some of the methodological limitations and challenges associated with the treatment engagement and retention literature that was reviewed for this literature review and study.

Methodological Considerations and Limitations Associated with Quantitative Substance

Abuse Treatment Engagement and Retention Research

In examining some of the large-scale research efforts in drug treatment outcomes research, methodological concerns related to operational standards, naturalistic designs, and difficulty with compliance rates of follow-ups emerge (Simpson, 1993). Furthermore, the assorted, and often conflicting, results in determining the predictive factors and correlates of retention have spurred questions regarding the variety of methods utilized in investigations (Broome et al., 1999). Methodological considerations and the importance of scientifically-sound research have continued to gain momentum and attention as substance abuse treatment has become increasingly evidenced-based and quality-controlled (Moyer, Finney, & Swearingen, 2002). What began as an effort to manage the rising health care costs, the current movement of evidenced-based practice has extended into the "need for a scientifically grounded approach to health care" (Tucker & Roth, 2006). Part of establishing scientifically grounded approaches for treatment involves careful consideration of methodological issues related to efficacy and effectiveness research and improving methodological soundness. Therefore, it is important that the scientific integrity of the body of literature cited throughout this review be critically examined.

Randomized Control Trials

Historically, as seen in much of the alcohol treatment research field, the "gold standard" of empirically evaluating treatments has been randomized clinical trials (RCTs). One of the most attractive characteristics of RCTs includes the design's simplicity. By utilizing a random approach to assignment a researcher is able to answer the question: Does the treatment cause an improvement on the outcome measure that is independent of other possible causal agents? Seen this way, RCTs maximize the internal validity by controlling for confounding variables that could impact detecting the "true" effect of a treatment approach (Tucker & Roth, 2006). Because RCT designs provide stronger evidence of a casual relationship than a non-experimental design, it has earned the reputation as the most robust approach in establishing efficacy.

It should be noted, however, that RCTs do not come without limitations that potentially negatively influence the scientific community's ability to apply findings to treatment settings. Efficacy trials tend to lack generalizability since the trials include, "tightly controlled settings and more narrowly defined, homogeneous samples than those seen in clinical practice" (Carroll & Rounsaville, 2003, p. 335). For example, clients with comorbid psychiatric diagnoses or more than one substance use disorder are often excluded from a trial to control for variance, which diverges from typical treatment conditions. Consequently, these more homogenous samples likely exclude participants that may be at a greater risk of prematurely drop out of treatment (i.e., polysubstance abusers, clients with comorbid psychiatric distress), which could potentially distort retention rates. It has also been suggested that participant treatment compliance can be artificially enhanced in RCTs by recruiting participants with high degrees of motivation,

and scheduling frequent appointments (Roy-Byrne, et al., 2003). Finally, the "common factors" (e.g., therapist empathy, patient expectations) that have been identified as impacting treatment outcomes cannot always be studied directly when therapists are required to respond to clients in a standardized manner (Tucker & Roth, 2006).

Of all the studies cited in this literature review, only a very small percentage utilized a randomized control clinical trial (e.g., COMBINE Study Research Group, 2003; Mullins et al., 2004; Project MATCH Research Group, 1997a). Indeed, according to Carroll and Rounsaville (2003), "only a handful of supporting clinical trials may exist" in substance abuse treatment evaluations (p. 336). And although there may be a need for additional RCTs in substance abuse treatment literature, other methodological approaches have significantly added to the literature base and will continue to do so. In fact Tucker and Roth (2006) indicate:

> The substance abuse field cannot afford a view of evidence that is overly restrictive in focus or methodology, which we risk if we follow uncritically the research conventions of medicine and other health-care disciplines that value the RCT over all other forms of evidence for informing practice. RCTs are invaluable for addressing some research questions, especially for evaluating treatment efficacy, and we have used them for this purpose ourselves. However, the design has limitations that are not always recognized and can render it less than ideal for investigating key aspects of the addictive behavior change process. For example, questions concerning what influences people with substance-related problems to seek and engage treatment, and how these self-selection processes and contextual influences contribute to the change process, are not investigated readily by studies that assign participants randomly to treatment and control groups (p. 919)

Perhaps not surprisingly then, the majority of the quantitative investigations reviewed for this paper were not efficacy studies but rather effectiveness investigations carried out in actual treatment settings. It has been argued that effectiveness

investigations may be particularly suited for studying treatment as a process (including factors related to it) versus an outcome. In other words, once a treatment is deemed efficacious, other questions become more relevant, particularly those related to treatment engagement and retention since clients need to remain in treatment to reap its associated benefits. Furthermore, factors related to engagement and retention that are identified in effectiveness studies may have more generalizability since treatment compliance is measured as it takes place in real-world settings as opposed to the incentive-based approach associated with RCTs (i.e., financial incentives or free medication for participation) (Tucker & Roth, 2006). Of course, non-RCT studies can have a variety of limitations and weaknesses, and these should also be noted. Because such a large number of studies were cited in the review of the engagement and retention literature, it is not feasible to comment comprehensively on the specific limitations associated with each investigation. As such, this section of the review will focus on the more common methodological limitations that were found to be associated with the previously cited treatment engagement and retention investigations that are not categorized as RCTs.

Research Design Weakness

Since many of the cited investigation did not fall into the category of RCT, different types of threats to validity emerge as potential limitations. For example, some studies employed nonrandomized comparisons, or lacked control groups making casual inferences associated with retention difficult (e.g., Bride, 2001; Charney et al., 2005; Fiorentine & Anglin, 1996; Hser et al., 2003). A lack of randomization results in a number of deleterious effects. For example, if groups are not randomly assigned to a treatment group, researchers cannot definitively determine if the experimental treatment

was indeed superior to standard treatment, and are not able to rule out possible

confounding variables impacting treatment effect (Carroll & Rounsaville, 2003).

Additionally, a large percentage of the studies utilized a naturalistic design (e.g., Broome

et al., 1999; Joe, et al., 1998; McLellan, 1994; Meier et al., 2006; Moos & Moos, 2003;

Veach et al., 2000; White et al., 1998). The high frequency of naturalistic designs is not

surprising since engagement and retention research investigates a treatment phenomenon.

As such, it is quite feasible to conduct this research in the centers where treatment is

already taking place. Although a naturalistic design has the strength of increasing a

study's external validity by studying retention phenomenon as they occur in the treatment

setting, internal validity is compromised since many variables can "neither be held

constant nor assessed and statistically controlled" (Meier et al., 2006, p. 62). For

example, it may be that factors external to treatment are impacting engagement and

retention, not the treatment itself, but these factors are not measured or controlled for in

the analyses. Finally, smaller sample size, potentially compromising the studies' overall

power, was also associated with some of the cited literature (e.g., Aharonovich et al.,

2006; Burke & Gregoire, 2007; Brocato & Wagner, 2008; Carroll et al., 2001; Daughters

et al., 2005; Green et al., 2002; Haller et al., 2002; Justus et al., 2006; Westreich, et al.

1997).

Definition of Retention

A common methodological problem associated with retention investigations

includes the manner with which the variable "retention" is measured and defined. Some

investigations looked at treatment completion status as indicative of retention, while

others included specific lengths of stay as representative of retention. The duration of

time utilized to define retention through these specific lengths of stay has also been inconsistent. These definitions have been found to vary significantly from study to study, and the only consistency is the inconsistency with which variables like completion, drop-out, and retention are defined (Wickizer, et al., 1994). For example, even when clients have been described as "treatment completers" the amount of time that each "completer" actually remained in treatment has been found to vary from 10 to 64 days (White et al., 1998). Furthermore, allotted treatment duration varies depending on the treatment center, mode of treatment, and/or insurance coverage, and can result in dramatically different lengths of treatment exposure. For example, Hser et al., (2003) reported that of the 12 inpatient treatment centers utilized for data collection, six centers involved treatment durations of less than a three months, three centers provided three month treatment durations, one center provided six month treatment durations, and two provided treatment durations of longer than six months. Variability in planned durations for outpatient programs has also been identified. For example, McLellan (1994) noted that of the eight included outpatient programs, treatment duration varied from four to 10 weeks and the time clients spent in treatment each week ranged from eight hours to 30 hours.

Treatment retention is often defined by completion of the programs themselves; the service providers would make the determination if a client successfully completed their program (Green et al., 2002; Sinqueland et al., 2002), and again, the amount of time needed to complete different treatment programs will vary depending on both client and program factors. Often treatment completion was defined by staff, but when this information was not available, treatment completion was defined in different ways. For example, Green et al., (2002) defined a treatment completer as someone who attended at

least 17 outpatient visits, which was based upon the average number of visits by those

clients deemed completers by treatment staff. On the other hand, Broome et al. (2002)

defined completion as participants attending five weeks or more of inpatient treatment

since that "generally" meant a client had completed treatment. Treatment retention was

also defined in some studies based upon a client remaining in treatment for a prescribed

period of time. For example, treatment retention was defined as "sufficient" when clients

either completed a treatment program (as stipulated by the program) or were retained for

at least 90 days (Hser et al., 2003; Hser et al., 2004). Other investigations have also

utilized the treatment retention thresholds that are predictive of more favorable outcomes

(90 days or longer for inpatient or outpatient treatment) defined early on by Simpson and

Sells (1982) (e.g., Aharonovich et al., 2006; Brocato & Wagner, 2008; Joe, Simpson, &

Broome, 1998; Meier et al., 2006; Rawson et al., 2000; Rowan-Szal, et al. 2000). The

lack of consistency in how retention is being defined begs the questions of whether

retention studies are investigating the same phenomenon and if some of the lack of

reliability associated with the results is related to the variability in definitions of retention

(Wickizer,et al., 1994).

Participation and Attrition in Substance Abuse Treatment Research

Attrition from substance use treatment programs is quite common and has been

documented as reaching upward of 70-75% (Justus et al., 2006; Sayre, et al., 2002;

Siqueland et al., 2002). The client and programmatic level effects of such attrition have

already been described, and yet it is also important to note that poor retention rates can

similarly negatively impact research efforts. Treatment efficacy and effectiveness

investigations rely on adequate recruitment of participants and also retention of those

participants throughout the course of the investigation to achieve reliable and valid results. Research trials commonly lose participants when they prematurely drop out of treatment, and there is disagreement among researchers on what constitutes an adequate follow-up rate (Vaughn, Sarrazin, Saleh, Huber, & Hall, 2002). Seen this way, high attrition from research protocols has the potential to decrease the validity of study findings, while also compromising the researchers' ability to determine between group differences since those who drop out may not receive adequate treatment exposure (Aharonovich et al., 2006; Festinger et al., 2005; Vaughn et al., 2002).

Additionally, high levels of attrition have been found to limit a thorough analysis of client prognosis and outcomes (Paraherakis et al., 2000). The reasons why clients initially agree to participate in substance abuse treatment research, and then remain in the study through long-term follow-up periods vary. Some of these reasons, though, are worth considering in terms of how they could potentially impact study results. For example, clients who self-select to participate in research may likely be distinct from those who do not, hence potentially compromising the generalizability of the results. Additionally, substance abuse treatment clients who feel coerced to participate in research protocols, or are paid to do so, may remain in treatment for reasons outside than those investigated directly in the study. As such, it will be discussed how these three factors (i.e. self-selection, coercion to participate, and incentive to participate) have the potential to impact retention research.

Self-selection to participate. Consideration of the initial agreement to participate in and subsequent retention of study participants is important; there is a potential for biased findings since clients self-select to participate. In other words, clients who choose

not to participate in research, or treatment for that matter, are not accounted for in

treatment effectiveness literature (Vaughn et al., 2002). Although it has been noted that a

certain percentage of clients may decline to participate in the research protocol,

investigating the differences between participants and non-participants cannot always be

conducted (McLellan et al., 1994). Vaughn et al. (2002) explained that clients who agree

to participate could have specific characteristics that are not associated with those who

choose not to participate. As a result, these differences "may alter the representation of

the treatment groups, resulting in invalid conclusions being drawn regarding treatment

effectiveness. In addition, systematic differences in retention in research across groups

may reflect systematic differences in treatment effectiveness between the subgroups" (p.

394). Put another way, positive treatment outcomes could be mediated by participant self-

selection, longer treatment stays, and its associated motivation (Moos & Moos, 2003).

The Vaughn et al. (2002) investigation tested for any significant differences

between the research participants and the client population in general and found that the

two groups were quite similar in terms of demographic characteristics and baseline

problem severity. On the other hand, certain client characteristics were found to be more

commonly associated with research participation and retention. For example, clients with

more intense treatment needs, females, and those who lived in closer proximity to the

research site, were more likely to participate in the research. Considering that

participation in the study required additional time and effort on behalf of the client, the

researchers concluded that only the most highly motivated clients likely agreed to

participate. This may be a particularly salient finding as it relates to treatment retention. If

those clients who self-selected to participate in the research protocol were indeed highly

motivated, it begs the question how that group would compare to the clients who declined to participate in terms of treatment retention. Unfortunately, comparing the research participants and non-participants on treatment retention rates was not investigated.

Coercion to participate. In order to conduct addiction treatment research, it is typically necessary to elicit the participation of those abusing the substances and/or receiving treatment to investigate the phenomenon connected to it. Following the ethical guidelines associated with human subjects research is an essential component of any type of human research. Inherent within and central to the process associated with protecting research participants is informed consent. In order for participants to provide true informed consent they must be able to comprehend what they are consenting to and voluntarily do so. Informed consent has been described as the "ultimate ethical criterion" in research (Stricker, 1991, p. 256). Substance abusing populations present unique challenges to obtaining informed consent. Some of these challenges arise from issues inherent in the disorder itself. For example, researchers run the risk of the potential participant being under the influence of substances, or in acute detoxification when signing an informed consent document, which would limit their ability to fully comprehend the parameters of the study (Anderson & DuBois, 2006).

Voluntariness to consent is also a concern with substance abusing populations; coercion to participate compromises voluntariness and can be subtle or more obvious. More subtly, if substance abusers are also experiencing medical problems and have limited access to treatment options they may feel forced to turn to clinical trials that offer free or reduced fee treatment. Potential coercion to participate in substance abuse treatment and/or research takes place on a more overt level as well. For example,

incarcerated or court supervised individuals may not have full autonomous choice to participate in treatment or a study connected to it (Burke & Gregoire, 2007; McCrady & Bux, 1999; Vaughn et al., 2002). Large numbers of substance abusers are arrested and face incarceration or come under supervision of the court system (DuVal & Salmon, 2004). The voluntariness of such participants to provide informed consent can be compromised, especially if participants feel they might not meet program requirements in an effort to avoid an incarceration. Individuals who both abuse drugs and/or alcohol and are connected to the criminal justice system often seek substance abuse treatment for a variety of reasons. Reduced sentencing, avoiding further legal difficulties, relieving urges/cravings, and addressing family stress to alter substance use are all possible reasons individuals involved in the legal system seek treatment. Noteworthy, these treatment regimens are often connected to research endeavors and in this way, incarcerated individuals may also feel pressured to participate in research efforts for the same cited reason associated with engagement in treatment services. Experiencing a degree of coercion to participate can limit voluntariness in informed consent for fear that they could be punished by court officials if they refuse (DuVal &Salmon, 2004).

In terms of impact on research efforts, it is hypothesized that coercion to participate in treatment and research could result in higher retention rates than those groups not forced to engage in treatment. Theoretically, if this confounding variable of external motivation is not controlled for in retention research, the validity of the results could be compromised. Research has demonstrated that when clients experience legal coercion to participate in treatment, they have been found to complete treatment at higher rates than clients who are not legally coerced to attend treatment (Hser et al., 2004;

Maglione et al., 2000b; Mammo & Weinbaum, 1993). Young and Belenko (2002) looked at the differences in retention between clients enrolled in extremely coercive treatment settings compared to clients enrolled in less coercive programs. The most coercive settings were one-and-a-half year residential drug treatment programs offered in lieu of a one to three year prison sentence. If those clients remained in treatment for the one-and-a-half year duration, the charges were subsequently dropped. However, clients who left treatment prematurely were faced with a mandatory prison sentence as a repeat offender. The less coercive settings involved parolees and other legally mandated clients who were referred to treatment by the courts. Results demonstrated that clients participating in residential treatment programs which were deemed "most coercive" were three times more likely to remain in treatment for at least six months compared to clients enrolled in less coercive programs. Mandated participation in treatment has also been found to be related to treatment outcomes. Research has shown that clients legally coerced to participate in treatment were more likely to demonstrate abstinence from substance use 30 days after treatment completion than those clients not legally required to attend treatment (Burke & Gregoire, 2007).

It is important to note that it can be difficult to separate coercion to participate in research and treatment since the two are likely related. For example, it would not be surprising that those clients who are forced into treatment as an effort to avoid further legal ramifications would also agree to participate in a research protocol connected to it. Clearly both subtle and overt coercion to participate in substance abuse treatment and research exists. Ethically, this raises concerns about the voluntariness of informed consent, while also potentially creating the confounding variable of external motivation,

which may not be controlled for in analyses. Furthermore, the question remains whether the longer stays and more favorable outcomes found to relate to coerced treatment would hold once this coercion is removed. Simply because clients are forced into treatment does not automatically assume that they will engage in the treatment process. For example, a significant limitation of the Burke and Gregoire (2007) investigation is that they did not subsequently investigate substance use rates after supervision of the courts was lifted and the risk of being incarcerated had passed. This is noteworthy since it has also been found that client relapse rates can increase significantly once monitoring probation programs end (Brecht, Anglin, Whang, 1993). Furthermore, a recent investigation conducted by Perron and Bright (2008) replicated the finding that clients legally coerced to attend treatment were statistically significantly more likely to be retained for longer periods than those clients not coerced to attend, however, treatment outcomes did not reflect the same positive trend. In fact, clients legally coerced to attend treatment demonstrated worse outcomes. This finding could lend support to the hypothesis above that for clients coerced to attend treatment, treatment effects may not necessarily hold simply because they remain in treatment for a longer period of time.

Financial incentives for participation. Coercion related to substance abuse treatment research is also a concern as it relates to paying individuals to participate. Within clinical research illicit drug users are typically considered a "hidden population" that is especially challenging to recruit and retain in studies (Barratt, Norman, & Fry, 2007). And yet, successful completion of research efforts relies on adequate recruitment and retention. To address this issue research efforts often pay for substance abusers to participate. For example, out of 91 researchers conducting studies in the field of

addictions 85% of them offered cash compensation to participants (McCrady & Bux, 1999). Payment for participation is often gauged according the amount of time a participant devotes to the research effort. The determination of how much to compensate participants is often more difficult when including substance abusing populations in research efforts. The most obvious risk is associated with participants utilizing the money to purchase substances (McCrady & Bux, 1999). There are other issues though related to financial incentives and retention in research within treatment programs.

In theory, providing monetary incentives for participation could inflate retention rates. Cash incentives could unduly influence clients to remain in a treatment setting and participate in the research being conducted. Despite this line of reasoning, there has been very little research investigating this phenomenon. Festinger et al. (2005) recently examined this topic noting that prior to their efforts they found no other empirical investigations focused on the relationship between financial incentives and its influence on participation in research. The study involved 350 clients from three outpatient substance abuse treatment programs who were offered $10, $40, or $70 incentives for participation in the study through a six month follow-up. Results demonstrated that higher payments were related to higher follow-up rates after treatment completion. Although this study did not investigate retention during treatment as it related to payment amount, theoretically, incentives could impact it. For example, clients may decide to remain in treatment for a longer period if they are also being compensated by participating in a research protocol, especially if they consider the incentive to be significant. Although high payments are generally not associated with research participation, there are exceptions. One study offered to pay alcohol dependent fathers

$400-$500 for participation (Jacob, Krahn, & Leonard, 1991). The concerns around the

true voluntariness of these participants were discussed in a follow-up article stressing that

offering such a payment for participation "may be considered coercive for a group that

included a large number of unemployed men" (Stricker, 1991, p. 256). Additionally, what

would seem like a small incentive to a researcher may in fact be substantial enough for a

participant to remain in treatment if only to receive the compensation for the associated

research project. In summary, although there is not overwhelming evidence to suggest

that participants are offered substantial financial incentives to engage in treatment

research, it is still worth noting that payment could create an external motivation to

continue with treatment and consequently inflate retention rates. Seen this way it could be

an additional confounding variable that deserves noting.

Generalizability

   Sampling. Sampling limitations were associated with various studies due to both

exclusionary and inclusionary criteria. For example, sampling biases were indentified

with investigations that excluded participants who were incarcerated (Simpson et al.,

1997), diagnosed with poly-substance abuse/dependence (Aharonovich, 2006; Dearing et

al., 2005), or had substantial co-morbid psychological distress (Anton et al., 2006;

Cannon et al., 1997; Dearing et al., 2005; Ross et al., 1997; Siqueland et al., 2002). When

clients are excluded from a study based on a specific characteristic, especially one that is

commonly associated with substance abuse and treatment retention (i.e., psychiatric

distress, poly-substance abuse, or significant legal problems), the generalizability of the

sample/results can be significantly compromised. In a similar manner, generalizability

can also be limited when studies only include a sample drawn from a very specific

population, like those who are incarcerated or connected to the criminal justice system (Brocato & Wagner, 2008; Lang & Belenko, 2000) or involve clients who are privately insured or can self-pay for treatment (White et al., 1998). Because a large proportion of substance abusers are incarcerated or come under the supervision of the courts research efforts are often focused on incarcerated populations and may exclude participation of those substance abusers not incarcerated (Duval & Salmon, 2004). The authors indicate that "given the high rates of criminal justice involvement among addicted persons, it may be that there are not sufficient available subjects outside of the criminal justice system to meet the needs of a particular research trial or program" (p. 994). Researchers also have difficultly generalizing from samples that over-represent specific populations relative to the general population, like women and employed clients (Ross et al., 1997), clients with high problem severity (Meier et al., 2006), or ethnic minorities (Brocato & Wagner, 2008). The nonrandom sampling of participants was a limitation associated with a number of studies also (Brocato & Wagner, 2008; Hser et al., 2003; McLellan, 1994; Ross et al., 1997).

Treatment programs and their clientele. Due to the aforementioned sampling biases, observed patterns of the participants of substance abuse treatment research cannot always generalize to any treatment program or group of individuals who abuse substances. Different treatment programs will attract different types of clients and the characteristics associated with those clients and their retention rates may be distinct. For example, a female addicted to cocaine with a co-morbid diagnosis of depression may have different treatment needs and demonstrate different correlates and predictors of retention than a male addicted to alcohol with no combined disorder. Moreover, different

treatment programs employ different treatment approaches and offer different types of

services (Simpson et al., 1997). For instance, it has been found that residential and

intensive outpatient programs tend to incorporate problem-solving techniques in

treatment delivery services, while methadone treatment tends to integrate case

management techniques. Furthermore, residential programs have been found to

incorporate milieu therapy and 12-step strategies where outpatient programs coupled 12-

step approaches with cognitive-behavioral techniques (Etheridge et al., 1997).

Related, the effectiveness of distinct treatment programs vary, which can have a

direct impact on how long clients are willing to remain in treatment and make stable

behavioral changes. Consequently, the correlative and predictive relationships associated

with treatment retention may be site-specific and the generalizability of such results

should be interpreted with caution (Broome et al., 1999; White et al., 1998), especially

when studies included multi-site treatment centers that were not randomly selected (Hser

et al., 2004; McLellan, 1994; Meier et al., 2006). Single site studies also have limitations

associated with the generalizability. For example, one study included a hospital that

incorporated the Minnesota model of treatment. These results may not be generalized to

programs that incorporate different treatment approaches and serve different populations

(Veach et al., 2000).

Client populations also vary depending on the site and locations, which can

negatively influence external validity. Even if specific client populations are not excluded

from participating, the characteristics of individuals engaged in different treatment

programs will likely vary. For example, studies that draw participants from a HMO may

differ from non-HMO populations (Green et al., 2002), or those that conduct research in

programs that typically involve participants that are insured may not share the same

characteristics of those uninsured. In summary, although a number of potential correlates

and predictors of retention have been suggested "there is little agreement on the

generalizability of the findings" (Sayre et al., 2002, p. 56) due to the variability across

clientele and programs.

Methodological Quality Improvements

As indicated, there are a variety of limitations associated with the cited body of

literature. It should be noted, however, that the movement toward more methodologically

sound investigations has not just been called for, but appears to be taking place. Moyer et

al. (2002) investigated the methodological quality of alcohol treatment studies conducted

from 1970-1998. They reviewed a total of 701 studies and focused on four specific

domains of "methodological rigor": (1) sampling procedure and description of

participants; (2) specification and provision of treatment; (3) outcome assessments and

follow-up procedures; and (4) accuracy of estimates of treatment effects (p. 255).

Overall, the "methodological quality" score was 9.5 out of 28.5 and was found to

improve over time (e.g., average score of 8.2 in the 70s to 10.6 during the 90s). The

authors noted that generally study strengths included reporting the number of participants

and the utilization of follow-ups of 12 or more months. Weaknesses included lack of

provider training, the use of manualized treatment, and not ensuring that participants

were drug and/or alcohol free during follow-up sessions. One of the most significant

changes over time included the utilization of diagnostic tools to assess for severity of

alcohol problems. The authors suggest that future research efforts should include

reporting reliability and validity associated with measures used, examining phenomenon

that may underlie treatment effects, ensuring sobriety when collecting follow-ups, and testing for differences associated with drop-out in different treatment groups.

Bridging the Gap between Clinical Research and Clinical Practice

Historically, clinical research and clinical practice remained quite distinct; as cited by Carroll and Rounsaville (2003), this gap has been especially apparent in drug abuse treatment. According to Carroll (1997), "although the ultimate purpose of clinical treatment research is to improve clinical practice, these two fields have, unfortunately, developed along separate lines" (p. 357); and the stressed importance of linking research and practice has grown tremendously. The high cost associated with health care for both drug and alcohol dependent individuals reinforces a need to demonstrate that treatment of these populations can indeed be cost-effective and help decrease some of the associated expenses (Booth, Blow, Cook, Bunn, & Fortney, 1997). Key stakeholders from treatment centers and managed care systems are increasingly making demands for treatment programs to prove effectiveness. This increased pressure provides ideal opportunities to help connect science and practice. Still, narrowing the gap between research and practice is not always easy. Drug treatment continues to be offered most often through community-based organizations and the clinicians practicing within the organizations often have difficulty incorporating research findings into their treatment delivery approaches. Typically, this is a consequence of the complexity associated with understanding the research results or knowing how to translate the findings into evidenced based clinical practice (Polcin, 2004; Van den Ende, et al., 2007).

Furthermore, studies in the field are often conducted with treatment programs that are very specific in terms of types of clients they attract and serve (i.e., the insured,

homeless etc.) and hence may not be as generalizable to other public programs (Weisner et al., 2001). Indeed, clinicians have been found to question the applicability of research results due to "differences between research and treatment settings, including staffing and other resources, selection criteria for the subject populations treated (e.g., problem severity; volunteers versus non-volunteers) and other characteristics and artifacts that affect outcomes in studies of treatment effectiveness" (Gottheil, Thornton & Weinstein, 1997, p. 63). As such, the utility of clinical research is not typically realized in clinical practice. One of the more significant obstacles in translating research into the clinical realm is that articles often remain in peer-reviewed journals, which sit on book shelves. This significantly inhibits a clinician's ability to tease out components of research to assist with delivering evidenced-based practices (Clay, 2006).

Another factor directly related to conducting in-house treatment evaluations is that retention is clearly linked to client attributes that are amenable to change through the therapeutic relationship (e.g., problem severity, motivation). This means that treatment programs would be better equipped to evaluate the characteristics of clients entering their programs and in turn tweak treatment interventions to more adequately serve such populations whereby improving retention rates. There has also been a call for additional research to be conducted in the area of treatment retention (Simpson, 2004). "In addition to replicating previous findings concerning treatment retention, more work is needed to address these effects in terms of treatment compliance and related process indicators for different therapeutic settings and types of clients" (Simpson et al., 1997, p. 294). The researchers involved with the large-scale multi-site drug treatment evaluations (i.e., DARP, TOPS, DATOS) also echo the need for smaller scale investigations to be

conducted in single treatment settings. Important variations in treatment philosophies and clientele across modalities need to be considered and investigated. This type of investigation has been especially recommended to take place in outpatient treatment programs due to the vast variability typically seen in both "the range of drug users they treat and the philosophies that guide them" (Simpson et al., 1997, p. 291). The importance of incorporating research within specific treatment settings has been encouraged on a larger scale as well. A push to create increased partnerships between researchers and clinicians in the area of substance abuse treatment has been promoted by The Substance Abuse and Mental Health Services Administration (SAMHSA) and the National Institute on Drug Abuse (NIDA) through major initiatives (Polcin, 2004).

As such, research should be informing treatment and likewise, treatment should drive and inform future research. Consequently, it is extremely important and prudent for treatment programs to evaluate their own treatment approaches, retention issues and outcomes. Theoretically, by incorporating substance use treatment evaluations within treatment programs research and clinical staff can work collaboratively one informing the other. A close collaboration between clinical treatment providers and clinical researchers can lead "to a situation in which the treatment staff and research team often grow in the understanding of an appreciation for each member's collaborative role and importance in reaching common goals" (Simpson, 1993, p. 123). In turn, research results can be used to inform treatment staff of the specific characteristics and predictive elements related to their retention/outcome rates whereby allowing for a process where at-risk clients can be screened up front and treatment approaches can then be tailored to address their specific needs (McKellar, Harris, & Moos, 2006). By doing so, treatment centers would stand to

decrease their up-front intake costs, improve their retention rates and outcomes, while at the same time providing the much needed documentation of their treatment effectiveness. It is important therefore, to conduct treatment research within the setting in which treatment is actually taking place. This is especially the case considering the retention literature has demonstrated inconsistent findings due to the variety of populations and treatment centers evaluated. An additional advantage to conducting research on-site is that client populations, in terms of their patterns and severity of use, is constantly in flux which calls for consistent evaluation of treatment outcomes to help identify important correlations of treatment drop-outs from specific programs (Mammo & Weinbaum, 1993).

A Model for Treatment Processes and Outcomes

On-site treatment evaluations are one method to bridge the gap between clinical research and clinical practice. Although on-site investigations are not typically rigorously controlled designs, it has been cautioned that RCTs should not be the only legitimate method investigating the usefulness of treatment (Tucker & Roth, 2006), because a limitation of this design includes controlling factors that are actually very difficult to control, like interpersonal interactions (Simpson, 2004). Furthermore, because it is well established that substance abuse treatment can significantly decrease substance use, provided clients are retained to receive it (Gerstein & Harwood, 1990, as cited in Simpson and Joe, 2004; Gossop et al., 2003; Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; Hubbard et al., 1989), research questions have shifted from focusing only on treatment outcomes, to investigating the components of the treatment process itself. Results of DATOS suggest that different types of clients are tapping into different

treatment programs and in turn, those programs offer various types of treatment approaches (Leshner, 1997). Those important program level factors and client characteristics (not limited to demographic factors) have not been investigated comprehensively. To address this gap in the research, Dwayne Simpson (2004) produced a seminal work, creating a model "framework for drug treatment process and outcomes". Employing such a model not only addresses the call to comprehensively investigate components of the treatment process, but it also can better equip treatment programs to evaluate their current treatment regime. By doing so, the gap between research and practice will continue to narrow while providing treatment centers with the ability to demonstrate effective treatment approaches.

Simpson notes that taking a more "systemic" view of treatment processes can help us better understand the numerous factors that contribute to treatment retention and outcome within the specific system in which it is found. For example, as demonstrated in the literature, although agency factors (e.g., program characteristics, therapist skills, etc.) have a direct impact on treatment retention, so can larger social factors, including extended familial/employer support, social policies, and treatment availability, just to name a few. Viewing treatment this way allows one to conceive it as a larger change agent than simply as isolated therapeutic interventions and specific behavior modifications. Simpson asserts that by altering this traditional view of treatment, researchers are better prepared to consider other factors that are likely related to treatment retention and outcomes, which include, but are not limited to the following: (1) patient motivation or readiness for treatment at time of engagement, (2) the therapeutic alliance formed between therapist and patient, (3) client alterations that take place during

treatment, including both cognitive and behavioral changes (4) length of time spent in treatment, (5) the impact of the agency's organizational factors, and (6) examining treatment while in progress including soliciting client feedback.

Taking a systemic approach to more fully understand treatment processes and outcomes provides helpful data about not only what takes place during different points of the treatment process, but also how agency policies and client characteristics directly impact the course of treatment. Therefore, this information can assist in the process of developing therapies for different settings and populations as well as provide evidence for when and with whom varying types of therapeutic interventions may be most useful. As such, Simpson stresses the importance of taking a services approach (i.e., a method to link treatment delivery and evaluation) to drug treatment evaluation, and not simply relying on clinical trials methods/data since so many client-therapist dynamics and therapeutic factors simply cannot be controlled for (Simpson, 1993; Simpson, 2004). He asserts, "it is longitudinal effectiveness studies, as opposed to highly restricted efficacy designs, that emphasize external validity and the interactions of clinical protocol with patient dynamics in natural setting. Furthermore, providers of behavioral health services and policymakers need evidence based on real-world applications of treatment in field studies" (Simpson, 2004, p. 101). Conducting evaluations within treatment settings allows for greater impact in the recovery process, the opportunity to test cutting edge techniques, create change within the agency's infrastructure over time, and influence key stake holders who make decisions regarding funding for treatment programs (Simpson, 2001).

Simpson goes on to note that although the progress of client change related to substance abuse has been demonstrated to happen in stages or steps (DiClemente, Bellino, & Neavins, 1999), a model for evaluating drug treatment outcomes involves more than just specific client change. Regardless of the associated challenge, he believes a treatment model should also inform treatment providers on what the most useful interventions are during various points of the change process. He therefore created the Texas Christian University (TCU) Treatment Model, which includes the following purposes: (1) allow for patient progress/monitoring to evaluate effectiveness and inform treatment planning/adjustments, (2) utilize a stage of change model whereby indicating when certain interventions would provide the most effective results, (3) utilize patient data (i.e., performance, engagement) to provide feedback to clients, direct service providers, and other agency staff to assist with program evaluation (Simpson, 2004).

Although more complex, by including various factors, one can approach treatment evaluation more holistically and in turn make appropriate changes at the treatment level to improve client retention and outcome. A significant increase in health care costs over the past twenty years was addressed through the implementation of a managed care system. The advent of this system brought about increased pressure for service providers to demonstrate evidenced based practice (Wampold, Licthenberg, & Waehler, 2002). As such, agencies could utilize the TCU model to strategically address the need for basic treatment evaluations. Simpson claims that the TCU model "focuses attention on sequential phases of the recovery process and how therapeutic interventions link together over time to help sustain engagement and retention" (Simpson, 2004, p. 102). The model is illustrated below and a brief description of the components involved will follow.
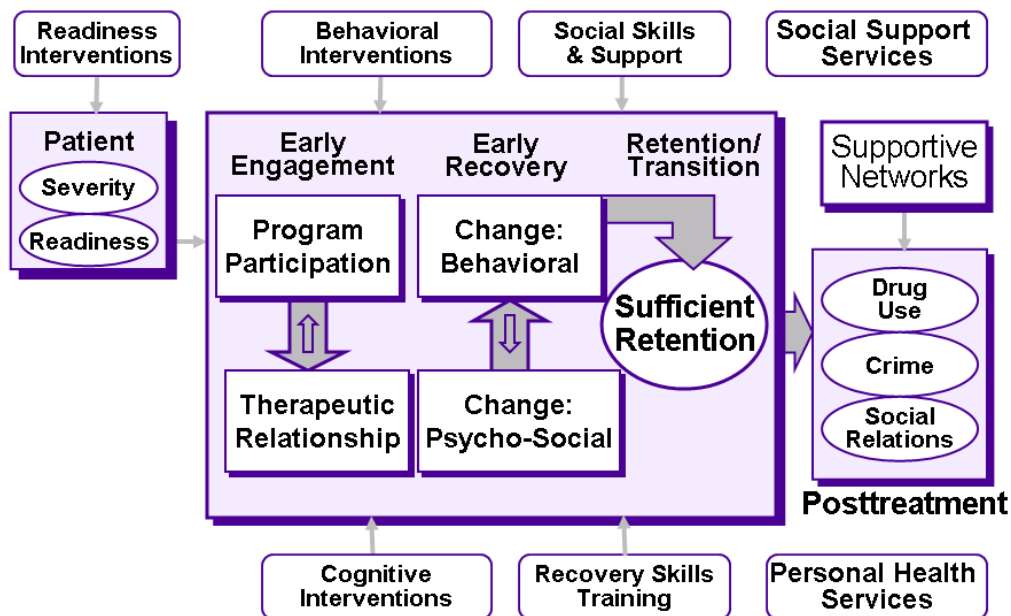
TCU Treatment Model

Figure 1. The TCU Treatment Model, representing sequential influences of patient attributes, stages of treatment, and evidence-based interventions on post-treatment outcomes.

1 From "A Conceptual Framework for Drug Treatment Process and Outcomes," by D. D. Simpson, 2004, *Journal of Substance Abuse Treatment, 27,* p. 103.

Treatment Induction: Patient and Program Attributes

Patient attributes at intake include those client characteristics that are thought to impact the treatment process. These features include client readiness or motivation for change, the degree of severity of the problems experienced upon engagement, appropriate treatment intensity matching, and self-efficacy. Related to the "motivational interviewing" work by Miller and Rollnick (2002), and DiClemente's (2003) work on client stages of change, Simpson (2004) asserts that treatment readiness and motivation

for change remains the most important client factor. A more thorough description of research findings linking client motivation and treatment retention were previously cited and will not be repeated in this section. Instead, a brief summary of how client motivation is thought to impact the treatment process is found below.

For example, Joe, Simpson, and Broome (1998) found that clients' level of motivation at treatment onset was significantly associated with retention in methadone maintenance programs, intensive outpatient drug free programs, and long-term residential care. Treatment readiness was also significantly positively associated with early treatment engagement. The authors found that these specific client attributes were more robust predictors of client engagement and retention than demographic/background variables and severity of drug use. Many other studies have also demonstrated that level of motivation is positively related to client retention and engagement (Broome et al., 1999; Simpson & Joe, 2004; Joe et al., 1999; Simpson et al., 1997; Simpson et al., 1997; Simpson, Joe, Rowan-Szal & Greener, 1995) and that readiness to change can also be predictive of treatment outcomes (Demmel, Beck, Richter & Reker, 2004). This is likely due to the fact that most treatment programs are designed to serve clients who are already in the "active" stage of change, as opposed to those who are still contemplating altering their drug or alcohol use (Di Clemente et al., 1999).

Despite the importance of motivational factors, problem severity is also a component of client characteristics and includes both the pretreatment intensity of drug/alcohol problems as well as psychiatric disturbance/distress. Increased levels of severity related to frequency and intensity of drug use, as well as psychiatric distress, have been found to require more intense therapeutic interventions and often result in a

lack of early engagement and treatment retention (Woody et al., 1984, as cited in

Simpson, 2004). For example, increased intensity of drug use just prior to treatment

engagement has been statistically significantly related to premature drop-out (Alterman,

McKay, Mulvaney, & McLellan, 1996) and increased problem severity at treatment

engagement for women has also been associated with decreased retention (Arfken, Klein,

di Menza, & Schuster, 2001).

Outside of client factors, there are also agency and program characteristics that

play a role in treatment engagement and retention. These features include the agency's

resources, treatment philosophies, and atmosphere/surroundings. There are thousands of

treatment programs in the US and they vary both in the type of clients they attract (i.e.,

substance use severity) and the orientation of treatment they provide. Furthermore, no

one treatment method is likely to be effective with every client (Chou, Hser, & Anglin,

1998). Indeed, research has suggested that less accurate treatment matching in terms of

level of treatment (i.e., matching high symptom severity clients with low intensity

treatment) leads to less favorable one year outcomes (Chen, Barnett, Sempel & Timko,

2006).

Because programs have been found to be quite distinct in terms of the type of

treatment matching, service offerings, personnel differences and therapeutic techniques

they provide, different programs will have varying levels of engagement and retention

(Simpson, 2004). Regardless of these differences, Simpson notes that even when similar

treatments are delivered and differences in client characteristics are controlled for,

program retention rates have been found to differ (Broome et al., 1999; Joe et al., 1998).

As such, it appears that program characteristics are likely related to their ability to engage

and retain clients. This includes how well a program is able to match the level treatment needed (e.g., intensive inpatient) based upon the degree of severity demonstrated by the client and how well they are able to deliver the treatment interventions.

Although agency characteristics (e.g., program features, staff characteristics) are thought to play a significant role in treatment engagement and retention, very little empirical research has directly studied this phenomenon (Ball et al., 2006). Negative perceptions of and interactions with treatment staff has been found to be related to premature drop-out. For example, experiencing interpersonal problems with staff members, feeling judged and not valued by staff, viewing staff as incompetent or insensitive, and lack of trust in staff appears to be related to decreased retention (Ball et al., 2006; Battjes, Onken, & Delany, 1999).

Early Engagement

Simpson asserts that a client's early engagement in treatment is the first progression towards recovery. Because a review of engagement literature can be found in earlier text, only a brief review of how early engagement is *specifically* related to Simpson's model will follow. Engagement involves two primary components including the degree to which a client participates in treatment activities and forms relationships with treatment staff (Simpson & Joe, 2004). Joe et al. (1999) indicate that engagement is more than simply attending treatment sessions. They explain, "clinically, it refers to the degree to which a patient actively *participates* in the treatment process. This active participation suggests both an objective aspect representing patient compliance and session content, and a subjective aspect that reflects cognitive involvement and satisfaction with the process" (p. 113). Without early engagement client retention is not

likely to take place (Simpson, 2001). Simpson notes that client motivation is directly related to early engagement. Clients who are motivated for treatment are much more likely to demonstrate regular participation early on in treatment and in turn, those clients who are more actively engaged in treatment are more likely to develop a positive relationship with treatment staff.

Participating in treatment has been found to be linked to client retention. For example, a higher degree of treatment readiness, as measured by program participation (Joe et al., 1998; Joe et al., 1999; Simpson et al., 1995), and level of motivation at intake (Joe et al., 1999) has been significantly positively associated with and predictive of early therapeutic engagement/involvement. Higher levels of treatment readiness have also been identified as one of the strongest predictors of overall client engagement and retention (Joe et al., 1998). Because those clients who regularly participate in early treatment are more likely to develop a therapeutic relationship with treatment staff, the therapeutic alliance is also related to a client's ability to engage and remain in treatment. Negative interactions with treatment staff, including feeling judged, and a lack of trust in treatment staff has been linked to premature drop-out (Ball et al., 2006; Battjes et al., 1999). Conversely, when clients report positive early therapeutic involvement (including therapeutic rapport with counselor and confidence in treatment) treatment retention improves (Joe et al., 1999). Additionally, more favorable outcomes of drug treatment have also been positively related with counselor ratings of the degree of their rapport with clients even when treatment retention is controlled for (Joe, Simpson, Danseruad & Rowan-Szal, 2001).

Early Recovery

The subsequent component in Simpson's model (2004) includes early recovery, which is demonstrated by specific behavioral changes and inter/intrapersonal shifts. As Simpson explains, clients often first experience new ways of thinking about their drug use and subsequently changes in behavior result. Positive changes in psychological functioning (e.g., including decreasing distress) often lead to more positive behavior changes (e.g., decreased drug use), which in turn reinforces retention in treatment. Essentially, this phase grows out of the first stage of engagement and helps to foster recovery and sustain participation (i.e., retention). If client motivation and strong therapeutic alliance is maintained in this stage this also assists with continued treatment engagement. During this stage treatment should focus on developing coping skills, preventing relapse in an attempt to assist the client in developing new ways to think and behave regarding their drug use, and fostering social and family support to reinforce client changes. As Simpson states, "The core objective of these interventions, of course, is to build social skills that link to support systems" (Simpson, 2004, p. 109).

Retention and Transition

Retention and transition comprises the fourth component of Simpson's model. The primary goal of this phase includes retaining clients beyond the minimum thresholds (i.e., 90 days for outpatient and residential treatment) (Simpson & Joe, 2004), in an effort to assist with the transition from treatment while helping to sustain the positive behavior changes. This goal subsumes that for lasting behavior change to take place it must be practiced and reinforced consistently until it becomes part of one's preferred lifestyle. By

doing so treatment programs can continue to provide on-going support regarding problem solving to further prevent relapse (Simpson, 2004).

Community Wrap-Around and Transitional Services

In order for successful transition to take place clients require ongoing support in the community. Simpson reports that these services often take the form of either wrap-around services or "re-entry" services. Wrap-around services often include educational/vocational assistance, child care, housing, help with utility services, transportation, and assistance with legal problems (Pringle et al., 2002). These types of services may be especially important when it comes to maintaining clients in treatment. Clients who are not offered ancillary services feel that all their identified needs (while in treatment) are not adequately addressed through treatment alone (Hser, Polinsky, Maglione & Anglin, 1999). When clients receive wrap-around services treatment retention and outcomes have been shown to improve. Educational, medical, or mental health services were positively associated with treatment retention and assistance with basic needs or educational services was positively associated with more favorable treatment outcomes. When ancillary services, including childcare, transportation and job training, are appropriately assigned and/or offered to clients who identify a need for such services, it has been found to significantly predict longer retention rates and improve treatment outcomes (Hser, et al., 1999).

These findings suggest that by attending to clients' needs outside of the therapeutic milieu itself, these clients may in turn be better equipped to remain focused on their treatment and therefore stay in treatment for a longer period (Pringle et al., 2002). Despite the increased need for and importance of such services, results of the

DATOS investigation suggested that ancillary services are not being offered or provided as often as in the past (Leshner, 1997). The reduced availability of wrap-around services is likely due to budget cuts and decreased funding available to treatment centers. Unfortunately, research on the benefits associated with providing ancillary services suggests that the lack of such benefits could negatively impact treatment retention and outcomes (Hser et al., 1999).

Transitional services assist clients in the "stepping down" of treatment intensity and often involve 12-step programs, which aim to offer additional community support in recovery. Although Simpson described how formal re-entry services can impact recovery, informal social support can also impact how well a client is able to transition out of treatment. Research has demonstrated that social support plays a role in post-treatment recovery, specifically when treatment was short-term and did not maintain clients past the critical thresholds. Broome, Simpson and Joe (2002) reported that social support was one of the most consistent correlates with post-treatment drug use. More specifically, clients who maintained contact with peers who were using, or who lived with someone who did not support their abstinence by using themselves, were at least 2 ½ times more likely to use alcohol or cocaine during the year following treatment. Additionally, when clients engaged in treatment for alcohol dependence were offered higher levels of support in terms of reassurance of their worth from family and friends, there was longer period of time before being re-admitted for treatment (Booth, Russell, Soucek & Laughlin, 1992). The authors conclude that these results suggest that support can boost self-esteem and efficacy levels in alcohol dependent people perhaps improving their ability to remain

abstinent from alcohol use. Booth's and colleagues study also further supports Simpson's notion of how crucial support is in assisting clients in their recovery process.

Simpson stresses the importance of implementing a drug evaluation treatment method which would include assessments that can measure "client-level progress and treatment satisfaction, as well as organizational factors related to program effectiveness and adaptability" (Simpson, 2004, p. 1). These assessment strategies are best suited to take place throughout the treatment process in an attempt to identify clients who are not improving and hence would have a greater chance of leaving treatment prematurely (Simpson, 2004). Because programs have been found to attract specific types of clients, and the service delivery methods vary from program to program, it behooves programs to conduct their own research on their own populations. By doing so they will be much better equipped to adjust treatment methods/interventions to better serve their populations and improve outcomes. Furthermore, by conducting on-site treatment evaluations, centers will be able to monitor changes in their own client populations (i.e., patterns of drug use, demographics) which could potentially signal a need to adopt new or different clinical interventions to meet client needs (Simpson, 2004). Improving treatment outcomes is not only better for the clients involved but for the agency as well. Until programs have a clearer understanding of the types of clients they have difficulty retaining it is more difficult to adequately address client needs. It appears especially important for treatment centers to conduct their own research due to the "large program variations in overall client engagement and retention levels" (Simpson, 2004, p. 4).

Conclusion

Substance abuse is a chronic condition that negatively impacts individuals, family, and society. Substance abuse treatment has been investigated for many years. As treatment options grew in the 1970s studies were launched to determine if treatment was effective. Over 30 years of investigations have firmly established that substance abuse treatment is effective in improving client functioning and decreasing their substance use (Gossop et al., 1997; Gossop, Marsden, Stewart, & Kidd, 2003; Hubbard et al., 1997; Hubbard et al., 1989; Longabaugh et al., 2005; Pearson & Lipton, 1999). Although empirically it has been shown to be the most effective means to reduce substance use, many people drop out of treatment before reaping the associated benefits (Justus et al., 2006; Sayre et al., 2002; Siqueland et al., 2002). As a result, the focus of many research efforts has been to gain a deeper understanding of the treatment phenomena related to drop-out, which has helped to continue building our theoretical base and applied knowledge in the field. In has been demonstrated that retention in substance abuse treatment has bearings of positive effects on individuals in the process of their recovery. Time in treatment has consistently been found to be positively associated with treatment outcomes including decreasing the amount and frequency of substance use and criminal behavior (Simpson, 2004). The 90 day retention threshold identified by Simpson and Sells (1982) has been replicated in other studies and yet ironically, it is precisely time spent in treatment that has been hit the hardest by managed care. If decreasing funding for time spent in treatment continues to take place, it may be prudent for future research to focus efforts on examining how to maximize treatment benefits during shorter durations.

Since length of stay has been implicated as a critical variable regarding treatment outcomes, client retention has become a very important factor to investigate. Early research efforts tended to focus only on client characteristics related to retention. Inherent within this client-only focus was an assumption that if clients prematurely dropped out of treatment it was due to the unredeemable qualities of being a substance abuser rather than treatment factors also playing a role (Fiorentine et al., 1999). The field now recognizes there is likely a dynamic interplay between both client and program factors that impact client retention, although this remains an understudied area (Simpson, 2001). It is also important to note that continuing to investigate client factors related to retention remains an important focus for future study since many client factors (i.e. psychiatric distress, motivation, subjective distress, self-efficacy to abstain) are amenable to change in the therapeutic environment. Furthermore, even client factors found to be associated with retention that are static (i.e. gender, ethnicity) are also important to understand more fully. For example, if females are found to drop out of treatment more often than their male counterparts treatment centers could attempt to gain a deeper understanding of why and attempt to incorporate programmatic changes that could positively alter this dynamic (i.e. provide child care during treatment regimens if it is found that lack of child care is a barrier to treatment).

Despite there being a large body of literature focusing on varied correlates and predictors of treatment retention, these studies have produced conflicting findings, hence, it remains difficult to draw sweeping conclusions about any consistent predictors of treatment retention. For example, a review of earlier research investigating the relationship between ethnicity and retention unveiled conflicting results with studies

finding higher, lower, and no difference in rates of drop-out for African American clients compared to that of Whites and other ethnic minorities (Stark, 1992). Questions concerning the reliability of the findings potentially stem from inconsistencies in operationally defining retention and the lack of standardized assessments employed in the evaluation process (Rounsaville, 1993, as cited in Broome et al., 1999). Compounding these issues is the variability of the treatment approaches employed at various centers and the types of clients they attract. Even when similar treatments are delivered and differences in client characteristics are controlled for, retention rates have been found to differ between programs (Broome et al., 1999; Joe et al., 1998). As such, it appears that various program characteristics are likely related to their ability to engage and retain clients. This includes issues like how well a program is able to match the level of treatment needed (e.g., intensive inpatient) based upon the degree of severity demonstrated by the client and how well they are able to deliver their adopted treatment interventions. Although both client and program factors have been found to be related to retention, how these factors interact to impact retention is not well understood. Additionally, although a wide variety of factors have been implicated as potentially impacting retention, these have not been investigated comprehensively and more accurately identifying the factors remains an ongoing research challenge (Simpson, 2004). Substance abuse treatment centers are in an ideal position to contribute to this charge to more comprehensively examine client and program variables by conducting the evaluations.

Treatment programs could benefit greatly from conducting treatment evaluations on-site for a variety of reasons. First, although naturalistic designs tend to have greater

generalizability to real client populations, this can also be comprised by wide variations from program to program as indicated above. If programs conduct in-house evaluations they can utilize the findings to better understand the treatment phenomenon taking place within their program and among their clientele. The results could be utilized to develop screens in an effort to identify at-risk clients up front and programmatic changes could then be made in an attempt to better serve and improve retention rates (and hopefully outcomes) of their clients. Second, on a larger scale, the findings can also contribute to the scientific literature base to help gain clarification with the inconsistencies identified. Third, treatment programs can join forces to help narrow the gap between research and practice that has existed in the substance abuse field for many years. Finally, treatment programs can demonstrate treatment effectiveness in a world where evidence based practice continues to be a critical component.

The TCU model for treatment evaluations is one viable method for conducting in-house investigations that allows treatment processes to be conceptualized within a larger, more complex, systemic perspective (Simpson, 2004). By incorporating a more complex conceptualization of treatment, and evaluating the processes as they are taking place real-time, with real-clients, researchers and treatment staff stand to gain a deeper understanding of treatment phenomenon while also having the opportunity to intervene at the treatment level. Part of the beauty in such an approach includes the synergistic interaction that can then take place between two historically relatively distinct disciplines of research and clinical practice. This in turn has the potential to create an ideal opportunity to significantly improve treatment regimens and outcomes for people struggling with addiction.

Bibliography

Aharonovich, E., Hasin, D. S., Brooks, A. C., Liu, X., Bisaga, A., & Nunes, E. V. (2006). Cognitive deficits predict low treatment retention in cocaine dependent patients. *Drug and Alcohol Dependence, 81,* 313-322.

Alterman, A. I., McKay, J. R., Mulvaney, F. D., & McLellan, A. T. (1996). Prediction of attrition from day hospital treatment in lower socioeconomic cocaine-dependent men. *Drug and Alcohol Dependence, 40*, 227-233.

Anderson, E. E. & DuBois, J. M. (2006). The need for evidence-based research ethics: A review of the substance abuse literature. *Drug and Alcohol Dependence, 86,* 95-105.

Anderson, D. J., McGovern, J. P., DuPont, R. L. (1999). The origins of the Minnesota Model of addiction treatment – A first person account. *Journal of Addictive Diseases, 18,* 107-114.

Anglin, M. D., Hser, Y., & Grella, C. E. (1997). Drug addiction and treatment careers among clients in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 308-323.

Anton, R. F., Miller, W. R., O'Malley, S. S., Zweben, A., & Hosking, J. D. (2006). Combined Pharmacotherapies and Behavioral Interventions for Alcohol Dependence: The COMBINE Study: A Randomized Controlled Trial-R: Reply. *Journal of the American Medical Association, 296*, 1728-1729.

Anton, R. F., O'Malley, S. S., Ciraulo, D. A., Cisler, R. A., Couper, D., Donovan, D. M. & et al. (2006). Combined pharmacotherapies and behavioral interventions for alcohol dependence: The COMBINE study: A randomized controlled trial. *Journal of the American Medical Association, 295,* 2003-2017.

Arfken, C. L., Klein, C., di Menza, S., & Schuster, C. R. (2001). Gender differences in problem severity at assessment and treatment retention. *Journal of Substance Abuse Treatment, 20*, 53-57.

Ball, S. A., Carroll, K. M., Canning-Ball, M., & Rounsaville, B. J. (2006). Reasons for dropout from drug abuse treatment: Symptoms, personality, and motivation. *Addictive Behaviors, 31*, 320-330.

Barratt, M. J., Norman, J. S., & Fry, C. L. (2007). Positive and negative aspects of participation in illicit drug research: Implications for recruitment and ethical conduct. *International Journal of Drug Policy, 18,* 235-238.

Battjes, R. J., Onken, L. S., & Delany, P. J. (1999). Drug abuse treatment entry and engagement: Report of a meeting on treatment readiness. *Journal of Clinical Psychology, 55*, 643-657.

Booth, B. M., Blow, F. C., Cook, C. A. L., Bunn, J. Y., & Fortney, J. C. (1997). Relationship between inpatient alcoholism treatment and longitudinal changes in health care utilization. *Journal of Studies on Alcohol, 58*, 625-637.

Booth, B. M., Russell, D. W., Soucek, S., & Laughlin, P. R. (1992). Social support and outcome of alcoholism treatment: An exploratory analysis. *American Journal of Drug and Alcohol Abuse, 18*, 87-101.

Brecht, M., Anglin, D. M., & Whang, J. (1993). Treatment effectiveness for legally coerced versus voluntary methadone maintenance clients. *American Journal of Drug and Alcohol Abuse, 19,* 89-106.

Bride, B. E. (2001). Single-gender treatment of substance abuse: Effect on treatment retention and completion. *Social Work Research, 25*, 223-232.

Brocato, J. & Wagner, E. F. (2008). Predictors of retention in an alternative-to-prison substance abuse treatment program. *Criminal Justice and Behavior, 35,* 99-119.

Broome, K. M., Flynn, P. M., & Simpson, D. D. (1999). Psychiatric comorbidity measures as predictors of retention in drug abuse treatment programs. *Health Services Research, 34*, 791-798.

Broome, K. M., Simpson, D. D., & Joe, G. W. (1999). Patient and program attributes related to treatment process indicators in DATOS. *Drug and Alcohol Dependence, 57,* 127-135.

Broome, K. M., Simpson, D. D., & Joe, G. W. (2002). The role of social support following short-term inpatient treatment. *The American Journal on Addictions, 11*, 57-65.

Burke, A. C. & Gregoire T. K. (2007). Substance abuse treatment outcomes for coerced and noncoerced clients. *Health & Social Work, 32,* 7-15.

Cannon, D. S., Keefe, C. K., & Clark, L. A. (1997). Persistence predicts latency to relapse following inpatient treatment for alcohol dependence. *Addictive Behaviors, 22*, 535-543.

Carroll, K. M. (1997). New methods of treatment efficacy research: Bridging clinical research and clinical practice. *Alcohol Health & Research World, 21*, 352-359.

Carroll, K. M., Libby, B., Sheehan, J., & Hyland, N. (2001). Motivational interviewing to enhance treatment initiation in substance abusers: An effectiveness study. *The American Journal on Addictions, 10*, 335-339.

Carroll, K. M., & Rounsaville, B. J. (2003). Bridging the gap: A hybrid model to link

efficacy and effectiveness research in substance abuse treatment. *Psychiatric Services, 54*, 333-339.

Castel, S., Rush, B., Urbanoski, K., & Toneatto, T. (2006). Overlap of clusters of

psychiatric symptoms among clients of a comprehensive addiction treatment service. *Psychology of Addictive Behaviors, 20*, 28-35.

Chen, S., Barnett, P. G., Sempel, J. M., & Timko, C. (2006). Outcomes and costs of

matching the intensity of dual-diagnosis treatment to patients' symptom severity. *Journal of Substance Abuse Treatment, 31*, 95-105.

Chou, C., Hser, Y., & Anglin, M. D. (1998). Interaction effects of client and treatment

program characteristics on retention: An exploratory analysis using hierarchical linear models. *Substance Use & Misuse, 33*, 2281-2301.

Claus, R. E. & Kindleberger, L. R. (2002). Engaging substance abusers after centralized

assessment: Predictors of treatment entry and dropout. *Journal of Psychoactive Drugs, 34*, 25-31.

Clay, R. (2006). Initiative blends research & practice. In Substance Abuse and Mental

Health Services Administration (Newsletter), September/October, 14, 1-3.

Daughters, S. B., Lejuez, C. W., Bornovalova, M. A., Kahler, C. W., Strong, D. R., &

Brown, R. A. (2005). Distress tolerance as a predictor of early treatment dropout in a residential substance abuse treatment facility. *Journal of Abnormal Psychology, 114*, 729-734.

De Leon, G., Melnick, G., & Kressel, D. (1997). Motivation and readiness for therapeutic community treatment among cocaine and other drug abusers. *American Journal of Drug and Alcohol Abuse, 23*, 169-189.

Dearing, R. L., Barrick, C., Dermen, K. H., & Walitzer, K. S. (2005). Indicators of client engagement: Influences on alcohol treatment satisfaction and outcomes. *Psychology of Addictive Behaviors, 19*, 71-78.

Demmel, R., Beck, B., Richter, D., & Reker, T. (2004). Readiness to change in a clinical sample of problem drinkers: Relation to alcohol use, self-efficacy, and treatment outcome. *European Addiction Research, 10*, 133-138.

DiClemente, C. C. (2003). *Addiction and change*. New York: Guilford Press.

DiClemente, C. C., Bellino, L. E., & Neavins, T. M. (1999). Motivation for change and alcoholism treatment. *Alcohol Research & Health, 23*, 86-92.

DuVal, G. & Salmon, C. (2004). Research note: Ethics of drug treatment research with court-supervised subjects. *Journal of Drug Issues, 34,* 991-1005.

Etheridge, R. M., Hubbard, R. L., Anderson, J., Craddock, S. G., & Flynn, P. M. (1997). Treatment structure and program services in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 244-260.

Festinger, D. S., Marlowe, D. B., Croft, J. R., Dugosh, K. L., Mastro, N. K., Lee, P. A., & et al. (2005). Do research payments precipitate drug use or coerce participation? *Drug and Alcohol Dependence, 78,* 275-281.

Fiorentine, R., & Anglin, M. D. (1996). More is better: Counseling participation and the effectiveness of outpatient drug treatment. *Journal of Substance Abuse Treatment, 13*, 341-348.

Fiorentine, R., Nakashima, J., & Anglin, M. D. (1999). Client engagement in drug treatment. *Journal of Substance Abuse Treatment, 17*, 199-206.

Fletcher, B. W., Tims, F. M., & Brown, B. S. (1997). Drug abuse treatment outcome study (DATOS): Treatment evaluation research in the United States. *Psychology of Addictive Behaviors, 11*, 216-229.

Flynn, P. M., Craddock, S. G., Hubbard, R. L., Anderson, J., & Etheridge, R. M. (1997). Methodological overview and research design for the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 230-243.

Gerstein, D. R., & Harwood, H. J. (Eds.) (1990). *Treating drug problems. Vol 1. A study of evolution, effectiveness, and financing of public and private drug treatment systems.* Washington, DC: National Academy Press.

Gossop, M., Marsden, J., Stewart, D., Edwards, C., Lehmann, P., Wilson, A., et al. (1997). The national treatment outcome research study in the United Kingdom: Six-month follow-up outcomes. *Psychology of Addictive Behaviors, 11*, 324-337.

Gossop, M., Marsden, J., Stewart, D., & Kidd, T. (2003). The national treatment outcome research study (NTORS): 4-5 year follow-up results. *Addiction, 98*, 291-303.

Gottheil, E., Thornton, C. C., & Weinstein, S. P. (1997). Treatment structure, client coping methods, and response to brief individual counseling: Preliminary findings in a substance dependent sample. *Journal of Addictive Diseases, 16*, 51-65.

Green, C. A., Polen, M. R., Dickinson, D. M., Lynch, F. L., & Bennett, M. D. (2002). Gender differences in predictors of initiation, retention, and completion in an HMO-based substance abuse treatment program. *Journal of Substance Abuse Treatment, 23*, 285-295.

Griffith, J. D., Knight, D. K., Joe, G. W., & Simpson, D. D. (1998). Implications of family and peer relations for treatment engagement and follow-up outcomes: An integrative model. *Psychology of Addictive Behaviors, 12*, 113-126.

Haller, D. L., Miles, D. R., & Dawson, K. S. (2002). Psychopathology influences treatment retention among drug-dependent women. *Journal of Substance Abuse Treatment, 23*, 431-436.

Hser, Y., Evans, E., Huang, D., & Anglin, D. M. (2004). Relationship between drug treatment services, retention, and outcomes. *Psychiatric Services, 55*, 767-774.

Hser, Y., Huang, D., Teruya, C., & Anglin, M. D. (2003). Gender comparisons of drug abuse treatment outcomes and predictors. *Drug and Alcohol Dependence, 72*, 255-264.

Hser, Y., Polinsky, M. L., Maglione, M., & Anglin, M. D. (1999). Matching clients' needs with drug treatment services. *Journal of Substance Abuse Treatment, 16*, 299-305.

Hubbard, R. L., Craddock, S. G., Flynn, P. M., Anderson, J., & Etheridge, R. M. (1997). Overview of 1-year follow-up outcomes in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 261-278.

Hubbard, R. L., Marsden, M. E., Rachal, J. V., Harwood, H. J., Cavanaugh, E. R., & Ginzburg, H. M. (1989). *Drug abuse and treatment: A natural study of effectiveness*. Chapel Hill: University of North Carolina Press.

Jackson, K. R., Booth, P. G., McGuire, J., & Salmon, P. (2006). Predictors of starting and remaining in treatment at a specialist alcohol clinic. *Journal of Substance Use, 11*, 89-100.

Jacob, T., Krahn, G. L., & Leonard, K. (1991). Parent-child interactions in families with alcoholic fathers. *Journal of Consulting and Clinical Psychology, 59,* 176-181.

Joe, G. W., Broome, K. M., Rowan-Szal, G. A., & Simpson, D. D. (2002). Measuring patient attributes and engagement in treatment. *Journal of Substance Abuse Treatment, 22*, 183-196.

Joe, G. W., Simpson, D. D., & Broome, K. M. (1998). Effects of readiness for drug abuse treatment on client retention and assessment of process. *Addiction, 93*, 1177-1190.

Joe, G. W., Simpson, D. D., & Broome, K. M. (1999). Retention and patient engagement models for different treatment modalities in DATOS. *Drug and Alcohol Dependence, 57*, 113-125.

Joe, G. W., Simpson, D. D., Dansereau, D. F., & Rowan-Szal, G. A. (2001). Relationships between counseling rapport and drug abuse treatment outcomes. *Psychiatric Services, 52*, 1223-1229.

Justus, A. N., Burling, T. A., & Weingardt, K. R. (2006). Client predictors of treatment retention and completion in a program for homeless veterans. *Substance Use & Misuse, 41*, 751-762.

King, A. C., & Canada, S. A. (2004). Client-related predictors of early treatment drop-out in a substance abuse clinic exclusively employing individual therapy. *Journal of Substance Abuse Treatment, 26*, 189-195.

Lang, M. A., & Belenko, S. (2000). Predicting retention in a residential drug treatment alternative to prison program. *Journal of Substance Abuse Treatment, 19*, 145-160.

Leshner, A. I. (1997). Introduction to the special issue: The national institute on drug abuse's (NIDA's) drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 211-215.

Longabaugh, R., Donovan, D. M., Karno, M. P., McCrady, B. S., Morgenstern, J., & Tonigan, J. S. (2005). Active ingredients: How and why evidence-based alcohol behavioral treatment interventions work. *Alcoholism: Clinical and Experimental Research, 29*, 235-247.

Maglione, M., Chao, B., & Anglin, M. D. (2000b). Correlates of outpatient drug treatment drop-out among methamphetamine users. *Journal of Psychoactive Drugs, 32*, 221-228.

Mammo, A., & Weinbaum, D. F. (1993). Some factors that influence dropping out from outpatient alcoholism treatment facilities. *Journal of Studies on Alcohol, 54*, 92-101.

Martin, D. J., Garske, J. P., & Davis, K. M. (2000). Relation of the therapeutic alliance with outcome and other variables: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 68,* 438-450.

McCrady, B. S. & Bux, D. A. (1999). Ethical issues in informed consent with substance abusers. *Journal of Consulting and Clinical Psychology, 67,* 186-193.

McKellar, J. D., Harris, A. H., & Moos, R. H. (2006). Predictors of outcome for patients with substance-use disorders five years after treatment dropout. *Journal of Studies on Alcohol, 67*, 685-693.

McLellan, A. T., Alterman, A. I., Metzger, D. S., & Grissom, G. R. (1994). Similarity of outcome predictors across opiate, cocaine, and alcohol treatments: Role of treatment services. *Journal of Consulting and Clinical Psychology, 62*, 1141-1158.

Meier, P. S., Barrowclough, C., & Donmall, M. C. (2005). The role of the therapeutic alliance in the treatment of substance misuse: A critical review of the literature. *Addiction, 100*, 304-316.

Meier, P. S., Donmall, M. C., McElduff, P., Barrowclough, C., & Heller, R. F. (2006). The role of the early therapeutic alliance in predicting drug treatment dropout. *Drug and Alcohol Dependence, 83*, 57-64.

Miller, W. R., & Rollnick, S. (2002) *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.

Moos, R. H., & Moos, B. S. (2003). Long-term influence of duration and intensity of treatment on previously untreated individuals with alcohol use disorders. *Addiction, 98*, 325-337.

Moyer, A., Finney, J. W., & Swearingen, C. E. (2002). Methodological characteristics and quality of alcohol treatment outcome studies, 1970-98: An expanded evaluation. *Addiction, 97*, 253-263.

Mueller, M. D. & Wyman, J. R. (1997). Study sheds new light on the state of drug abuse treatment nationwide. National Institute on Drug Abuse, NIDA Notes. www.drugabuse.gov/Nida_Notes/NNVol12N5/Study.html. Accessed January 15th, 2007.

Paraherakis, A., Charney, D. A., Palacios-Boix, J., & Gill, K. (2000). An abstinence-oriented program for substance use disorders: Poorer outcome associated with opiate dependence. *Canadian Journal of Psychiatry, 45*, 927-931.

Pearson, F. S. & Lipton, D. S. (1999). A meta-analytic review of the effectiveness of corrections-based treatments for drug abuse. *The Prison Journal, 79,* 384-410.

Perron, B. E. & Bright, C. L. (2008). The influence of legal coercion on dropout from substance abuse treatment: Results from a national survey. *Drug and Alcohol Dependence, 92,* 123-131.

Polcin, D. L. (2004). Bridging psychosocial research and treatment in community substance abuse programs. *Addiction Research and Theory, 12,* 275-283.

Pringle, J. L., Edmondston, L. A., Holland, C. L., Kirisci, L., Emptage, N. P., Balavage, V. K., et al. (2002). The role of wrap around services in retention and outcome in substance abuse treatment: Findings from the wrap around services impact study. *Addictive Disorders & Their Treatment, 1*, 109-118.

Project MATCH Research Group. (1997a). Matching alcoholism treatments to client heterogeneity: Project MATCH posttreatment drinking outcomes. *Journal of Studies on Alcohol, 58, 7-29.*

Project MATCH Research Group. (1997b). Matching alcoholism treatments to client heterogeneity: Treatment main effects and matching effects on drinking during treatment. *Journal of Studies on Alcohol, 59*, 631-639.

Project MATCH Research Group. (1997c). Project MATCH secondary a priori hypotheses. *Addiction, 92,* 1671-1698.

Project MATCH Research Group. (1998a). Matching patients with alcohol disorders to treatments: Clinical implications from Project. *Journal of Mental Health, 7,* 589-602.

Project MATCH Research Group. (1998b). Matching alcoholism treatments to client heterogeneity: Project MATCH three-year drinking outcomes. *Alcoholism: Clinical and Experimental Research, 22*, 1300-1311.

Rawson, R., Huber, A., Brethen, P., Obert, J., Gulati, V., Shoptaw, S., et al. (2000). Methamphetamine and cocaine users: Differences in characteristics and treatment retention. *Journal of Psychoactive Drugs, 32*, 233-238.

Ricketts, T., Bliss, P., Murphy, K., & Brooker, C. (2005). Engagement with drug treatment and testing orders: A qualitative study. *Addiction Research and Theory, 13*, 65-78.

Ross, H. E., Cutler, M., & Sklar, S. M. (1997). Retention in substance abuse treatment: Role of psychiatric symptom severity. *The American Journal on Addictions, 6*, 293-303.

Rowan-Szal, G. A., Joe, G. W., & Simpson, D. D. (2000). Treatment retention of crack and cocaine users in a national sample of long term residential clients. *Addiction Research, 8*, 51-64.

Roy-Byrne, P. P., Sherbourne, C. D., Craske, M. G., Stein, M. B., Katon, W. Sullivan, G., Means-Christensen, A., & Bystritsky, A. (2003). Moving treatment research from clinical trials to the real world. *Psychiatric Services, 54,* 327-332.

Sayre, S. L., Schmitz, J. M., Stotts, A. L., Averill, P. M., Rhoades, H. M., & Grabowski, J. J. (2002). Determining predictors of attrition in an outpatient substance abuse program. *American Journal of Drug and Alcohol Abuse, 28*, 55-72.

Simpson, D. D. (1993). Drug treatment evaluation research in the United States. *Psychology of Addictive Behaviors, 7*, 120-128.

Simpson, D. D. (2001). Modeling treatment process and outcomes. *Addiction, 96*, 207-211.

Simpson, D. D. (2004). A conceptual framework for drug treatment process and outcomes. *Journal of Substance Abuse Treatment, 27*, 99-121.

Simpson, D. D., & Joe, G. W. (2004). A longitudinal evaluation of treatment engagement and recovery stages. *Journal of Substance Abuse Treatment, 27*, 89-97.

Simpson, D. D., Joe, G. W., Broome, K. M., Hiller, M. L., Knight, K., & Rowan-Szal, G. A. (1997). Program diversity and treatment retention rates in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 279-293.

Simpson, D. D., Joe, G. W., & Brown, B. S. (1997). Treatment retention and follow-up outcomes in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 294-307.

Simpson, D. D., Joe, G. W., Rowan-Szal, G. A., & Greener, J. M. (1997). Drug abuse treatment process components that improve retention. *Journal of Substance Abuse Treatment, 14*, 565-572.

Simpson, D. D., Joe, G. W., Rowan-Szal, G., & Greener, J. (1995). Client engagement and change during drug abuse treatment. *Journal of Substance Abuse, 7*, 117-134.

Simpson, D. D. & Sells, S. B. (1982). Effectiveness of treatment for drug abuse: An overview of the DARP research program. *Advances in Alcohol and Substance Abuse, 2,* 7-29.

Siqueland, L., Crits-Christoph, P., Gallop, R., Barber, J. P., Griffin, M. L., Thase, M. E., et al. (2002). Retention in psychosocial treatment of cocaine dependence: Predictors and impact on outcome. *The American Journal on Addictions, 11*, 24-40.

Stark, M. J. (1992). Dropping out of substance abuse treatment: A clinically oriented review. *Clinical Psychology Review, 12*, 93-116.

Stricker, G. (1991). Ethical concerns in alcohol research. *Journal of Consulting and Clinical Psychology, 59,* 256-257.

Tucker, J. A., & Roth, D. L. (2006). Extending the evidence hierarchy to enhance evidence-based practice for substance use disorders. *Addiction, 101*, 918-932.

Vaughn, T., Sarrazin, M. V., Saleh, S. S., Huber, D. L., & Hall, J. A. (2002). Participation and retention in drug abuse treatment services research. *Journal of Substance Abuse Treatment, 23*, 387-397.

Veach, L. J., Remley, T. P. J., Kippers, S. M., & Sorg, J. D. (2000). Retention predictors related to intensive outpatient programs for substance use disorders. *American Journal of Drug and Alcohol Abuse, 26*, 417-428.

Wampold, B. E., Lichtenberg, J. W., & Waehler, C. A. (2002). Principles of empirically supported interventions in counseling psychology. *The Counseling Psychologist,* 30, 197-217.

Weisner, C., Mertens, J., Tam, T., & Moore, C. (2001). Factors affecting the initiation of substance abuse treatment in managed care. *Addiction, 96*, 705-716.

Westreich, L., Heitner, C., Cooper, M., & Galanter, M. (1997). Perceived social support and treatment retention on an inpatient addiction treatment unit. *The American Journal on Addictions, 6*, 144-149.

White, J. M., Winn, K. I., & Young, W. (1998). Predictors of attrition from an outpatient chemical dependency program. *Substance Abuse, 19*, 49-59.

Wickizer, T., Maynard, C., Atherly, A., & Frederick, M. (1994). Completion rates of clients discharged from drug and alcohol treatment programs in Washington State. *American Journal of Public Health, 84*, 215-221.

Winters, K. C., Stinchfield, R. D., Opland, Elizabeth, Weller, C., & Latimer, W. W. (2000). The effectiveness of the Minnesota model approach in the treatment of adolescent drug abusers. *Addiction, 95,* 601-612.

Woody, G. E., McLellan, A. T., Luborsky, L., O'Brien, C. P., Blaine, J., Fox, S., Herman, I., &Beck, A. T. (1984). Severity of psychiatric symptoms as a predictor of benefits from psychotherapy: The Veteran's Administration-Penn Study. *American Journal of Psychiatry, 141,* 1171-1177.

Young, D. & Belenko, S. (2002). Program retention and perceived coercion in three models of mandatory drug treatment. *Journal of Drug Issues, 32,* 297-328.

Zhang, Z., Friedmann, P. D., & Gerstein, D. R. (2003). Does retention matter? Treatment duration and improvement in drug use. *Addiction, 98*, 673-684.

Appendix B

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

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.

Participant Initials _____

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 C

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 ____days heavy drinking 　　　　　　　　　　　(1-4 standard drinks)　　(5+ standard drinks) **Typical week:** _____standard drinks **Your drinking compared to American adults:** _____ percentile *(same sex)* **Estimated blood alcohol concentration (BAC) level on heaviest drinking day:**

Other Drug Use

Percentiles (US Adults)						
Your use (days) in last 90						
	Tobacco/ Nicotine	**Marijuana/ Cannabis**	**Stimulants/ Amphetamines**	**Cocaine**	**Opiates**	**Other**

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 Consequences	Interpersonal Consequences	Intra-personal Consequences	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 (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 etc):

Overall Impression of Client: