

Predictors of Treatment Retention among Homeless Men With Substance Use Disorders

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Recommended Citation

Drymalski, Walter Matthew, "Predictors of Treatment Retention among Homeless Men With Substance Use Disorders" (2010).
Dissertations (2009 -). Paper 60.
http://epublications.marquette.edu/dissertations_mu/60

PREDICTORS OF TREATMENT RETENTION AMONG HOMELESS MEN
WITH SUBSTANCE USE DISORDERS

by

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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
PREDICTORS OF TREATMENT RETENTION AMONG HOMELESS MEN
WITH SUBSTANCE USE DISORDERS

Walter Matthew Drymalski, B.A., M.A

Marquette University, 2010

Homelessness is a significant problem in the United States. Recent estimates suggest that nearly three million people experience homelessness over the course of a year. Further, the rates of substance abuse are considerably higher among the homeless than in the general population. Substance abuse treatment has been found to be effective in reducing substance use among those persons with substance use disorders, as well as ameliorating other consequences of substance abuse (e.g., reducing rates of crime associated with substance abuse and dependence). One of the more robust predictors of positive outcomes for substance abuse treatment is retention, which is defined as the length of time clients remain in treatment. However, while a considerable amount of research has been conducted regarding what predicts retention among non-homeless persons with substance use disorders, less is known about what predicts retention among homeless persons with substance use disorders.

The following study was conducted to determine if a set of pre-treatment biopsychosocial variables could effectively predict retention among a cohort of homeless men with substance use disorders who were seeking treatment in a substance abuse clinic, which was located in a homeless shelter for men. Path analysis was used to compare two predictive models of retention.

The results indicated that both models represented an adequate fit to the data, though each model explained approximately 15% of the variance in retention. In both models, initial severity of biopsychosocial issues and perceived consequences of substance abuse did appear to predict higher motivation for treatment, which itself appeared to predict greater length of time in treatment. However, nearly 85% of the variance in retention was not explained by either model. This suggests that the factors that lead homeless individuals to remain in substance abuse treatment over the long-term may be better accounted for by variables not in the model, such as during treatment “process factors,” rather than pre-treatment factors. Study implications, limitations, and directions for future research are discussed.

ACKNOWLEDGMENTS

Walter Matthew Drymalski, B.A., M.A.

This dissertation is dedicated to the memory of my father, Walter George Drymalski. Dad, you are never far from my thoughts or from my heart. Wherever you are, I miss you and I hope I have made you proud.

This project could not have reached its conclusion without the support, guidance, and love of my friends and family. There simply is not enough space to thank everyone who encouraged me through this process, nor to express the magnitude of my gratitude. Thus, to all who are not mentioned below but whose love nurtured me, even in the smallest of ways, thank you. Words do not do justice to the extent of my appreciation.

First, I would like to thank my advisor, Dr. Todd Campbell, who has been my advisor, my mentor, and my friend. Dr. Campbell, it was through you that I developed a passion for social justice, a desire to work with the underprivileged, and a passion for research. Your intellectual curiosity continues to inspire me, the wealth of your knowledge awes me, and your down-to-earth attitude humbles me. I feel grateful that you were my advisor when I first entered the field of psychology, and I feel honored to be able to one day call you my colleague. Thank you for your guidance and support as I struggled to write this, Dr. Campbell – your faith in me helped me to have faith in myself.

Second, I would like to thank Drs. Melchert and Griffin for their support and encouragement through this process. Dr. Bob, I cannot express how grateful I am for all your time and patience during those late nights as we attempted to make sense of the results. I could not have asked for a better “statistics” committee member, and your knowledge of statistics seems to be surpassed only by your kindness. Dr. Melchert, thank

you for all your understanding and feedback as well. Your flexibility and encouragement helped me to move forward in the process, and I was touched by your kind words during my defense.

To my new parents-in-law, Sandy and Bill, I can only say thank you and I love you both very much. From your words of encouragement, to the countless delicious burgers and meals, to letting me stay in your basement, to teaching me how to water ski, to teaching me how to golf, to raising the woman I would fall in love with, you have welcomed me into your family. For the first time since I left for college when I was 18, your warmth, kindness, and love have given me a place where I feel like I belong. I wish I could express just how much I look up to both of you... Thank you for all your support while I was writing this “book report”. I feel truly blessed to have come into such a wonderful family.

To my mom, my words will be short, but they carry the full weight of my heart. You are my model of what it means to be good. When I think about what it is to live with kindness, I think of you. You are the moral compass to whom I look for direction. If there is any good in me, it is from you. If I am able to care for the hearts and souls of the people with whom I work, if I am able to be a healer in any sense of the word, it is because of you, mom. I love you.

Finally, to my beloved wife, Theresa, I do not know where I would be without you, but I do know that I could not have finished this dissertation. From the more mundane tasks such as editing, to all the times I leaned on you when I didn't think I could go any further – you gave me your strength and your love. In my heart of hearts, I know that we did this together, as a team. But... more than anything, you reminded me that

there was more to life than graduate school or than a dissertation. I had the strength to keep working because you helped me to keep this whole process in perspective. I knew that no matter what happened, whether I passed or failed, I would still have you in my life. This dissertation may represent an important step in my life, but it pales in comparison to you. There are no words to express how much you mean to me. You are the reason for my heart.

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CHAPTER I:
OVERVIEW & STATEMENT OF THE PROBLEM

Overview

This study is an evaluation of the predictors of retention in substance abuse treatment among homeless men. The first chapter of this document focuses on defining the terms used throughout the study, and then discusses the prevalence rates of homeless persons in the United States, the prevalence of substance use disorders (SUDs) in the United States, and the prevalence of SUDs among homeless persons. It is then argued that, similar to psychotherapy research in general, research on specific ingredients in substance use treatment have born little fruit, which suggests that common treatment factors may exert a greater impact on substance abuse treatment outcomes than factors unique to different types of substance use interventions. Retention in treatment is then postulated as one of the common factors, thus providing a rationale for examining those variables that appear to be predictive of treatment retention. However, while predictors of retention have been widely researched among non-homeless clients in substance abuse treatment, it is noted that considerably less research has examined which factors appear to predict retention among homeless clients in substance abuse treatment. This provides the rationale for the current study to address this gap in the literature. A statement of the problem, purpose of the study, and research questions then follow.

Chapter Two provides an overview of the impact of retention on outcomes in substance abuse treatment, both with non-homeless and homeless clients. The wide variation in the operationalizations of retention are then discussed, followed by a brief review of the wide range in rates of retention among homeless clients, based on the

operationalization used. Given the paucity of research on predictors of retention among homeless clients, the more substantial corpus of literature on predictors of retention among non-homeless is reviewed first, followed by a review of the extant research on predictors of retention among homeless clients. Chapter Two ends with a hypothetical predictive model, which is based on the Texas Christian University treatment process model proposed by Simpson and colleagues (e.g., Simpson, 2001; Simpson, 2004) and informed by the literature reviewed.

Chapter Three provides a description of the sample of homeless clients involved in the study, the setting in which the study took place, and the assessment process through which the data for this study were generated and collected. A descriptive and psychometric review of the instrumentation employed in the study is then provided. Finally, a description is provided of the statistical procedures that were utilized to analyze the predictive model of retention offered in Chapter Two.

Chapter Four discusses the demographics of the sample, the results of the path analyses conducted, and modifications made to one or both of the models, as necessary. Methods for handling missing and non-normal data will also be addressed. Finally, Chapter Five provides an interpretation of the results of the path analyses, including any modifications made to either of the models. The implications of the results are also discussed. Chapter Five ends with a discussion of the limitations of the study, suggestions for future research, and concluding remarks.

Definitions of Terms

Treatment completion. There is considerable variability in the meaning of treatment completion in the substance abuse literature. It is generally dependent on each

program's specific operationalization, and is frequently comprised of an algorithm which might include measures of engagement, length of time in treatment, attendance at specific types of programming, clinical improvement and/or goal attainment, adherence to programmatic rules, and so forth. For the purposes of this study, treatment completion will be used to refer to the attainment of clinical goals as determined by clinician and client judgment, which resulted in a successful discharge.

Treatment attrition. Treatment attrition is often defined as the converse of treatment completion, again generally defined by each specific program. For the purposes of this study, treatment attrition will refer to clients who were not successfully discharged and left treatment prior to attainment of treatment goals, as determined by both clinician and client. Discharge status (i.e., successful or unsuccessful) will be ascertained from each client's clinical file, which contains discharge paperwork that indicates whether the client dropped out of treatment prior to completion of his goals, or was successfully discharged following completion of his goals. In this study, treatment attrition will be used interchangeably with *treatment dropout*.

Length of time in treatment. Length of time in treatment will be operationalized as the length of time from a client's first contact with a clinician in the 7Cs Community Counseling Clinic to his last date of contact, regardless of whether this last date was the result of treatment dropout or a successful discharge.

Treatment engagement. For the purposes of this study, engagement will be defined as a ratio:

$$\frac{\text{Number of Sessions Attended}}{\text{Number of Sessions Scheduled}}$$

Prevalence Rates of Homeless Persons in the United States

The most recent “Annual Homeless Assessment Report to Congress” released by the U.S. Department of Housing and Urban Development’s Office of Community Planning and Development (hereafter referred to as HUD) in February of 2007 estimated that the average number of sheltered homeless people in the United States who are homeless on an average day between February 1, 2005, and April 30, 2005, was 334,744, while the average number of sheltered homeless people on a given day in January of 2005 was estimated to be 415,366 (HUD, 2007). Further, this report estimated that on any given day in January of 2005, there was an average of approximately 338,781 unsheltered homeless persons, bringing the total number of homeless persons on any given day in January of 2005 to 754,147 (HUD, 2007). However, it should be noted that this estimation is likely an underestimation of the total number of homeless persons in the U.S. on any given day as it is based on the number of people considered by HUD (2007) to be “literally homeless”:

These include people who for various reasons have found it necessary to live in emergency shelters or transitional housing for some period of time. Most tragically, this category also includes people who sleep in places not meant for human habitation (for example, streets, parks, abandoned buildings, and subway tunnels). These “street homeless” people may also use shelters on an intermittent basis (pp. 1-2).

Unfortunately, this definition omits people who may be on the verge of becoming homeless, defined by HUD (2007) as “precariously housed”:

These people are on the brink of homelessness. They may be doubled up with friends and relatives or paying extremely high proportions of their resources for rent. They are often characterized as being at imminent risk of becoming homeless. (p. 2)

Regardless of the definition employed, it is clear that homelessness in the United States is a prevalent social problem in the United States. Indeed, annual reports of homeless estimate that approximately 1% of the United States population is homeless in a given year (National Coalition for the Homeless, 2007a).

Prevalence Rates of Substances Use Disorders Among Non-Homeless and Homeless Persons in the United States

Rates of substance abuse among the homeless are considerably higher than in the general population. For example, in the 2006 National Survey on Drug Use and Health (NSDUH), approximately 22.6 million people (9.2% of the population aged 12 and older) were classified with substance dependence or abuse in the past year. Moreover, 8.5% of the United States population were current users of illicit drugs, an estimated 23.0% of the population engaged in an episode of binge drinking within the past 30 days, and approximately 6.9% of the population engaged in heavy drinking, which was defined as binge drinking on at least 5 days out of the past 30 (SAMSHA, 2006b). (It should be noted that the NSDUH excluded people who were homeless at the time of data collection).

In contrast, in a survey of 564 homeless adults in Alameda County, California, approximately half (52.4%) of the sample had a current substance use disorder of alcohol abuse or dependence (38.8%) and/or drug abuse or dependence (31.3%) (Robertson, Zlotnick, Westerfelt, 1997). O'Toole et al. (2004), in a survey of 531 homeless adults in Philadelphia and Pittsburgh conducted in 1997, found that 78.3% of the sample met criteria for a substance abuse/dependence disorder (defined as alcohol, drug, or co-occurring alcohol and drug), according to the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition-Revised* (American Psychiatric Association, 1987). In a

review of the literature on the rates of substance use among homeless individuals, Fischer and Breakey (1991) found rates of alcohol and drug problems among men as high as 80% and 61%, respectively, and 63% and 26%, respectively, among women. North, Eyrich, Pollio, and Spitznagel (2004), in a sample of 298 homeless men and 98 homeless women, found rates of alcohol or other drug use disorders of 84% and 58%, respectively, while Glasser and Zywiak (2003) reported that among homeless individuals surveyed in Hartford, Connecticut, and Providence, Rhode Island, 43% and 45.1%, respectively, believed that the primary reason they were homeless was because of their substance use.

Access of Substance Abuse Treatment Services by Homeless Persons

Not only do rates of substance abuse appear to be higher among homeless individuals, but their rates of admission into substance abuse treatment programs appear to be disproportionately higher than those of the general population as well. For example, the 2000 Drug and Alcohol Services Information System (DASIS) report (SAMSHA, 2003) reported that of the recorded individuals who sought treatment for substance use problems, approximately 10% were homeless. This number climbed to 13% in the most recent 2004 DASIS report (SAMSHA, 2006a). These numbers become particularly striking when one considers that homeless individuals comprise less than 0.3% of the entire United States population (HUD, 2007). To put these numbers in greater relief, only approximately 1.6% of the general United States Population sought treatment for substance abuse in 2006 (SAMSHA, 2006b), while approximately 175,300 of people admitted to substance abuse treatment in 2004 were homeless at time of admission (SAMSHA, 2006a). If one extrapolates from the approximate number of homeless individuals presented above, it suggests that over 5% ($175,300 / 3,500,000$) of homeless

individuals sought treatment during 2004, a rate nearly three times that of non-homeless persons. Moreover, of the individuals with five or more prior episodes of treatment who were admitted to substance abuse treatment programs in 2005, approximately 24% were homeless at the time of admission, compared to 8% of first time admissions (SAMSHA, 2007a), highlighting the chronicity of substance use problems among homeless persons with SUDs.

Effectiveness of Substance Abuse Treatment

A large body of literature strongly indicates that substance abuse treatment is effective at ameliorating the deleterious consequences of substance abuse. This research suggests that treatment is effective at treating both alcohol (Burke, Arkowitz, & Menchola, 2003; Irvin, Bowers, Dunn, & Wang, 1999; Miller & Willbourne, 2002; Woody, 2003) and drug use disorders (Burke et al., 2003; Carroll & Onken, 2005; Dutra et al., 2008; Irvin et al., 1999; Knapp, Soares, & Farrel, & Lima, 2007; Prendergast, Podus, Chang, & Urada, 2002; Woody, 2003). Moreover, recent meta-analytic research suggests that these positive effects are present for brief interventions for substance use disorders (Dunn, DeRoo, & Rivara, 2001; Moyer, Finney, Swearingen, & Vergun, 2002; Rubak, Sandboek, Lauritzen, & Christensen, 2005; Vasilaki, Hosier, & Cox, 2006), as well as for Alcoholics Anonymous (Tonigan, Toscova, & Miller, 1996). However, while this literature indicates that treatment is effective in treating the symptoms of substance use disorders, less clear are the mechanisms by which substance abuse treatment works.

Common Factors in Substance Abuse Treatment

The presence of the “dodo bird” effect among various psychotherapeutic interventions is a well-documented phenomenon (Wampold, 2001). The crux of this

phenomenon is that while most psychotherapeutic interventions demonstrate absolute efficacy, the evidence for their efficacy relative to one another is weak (Wampold, 2001). This has led several researchers to argue that patient change in psychotherapy is largely the result of “common factors” or “non-specific ingredients” within the therapeutic process, rather than ingredients unique to specific psychotherapeutic approaches (Wampold, 2001). However, research on these common factors has generally been confined to the psychotherapeutic treatment of psychiatric disorders, while their impact on the psychotherapeutic treatment of substance use disorders (SUDs) has largely been ignored.

Recently, several researchers have suggested that there is weak evidence that specific substance use disorder treatments facilitate change via their purported mechanisms of action (Longabaugh et al., 2005; Moos, 2003; Morgenstern & McKay, 2007). Morgenstern and Longabaugh (2000), in their review of 10 studies of cognitive-behavioral therapy (CBT) for alcohol dependence, found little support for the hypothesized active ingredients of CBT on drinking outcomes. Interestingly, Crits-Christoph et al. (2003), in their study of the relative efficacy of CBT plus group drug counseling (GDC), individual drug counseling (IDC) (an intervention based on the 12-step approach) plus GDC, and supportive-expressive psychotherapy (SE) plus GDC for cocaine dependence, found statistically significantly greater improvements in mediators of outcome hypothesized to be unique to CBT in the IDC group than both the CBT and SE groups, but also demonstrated statistically significantly larger improvements in drug use compared to both CBT and SE.

Not surprisingly, Morgenstern and McKay (2007) also note that there is little empirical support for the relative efficacy of various SUD interventions, and point out that while meta-analytic research suggests that treatments such as Motivational Interviewing (Burke et al., 2003) and Relapse Prevention (Irvin et al., 1999) demonstrate absolute efficacy, they have not been found to be more efficacious than other SUD treatments. As noted above, Crits-Christoph et al. (1999) found that IDC plus GDC resulted in greater improvements in drug use outcomes (as assessed by the Addiction Severity Index Drug Composite Score and number of days of cocaine use in the last month) than either CBT plus GDC or SE plus GDC. Timko, Moos, Finney, and Lesar (2000) found no differences in drinking outcome, functioning, or coping style among clients with alcohol use disorders who received “formal” treatment, attended AA only, or who received both formal treatment and attended AA at eight-year follow-up.

Moreover, as demonstrated in Project MATCH, “treatment matching,” in which clients are assigned to specific SUD interventions based on the degree of “match” between client pretreatment characteristics and a given intervention’s hypothesized mechanisms of action, has proved to be largely unsuccessful (Project MATCH Research Group, 1997). However, it should be noted that there were significant interactions at the three-year follow-up. For example, clients with higher levels of anger who received Motivational Enhancement Therapy had more days abstinent from drinking compared to clients with higher levels of anger in either Twelve Step Facilitation or Cognitive Behavioral Therapy, whereas clients who had social networks that were more supportive of drinking reported more days abstinent than clients in Motivational Enhancement Therapy (Project MATCH Research Group, 1998). However, these few positive findings

aside, Morgenstern and McKay (2007) write, “Overall, tests of patient-treatment matching, which would have been expected to yield strong results, almost without exception, yielded non-significant findings” (p. 1383).

Morgenstern and McKay (2007) note that while the aforementioned lack of relative efficacy, mediator, or matching effects might tempt one to argue that SUD treatment exerts its effects through “non-specific” active ingredients, “Consistent empirical support for the efficacy of SUD treatment suggests that interventions... are not just elaborate placebos, but do have specific effects... the process of change in behavioral treatments for addiction is dynamic, and the patient, therapist and therapy factors that influence change are, as yet, poorly understood” (p. 1383). This suggests that the “specific effects” alluded to by Morgenstern and McKay may be better understood and conceptualized through the language of common factors in substance abuse treatment, rather than through the lens of effects specific to a particular type of intervention.

This review will now turn to an in-depth examination of one of these ubiquitous, “common” treatment factors, length of time in SUD treatment, or rather, treatment retention. Although it is unclear whether treatment retention is a common factor itself, or is a process which allows other common factors to exert their impact on outcomes, the research strongly indicates that greater lengths of time in substance abuse treatment is predictive of positive treatment outcomes. Accordingly, this paper will first address the literature which has examined the impact of length of time in SUD treatment on outcomes, and will then focus on the client, programmatic, and relational factors which appear to influence length of time in treatment. It will begin with an examination of these

factors for non-homeless clients, and then turn to the sparser research conducted on homeless clients.

Statement of the Problem

As widespread as SUDs are in the United States population, they are even more prevalent among people who are homeless. The numbers dramatically tell the story. Recent estimates place the rate of substance use disorders in the general United States population at approximately 9-10% (SAMSHA, 2006b), whereas the reported rates among homeless persons are often at least five times higher, and frequently much higher than that (e.g., Robertson et al., 1997). Despite the prevalence of SUDs among homeless persons, scant research has been conducted on this pressing problem, particularly research examining which treatments are most effective, and why. As proposed in the Evidence-Based Practice (EBP) statement released by the American Psychological Association in 2006, “*Evidence-based practice in psychology (EBPP)* is the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences” (APA Presidential Task Force on Evidence-Based Practice, 2006, p. 271). This policy statement drives home the import of studying those client characteristics that may influence the practice and outcomes of psychological treatment, and enjoins the profession to examine whether factors and phenomena that appear to confer positive treatment benefits for one type of client population are transportable and applicable to another. Thus, the current study will examine whether factors which appear to be predictive of retention among non-homeless clients with SUDs are similarly predictive of retention among homeless clients with SUDs. It is hoped that this examination will also reveal whether there are predictive factors or combinations of

factors that are unique to homeless persons seeking substance abuse treatment.

Purpose of Study

The primary purpose of this study is to examine the predictors of retention in substance abuse treatment among homeless clients with substance abuse problems. More specifically, this study attempts to determine if the predictors of retention in a sample of homeless clients in substance abuse treatment are similar to predictors of retention in non-homeless clients in substance abuse treatment, as well as illuminate those predictors which are unique to homeless clients. In accordance with the third prong of APA's EBPP mission statement, which argues that EBP in psychology must be sensitive to the unique contextual factors each client faces, and given the dearth of research examining predictors of retention among homeless clients, this study attempts to determine which factors are similar among homeless and non-homeless clients, and which factors are unique to homeless clients. A secondary purpose of this study is to utilize a statistical analysis, path analysis, to help to elucidate the directional relationships among a large set of pre- and during-treatment variables, as well as the ways in which they interact with one another to exert their impact on treatment retention. Path analysis represents an improvement over the multiple regression techniques more commonly used in the substance abuse treatment retention literature in that it allows for causal inferences between variables.

Research Questions

In light of these study purposes, the following predictive models of retention with homeless, substance abusing clients are posed. Each model specifies a path analytic model, which is hypothesized to predict treatment retention, and each model will be

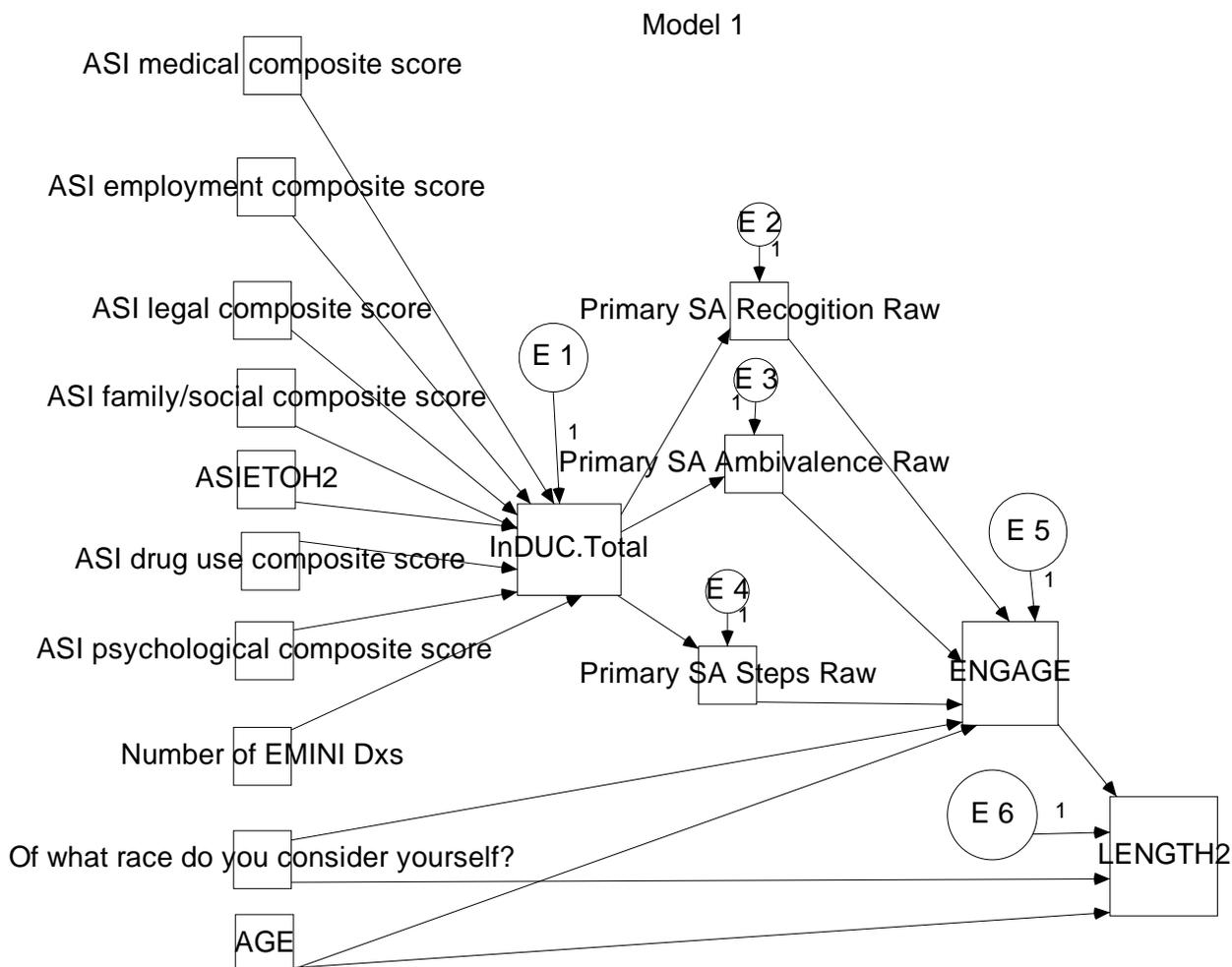
tested to determine its goodness-of-fit with the data. Thus, the research question to be answered is: which model more effectively and robustly predicts treatment retention among homeless men with substance use disorders?

These models were derived from the empirical literature on retention with both homeless and non-homeless clients. The development of these models was also informed by theoretical literature on retention, given some of the methodological limitations present in the existing empirical literature with both homeless and non-homeless clients (to be discussed in Chapter 2), as well as the fact that, as noted earlier, very little research on retention has been conducted with homeless clients in substance abuse treatment. The variables and rationale for these models will be discussed more fully in Chapter Two.

Predictive Model 1

It is expected that higher problem severity in terms of psychiatric symptoms, psychiatric and substance abuse diagnoses, substance abuse severity, social conflict, employment issues, medical issues, and legal issues will be directly related to higher substance use consequences, and through substance use consequences, indirectly related to motivation, engagement, and retention. Motivation will be directly related to engagement and indirectly related to retention through engagement. Greater degrees of engagement will be directly predictive of greater lengths of time in treatment. Older age will be directly and positively related to engagement and length of time in treatment. Race will be directly associated with engagement and retention, but the direction (positive or negative) of these relationships are presently unspecified. Finally, given that the sample for this study is entirely male, gender will not be used as a predictive variable. Please see *Figure 1* below for a graphical presentation of this predictive model.

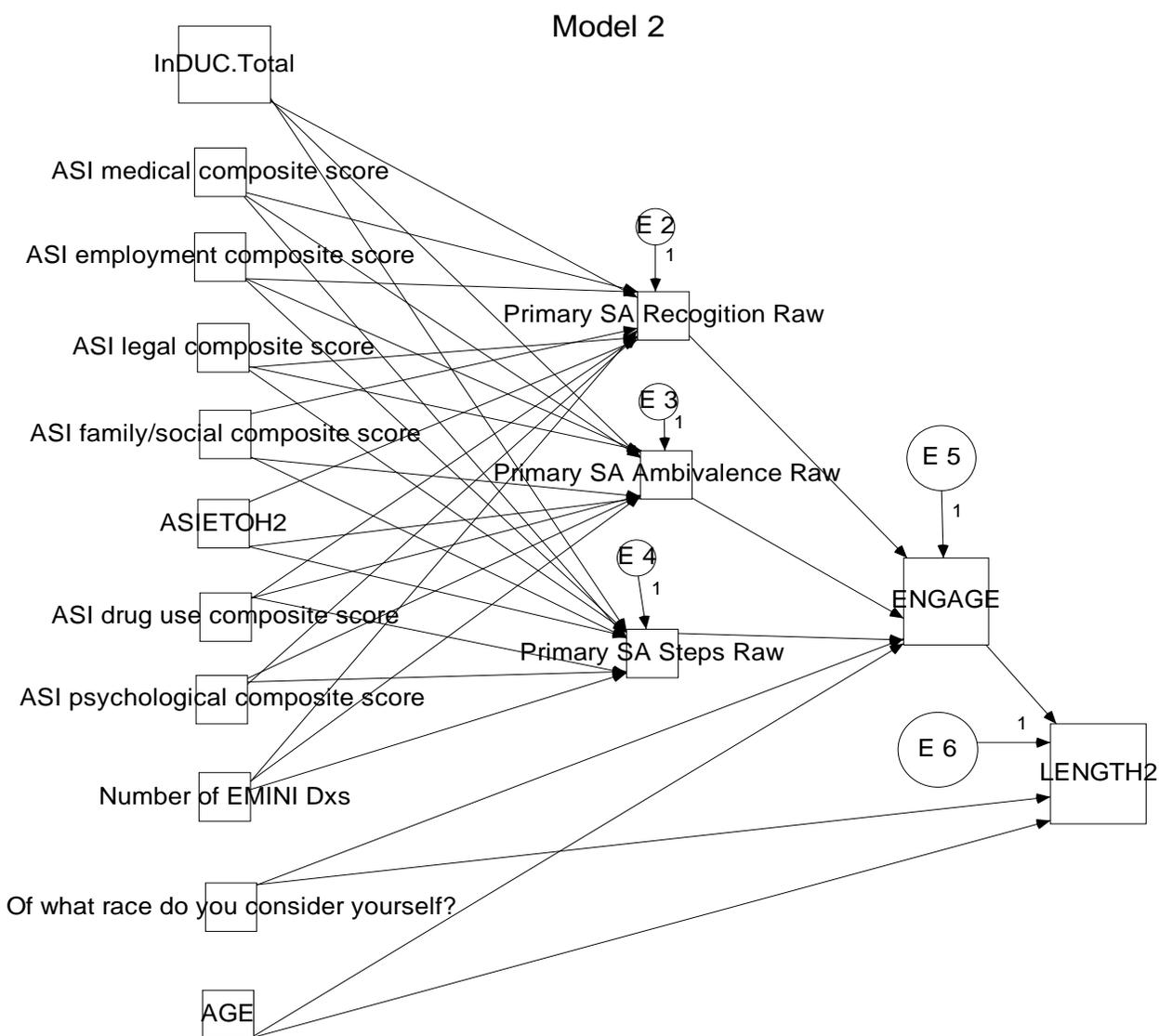
Figure 1: Predictive Model 1

*Predictive Model 2*

It is expected that higher problem severity in terms of psychiatric symptoms, number of psychiatric diagnoses and substance abuse diagnoses, substance use severity, social conflict, medical issues, employment issues, substance use consequences, and legal issues will be directly related to motivation, and through motivation, indirectly related to engagement and retention. Motivation will be directly related to engagement and

indirectly related to retention through engagement. Greater degrees of engagement will be directly predictive of greater lengths of time in treatment. Older age will be directly and positively related to engagement and length of time in treatment. Race will be directly associated with engagement and retention, but the direction (positive or negative) of this relationship is presently unspecified. Finally, given that the sample for this study is entirely male, gender will not be used as a predictive variable. Please see *Figure 2* below for a graphical presentation of this predictive model.

Figure 2: Predictive Model 2



CHAPTER II: REVIEW OF THE LITERATURE

Treatment Retention and Its Relationship to Outcomes

Length of time in treatment has been one of the most consistent and robust predictors of outcome in the field of substance abuse treatment. Multiple large scale, longitudinal studies, including the Drug Abuse Treatment Outcomes Study (DATOS), conducted between the years of 1991-1993 on a sample of 10,010 clients (Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997), and the California Treatment Outcomes Project, conducted in 2000 on a sample of 1,939 clients recruited from outpatient drug-free and residential substance abuse treatment programs (Hser, Evans, Huang, & Anglin, 2004), suggest that retention in treatment for at least 90 days confers positive benefits on a number of treatment outcomes, such as drug and alcohol use and criminal activity. Furthermore, follow-up data from the Drug Abuse Reporting Program (DARP), suggested that there was a positive linear relationship between length of time in treatment and post-treatment composite outcome scores, which consisted, among other things, of alcohol and drug use measures and criminal activity (Simpson, 1981; Simpson & Sells, 1982). However, one intriguing aspect of these findings was that this positive linear relationship appeared to require a critical mass of treatment time, as it manifested itself only among those clients who remained in treatment 91 days or more, and was not evident in clients who stayed in treatment 90 days or less.

While the literature above suggests that 90 days may be the minimum critical mass for treatment length, other large-scale research indicates that the minimum length may be even higher, from at least six to seven months (Moos & Moos, 2003), to as high as one year (Moos, Finney, Federman, & Suchinsky, 2000). This research is consistent

with the results from the large scale Treatment Outcome Prospective Study (TOPS), which was conducted between 1979-1981 on 11,750 clients in 41 drug abuse treatment centers across the country. Evidence from this study suggested lengths of retention of at least six months were required to effect significant reduction in heroin and marijuana use for clients in outpatient treatment, and at least one year for clients in residential and methadone maintenance treatment (Hubbard et al., 1989). Moreover, other research suggests that even after minimum treatment retention has been achieved, improvement in outcomes continue to increase in a linear fashion with length of time in treatment, though these effects begin to wane eventually (Zhang, Friedmann, & Gerstein, 2003). The relationship between length of time in treatment and drug use and criminal outcomes has been replicated in studies conducted in England as well (Gossop, Marsden, Stewart, & Rolfe, 2000; Gossop, Marsden, Stewart, & Treacy, 2002; Gossop, Trakada, Stewart, & Witton, 2005), though improvements in alcohol and crack-cocaine use may not persist for some clients at four to five years post-treatment (Gossop, Marsden, Stewart, & Todd, 2003).

Among homeless clients who abuse substances, the relationship between length of time in treatment and positive outcomes also appears to be present. A number of studies have documented a positive correlation between time spent in treatment and improvements in alcohol and drug use (Burnam et al., 1995; Liberty et al., 1998), stable housing (Burnam et al.; Lapham et al., 1995), employment (Lapham et al.; Mierlak et al., 1998), as well as fewer psychiatric hospitalizations (Mierlak et al.) and reductions in psychiatric symptoms of depression, anxiety, anger, and hostility (Burnam et al.).

Treatment engagement has also been found to have a positive association with outcomes among homeless clients who abuse substances. Braucht et al. (1995) reported that increasing service intensity was positively related to improvements in a number of domains, including drug and alcohol use, criminal behavior, housing, and employment, to name a few. This is consistent with other research which has found an inverse correlation between degree of service intensity and amount of post-treatment cocaine usage (Milby et al., 1996; Schumacher et al., 1995; Schumacher et al., 2007).

However, it should be noted that not all research has documented a positive relationship between length of time in treatment and outcomes. For example, Orwin, Scott, & Arieira (2005) reported that length of time in treatment was not associated with increased rates of stable housing among 1,143 homeless clients seeking substance abuse treatment services.

Overall, this literature strongly indicates that length of time in treatment is correlated with positive outcomes in a number of domains for both homeless and non-homeless clients. While improvements in outcomes appear to be linearly related to length of time in treatment, the research cited above suggests that a critical mass of time in treatment must accrue before this linear relationship becomes manifest. However, while this phenomenon may be operant in both homeless and non-homeless client populations, the specific variables which predict retention show both similarities and dissimilarities between homeless and non-homeless clients. However, before examining the predictors of retention, this review will first provide a brief discussion of the general rates of retention among homeless clients, as well as the various definitions of retention employed in the literature.

Rates of Retention among Clients Who Are Homeless

“Retaining clients in substance abuse treatment is always a challenge, but the challenge is intensified when the target population is homeless” (Zerger, 2002, p. 19). In contrast to the research conducted on stably housed individuals, the impact of length of time in substance abuse treatment on outcomes among homeless, substance-abusing clients has been studied less frequently. However, before one can begin to examine rates of retention during treatment, the considerable rates of attrition prior to treatment admission bears mention.

Nuttbrock, Ng-Mak, Rahav, and Rivera (1997) found that 58% (404/694) of pre-screened, homeless clients with co-occurring psychiatric and substance use disorders did not start treatment in the treatment facility to which they were referred (either a therapeutic community or community residence). Among the clients referred to a therapeutic community, 23% (84/373) were rejected for admission by the facility, and 33% (120/373) failed to show up at their assigned facility either before or after their first scheduled appointment. Among the clients referred to community residences, these numbers were 23% (73/321), and 39% (127/321), respectively. Thus, even the most impressive treatment retention rates may be inflated due to high rates of pre-admission attrition. Orwin, Garrison-Mogren, Jacobs, and Sonnefeld (1999), in a study of 14 different treatment programs, reported that the percentage of clients who were assigned to treatment but did not attend their first appointment were over 40% for some programs. Other research has suggested rates of attrition as high as 45% prior to initial screening (Liberty et al., 1998) and as high as 40% prior to treatment assignment (Burnam et al., 1995). This data is particularly troubling in light of other research which suggests that

homeless clients who engage in treatment through outreach efforts may have higher rates of drug and alcohol use than “walk-in” clients who are self-referred to treatment, and also suggests a need for creative strategies to engage these clients who do not enter treatment through traditional channels (Bradford, Gaynes, Kim, Kaufman, & Weinberger, 2005; Tommasello, Myers, Gillis, Treherne, & Plumhoff, 1999). These findings are consistent with research on non-homeless, substance-abusing clients, which indicate high levels of attrition prior to initial intake, as well as during the period between intake and treatment randomization (Siqueland, Crits-Cristoph, Gallop, Gastfriend, et al., 2002).

Once in treatment, the rates of treatment retention among homeless clients vary widely across the studies. It is difficult to compare these retention rates given the methodological differences which exist across the studies, particularly the diverse treatment modalities examined by each. Further complicating this analysis is the fact that “retention” is not uniformly operationalized across the literature. For example, some authors defined retention via measures of central tendency, such as the median (e.g., Justus, Burling, & Weingardt, 2006; Orwin et al., 1999) or mean (e.g., Baier, Murray, North, Lato, & Eskew, 1996) number of days a cohort of clients remained in treatment, whereas others discussed retention in terms of the number of clients who successfully completed programming versus those who did not (e.g., Nuttbrock et al., 1997). Moreover, there is considerable variation across programs in terms of services offered (e.g., counseling, case management, housing, etc.), program policies (e.g., abstinence requirements versus no abstinence requirements), or reasons clients might be asked to leave treatment (e.g., violation of program abstinence rules, fighting with other clients or staff). Therefore, the rates of retention across the different studies should be interpreted

with caution given the wide variation in services offered, even within specific modalities, as well as the different operationalizations of retention employed.

Ranges of Retention within Different Metrics of Retention for Homeless Clients

The median number of days homeless clients were retained in substance abuse treatment ranged from 7.5 days to 266 days (e.g., Justus et al., 2006; Lapham et al., 1995; Leda & Rosenheck, 1992; Liberty et al., 1998; McGeary, French, Sacks, McKendrick, & DeLeon, 2000; Orwin et al., 1999; Orwin et al., 1994; Wenzel et al., 1995). The mean number of days homeless clients were retained in treatment ranged from 50.0 ($SD = 72.6$) to 179.4 ($SD = 151.1$) (e.g., Baier et al., 1996; Orwin et al., 1999; Wright & Devine, 1995). Some authors used the percentage of clients who completed a set duration of treatment as their proxy for retention. For example, Nuttbrock et al. (1997) assessed the percentage of clients who completed 2, 6, and 12 months of therapeutic community treatment ($n=169$) or community residence treatment ($n=121$) and found rates of 73% (123/169), 43% (72/169), and 26% (43/169), versus 87% (106/121), 55% (67/121), and 37% (45/121), respectively. Liberty et al. (1998) reported 90 day retention rates of 31.4%, 38.7%, and 38% for two modified therapeutic communities and a clean and sober dormitory, respectively. The percentage of homeless clients completing treatment programs ranged widely from 2.5% to 38.4% (Lapham et al.; Leda & Rosenheck; Mierlack et al., 1998; Orwin et al., 1999).

Regardless of modality or programmatic elements available, the highest rates of attrition generally occurred early in treatment. For example, Baier et al. (1996) reported that of the 118 clients (52%, 118/228) who did not complete their residential treatment program, 43.2% (51/118) left within the first month, and Burnam et al. (1995) reported

that only 49% of clients remained in a residential program for at least two weeks.

Mierlack et al. (1998) reported that of the 66% (125/189) of clients who dropped out of a modified therapeutic community, approximately 74% (92/125) of these dropped out within the first three months. Ball, Cobb-Richardson, Connolly, Bujosa, & O'Neill (2005) reported that over 60% (31/52) of clients with co-occurring substance use and personality disorders at a homeless drop-in center dropped out of psychotherapy treatment by the end of the first month. This pattern mirrors that of other research with non-homeless clients in substance abuse treatment, in which rates of attrition from treatment are highest early in treatment (e.g., in the first six weeks), and decrease as treatment progresses (e.g., Pena et al., 1999).

This review will now turn to the specific client factors which may help to predict treatment retention. It will first examine the factors identified in research with non-homeless clients, and will then address the considerably more exiguous literature on homeless clients.

Predictors of Retention among Non-Homeless Clients

Psychiatric symptoms. Research suggests that psychiatric diagnoses have an inconsistent relationship with retention. For example, while Curran, Kirchner, Worley, Rookey, and Booth (2002) found that higher levels of depressive symptoms (≥ 33) on the Beck Depression Inventory increased the odds ratio (5.7) of early attrition from intensive outpatient substance abuse treatment for male veterans ($\beta = .39, p = .024$).

Other authors have found that Addiction Severity Index psychiatric composite scores have predicted attrition among a subsample of clients who dropped out of treatment early (Sayre et al., 2002). Broome, Flynn, and Simpson (1999) reported that higher levels of

hostility, as assessed by the SCL-90, were related to lower retention in long term residential treatment (LTR) and inconsistently related to retention in outpatient drug-free treatment (ODF), depending on the program. More specifically, hostility was either unrelated to retention or related to lower rates of retention, depending on the ODF program.

However, Broome et al. (1999) also found that while higher levels of depressive symptoms, as assessed by the Symptom Checklist 90 (SCL-90), were predictive of shortened length of time in treatment for methadone maintenance (MM) clients, they were unrelated to length of time in ODF treatment (Broome et al.). This is consistent with other literature that suggests that level of psychiatric symptoms are unrelated to treatment initiation (Weisner, Mertens, Tam, & Moore, 2001) or retention in treatment (Siqueland, Crits-Cristoph, Gallop, Barber, et al., 2002; White, Winn, & Young, 1998).

Further, Broome et al. (1999) found that greater levels of depressive symptomatology were actually related to greater length of time in LTR treatment. This is consistent with other research, which has reported that clients with greater psychiatric severity were more likely to enter treatment (Weisner & Matzger, 2002), and that more psychiatrically complex clients with multiple morbidities were more likely to remain in treatment (Castel, Rush, Urbanoski, & Toneatto, 2006; Veach, Remley, Kippers, & Sorg, 2000). Indeed, Pringle et al. (2002) found that substance abuse clients who received concomitant mental health services were 2.04 times more likely to remain in substance abuse treatment past the 90 day threshold.

Research also indicates that levels of psychological distress may differentially impact retention, depending on client demographic and treatment variables. For example,

Ross, Cutler, and Sklar (1997) found that men with higher levels of psychological distress were less likely to begin treatment, but that once in treatment, the lowest levels of psychological distress tended to be reported by non-completers. This trend was reversed among the female clients in their sample, with those reporting the highest levels of psychological distress more likely to be non-completers and those with the lowest levels of psychological distress more likely to complete treatment. This is consistent with other literature which indicates that the presence of depressive symptoms decreases the likelihood of abstinence post-treatment among female clients (Hser, Huang, Teruya, & Anglin, 2003). The fact that several authors have found higher levels of depressive symptoms in women than in men in substance use treatment (Hser, Evans, & Huang, 2005; Paraherakis, Charney, Palacios-Boix, & Gill, 2000) further reinforces the importance of understanding the interaction of psychiatric symptoms with gender and the impact it has on retention.

Interestingly, neither Broome et al. (1999) nor Curran et al. (2002) found that a diagnosis of depression was related to treatment retention, which is consistent with other substance abuse research (e.g., Alterman, McKay, Mulvaney, & McLellan, 1996; Stark, 1992). However, Claus and Kindleberger (2002) found a relationship between presence of a comorbid psychiatric disorder and treatment retention (though it was unclear by which instrument they arrived at their diagnoses), and Siqueland, Crits-Cristoph, Gallop, Barber, et al. (2002) reported that a diagnosis of antisocial personality disorder was related to lower retention.

Although the presence of a psychiatric diagnosis and levels of psychiatric symptomatology are inconsistently correlated with length of time in treatment, other

research suggests that a history of psychiatric treatment is associated with increased odds of attrition from treatment (Lang & Belenko, 2000). In this same vein, research with non-substance using clients suggests that a greater degree of chronicity of psychological problems may be related to lower levels of retention (Tasca et al., 1999), further underscoring the complexity of this issue.

Recent research suggests that the inconclusive relationship between psychiatric diagnosis and level of symptomatology and treatment retention may be due to the mediating influence of client coping skills. For example, Patkar, Murray, et al. (2004) found that higher levels of sensation-seeking and impulsivity were negatively associated with treatment retention among cocaine-dependent patients, and Daughters et al. (2005) reported that lower levels of psychological distress tolerance (but not physical distress tolerance) were related to higher levels of early treatment attrition in substance abuse treatment. Further, research indicates that clients with mild cognitive impairments are less likely to complete treatment than client without such impairments (Aharonovich et al., 2006). The above research suggests that a clients' psychiatric diagnosis or level of symptomatology may be less important to their length of time in treatment than their ability to cope with their psychological distress, and may also help to partially explain the conflicting results found in the literature. Interestingly, a study by Tate et al. (2008) reported that while lower levels of self-efficacy and the presence of life stressors were related to early relapse in treatment, the interaction of self-efficacy and life stressors was not significant.

Thus, while the research suggests that psychiatric diagnosis is not related to retention, a diagnosis of antisocial personality disorder may be an exception. Levels of

psychiatric symptomatology appear to be more consistently related to longer lengths of time in treatment. However, as noted above, this finding is also not without exception, and may be influenced by other factors, such as stage of treatment and client gender. The confusing relationship between client psychiatric issues and length of time in treatment may be mediated by client coping skills, but this conjecture has yet to be tested.

Motivation. The relationship between initial motivation for treatment and length of time in treatment has been considerably more consistent in the literature than that of psychiatric symptoms. However, like psychiatric symptomatology, motivation is an incredibly complex phenomenon, which has been operationalized differently by many authors conducting research with substance-abusing populations and broken down into multiple subcomponents (Klag, O'Callaghan, & Creed, 2004). Moreover, the time of the assessment of motivation is a critical factor to consider as well, as research suggests that motivation is a dynamic phenomenon over the course of treatment (Cahill, Adinoff, Hosig, Muller, & Pulliam, 2003; Simoneau & Bergeron, 2003), thus suggesting that levels and sources of motivation at pre-treatment may differ from those during and following treatment.

Indeed, prior to even analyzing the impact of motivation on length of time in treatment, indices of motivation, such as perceived need for treatment, perceived readiness for treatment, and motivation to quit using substances have been found to be associated with increased odds of treatment initiation (Weisner, Mertens, Tam, & Moore, 2001), as well as use, or attempted use, of any substance abuse services (Neff & Zule, 2002). Once in treatment, motivation at the outset of treatment appears to be a robust predictor of length in time in treatment, with higher motivation nearly doubling the odds

that a client will remain in treatment at least 360 days in MM (Simpson, Joe, & Rowan-Szal, 1997; Simpson, Joe, Rowan-Szal, & Greener, 1995), and at least 90 days in LTR (Rowan-Szal, Joe, & Simpson, 2000) and ODF (Joe, Simpson, & Broome, 1998). However, it should be noted that after controlling for covariates, Joe et al. (1998) reported that motivation was not related to retention in the ODF programs. DeLeon, Melnick, and Kressel (1997) reported that motivation was the most consistent predictor of retention at both 30 day and 10 month follow-ups in therapeutic community treatment, which is consistent with other literature which has found a positive association between staff assessment of client motivation and treatment completion (Ward, 2005).

In support of the impact of motivation on retention, other research indicates that low motivation or low hope for change is one of the more common reasons clients endorse for dropping out of treatment (Ball, Carroll, Canning-Ball, & Rounsaville, 2005). Not surprisingly, Zhang, Harmon, Werkner, and McCormick (2004) found that clients who reported more ambivalence about their alcohol use at baseline reported greater alcohol use at nine month follow-up than those with lower ambivalence.

Moreover, the influence of motivation on treatment retention is complicated by the fact that multiple conceptualizations of motivation exist, and multiple factors can influence each client's motivation levels as well. In other words, what makes behavior change, and thus, retention in treatment, important to one client may be entirely different for another. One of the more useful ways in which to think about motivation may be the dichotomous theory of intrinsic/extrinsic motivation (Klag et al., 2004). Within this theory, intrinsic motivation is understood as motivation which arises from within the individual to change given behavior, whereas extrinsic motivation is understood as

outside influences or circumstances which coerce or pressure an individual into behavior change.

However, as noted earlier, the sources of both intrinsic and extrinsic motivation may differ depending on each client's unique personality configuration, life circumstances, and personal history. Moreover, motivation may influence, or be influenced by, several other variables which have been found to impact retention. In regards to intrinsic factors, for example, as was discussed in the section on the influence of psychological symptoms on retention, some research indicates that greater levels of psychological symptoms or a greater number of psychological problems lead to increasing lengths of time in treatment (e.g., Broome et al., 1999; Castel et al., 2006; Veach et al., 2000). This has led some to speculate that greater psychological distress may, in fact, increase a client's intrinsic motivation to seek out and remain in treatment to obtain the help he or she needs (Cahill et al., 2003; Klag et al., 2004). Tentative support for this contention was provided by Castel et al., in which the authors found that clients with the fewest psychiatric symptoms were found to be in the earliest Stages of Change (as assessment by the Stages of Change model), as well as the lowest levels of treatment engagement.

In regards extrinsic factors, for example, some literature suggests that clients who have received pressure from employers to enter treatment are more likely to initiate (Weisner et al., 2001) and remain in treatment (Mertens & Weisner, 2000), and those who are coerced to treatment through the legal system may have longer stays in treatment as well (Maglione, Chao, & Anglin, 2000a, 2000b). Interestingly, some research suggests

that high intrinsic and extrinsic motivation may be the optimal combination to produce the greatest length of time in treatment (Ryan, Plant, & O'Malley, 1995).

Simpson, Joe, Rowan-Szal, and Greener (1997) reported that greater initial pre-treatment motivation increased early session attendance, which was related to stronger therapeutic relationships, was in turn, related to both lower levels of drug use during treatment, as well as greater length of time in treatment. Lower levels of drug use during treatment were also related to increased length of time in treatment. These findings are consistent with other literature which suggests that higher levels of engagement in treatment (e.g., Hser et al., 2004; Simpson, Joe, & Rowan-Szal, 1997; Simpson, Joe, Rowan-Szal, et al., 1997) and stronger therapeutic alliances (e.g., Meier, Donmall, McElduff, Barrowclough, & Heller, 2006; Simpson, Joe, Rowan-Szal, et al.) are related to greater lengths of retention in substance abuse treatment. Thus, motivation's correlation with treatment retention may best be understood in relation to other factors which influence a client's motivation, whether these factors be intrinsic (e.g., psychological distress), or extrinsic (e.g., legally mandated treatment), as well as those factors which are influenced by motivation (e.g., engagement, therapeutic relationship).

Regardless of the pathway through which it exerts its effects, it is clear that motivation has a robust relationship with length of time in treatment. Moreover, interventions designed to enhance motivation, such as Motivational Interviewing (Miller & Rollnick, 2002), have generally been shown to be effective to increase both engagement and retention in treatment (Carey, Carey, Maisto, & Purnin, 2002; Carroll et al., 2006; Carroll, Libby, Sheehan, & Hyland, 2001; Daley, Salloum, Zuckoff, Kirisci, & Thase, 1998; Martino, Carroll, O'Malley, & Rounsaville, 2000; Secades-Villa, Fernande-

Hermida, Arnaez-Montaraz, 2004; Steinburg, Ziedonis, Krejci, & Brandon, 2004; Swanson, Pantalon, & Cohen, 1999), as well as problem recognition (Dench & Bennett, 2000). This research provides additional, albeit indirect support for the importance of initial motivation on treatment engagement and retention.

Engagement. Engagement, or intensity of services received, is often estimated by examining the number of sessions attended during treatment. Although several authors have noted the positive impact of engagement on eventual substance abuse treatment outcomes (Carlson & Gabriel, 2001; Fiorentine & Anglin, 1996; Fiorentine, Nakashima, & Anglin, 1999; Jerrell & Ridgely, 1999; Simpson, Joe, Rowan-Szal, et al., 1995), research examining the impact of engagement on retention is more limited.

The extant research on engagement suggests that it does appear to have a positive impact on retention rates. A series of follow-up studies by Simpson and colleagues found that greater session attendance was positively related to one year retention rates among clients in methadone maintenance (Simpson & Joe, 2004; Simpson, Joe, & Rowan-Szal, 1997; Simpson, Joe, Rowan-Szal, et al., 1997), and Hser et al. (2004) found that greater service intensity was correlated with greater rates of clients who remained in treatment at least 90 days or more, or who completed treatment. However, Moos and Moos (2003) reported a negative correlation between treatment intensity and retention, and also found that treatment intensity did not influence outcomes above and beyond length of time in treatment.

As noted above, initial motivation at the beginning of treatment appears to exert a salutary effect on treatment engagement, which, along with therapeutic alliance and during-treatment drug use, appears to predict greater length of time in treatment (e.g.,

Simpson, Joe, Rowan-Szal, et al., 1997). Thus, much like the variables already enumerated (i.e., motivation, psychiatric symptoms), engagement's relationship with retention may be best understood through a complex calculus involving multiple variables which occurs both prior to and during treatment.

Therapeutic alliance. The therapeutic alliance has long been recognized as one of the common factors (Wampold, 2001) which appears to contribute to positive outcomes in psychotherapy for non-substance use disorders, regardless of the type of therapeutic approach used, or the alliance instrument employed (e.g., Martin, Garske, & Davis, 2000). This same phenomenon has been replicated in research with clients with substance use disorders, with some authors reporting that higher levels of therapeutic alliance are generally associated with better during-treatment (Connors, Carroll, DiClemente, Longabaugh, & Donovan, 1997) and post-treatment outcomes (Connors et al., 1997; Joe, Simpson, Dansereau, & Rowan-Szal, 2001). However, a recent review of the literature noted that while ratings of the therapeutic alliance early in substance abuse treatment appear to be predictive of early substance use improvement during treatment, the relationship of the alliance to post-treatment outcomes is inconsistent (Meier, Barrowclough, & Donmall, 2005).

Recent research by Meier and colleagues (Meier et al., 2005; Meier et al., 2006) suggest that the therapeutic alliance, particularly the therapist-rated alliance, demonstrates a consistent and robust positive relationship with treatment engagement and retention. However, as discussed above, research by Simpson and colleagues (Joe et al., 1998; Simpson & Joe, 2004; Simpson, Joe, Rowan-Szal, et al., 1997) indicate that the relationship between the therapeutic alliance and retention may be influenced and

mediated by a number of additional pre- and during-treatment factors. As noted earlier, they posited a treatment process model whereby greater initial pre-treatment motivation increased early engagement, which was related to stronger therapeutic alliances. Stronger therapeutic alliances were related to lower levels of drug use during treatment, and the therapeutic alliance, treatment engagement, and lower levels of during-treatment drug use were correlated with greater length of time in treatment.

Other research supports various aspects of these stages. For example, several authors have found a relationship between substance abuse treatment engagement and therapeutic alliance (Connors et al., 1997; Fiorentine et al., 1999; Simpson et al., 1995; Siqueland et al., 2004), providing partial support for one of the initial stages of Simpson's model. Moreover, other research suggests that a strong therapeutic alliance may counteract the impact of low motivation on substance use outcomes during the course of treatment (Ilgen, McKellar, Moos, & Finney, 2006). Although the relationship between the therapeutic alliance and motivation during the treatment process remains unclear, this study provides partial support for Simpson and colleagues (e.g., Simpson & Joe, 2004) contention that while initial motivation may be important for early engagement, other factors, such as the therapeutic alliance, may ultimately have greater bearing on eventual outcomes. In support of this hypothesis, other research has found that initial readiness for change was not correlated with drug use outcomes (Gossop, Stewart, & Marsden, 2006).

Dearing, Barrick, Dermen, and Walitzer (2005) employed a model similar to Simpson's and proposed an additional mediating variable, treatment satisfaction. They reported that the therapeutic alliance, in conjunction with expectations of treatment and number of sessions attended, was positively correlated with treatment satisfaction, which

was predictive of post-treatment abstinence days. Although not a direct examination of retention, this study suggests that the relationship of the therapeutic alliance to outcomes may be mediated by the variable of satisfaction. This has important implications for the study of retention for, as shall be reviewed below, a growing corpus of literature suggests that treatment satisfaction is related to retention as well. In sum, irrespective of the mechanism(s) by which it is influenced or through which it exerts its influence, the therapeutic alliance appears to have a strong relationship with treatment retention.

Satisfaction with treatment. A seemingly obvious, yet often overlooked, aspect of substance abuse treatment in regards to retention and other outcomes is the client's level of satisfaction with the treatment he or she has received. However, it is not entirely clear what leads to greater client satisfaction with treatment. Some research suggests that clients who receive the services they need (whether these services are medical, employment, or psychological), as well as the appropriate level of these services, tend to have better outcomes (Chen, Barnett, Sempel, & Timko, 2006; Moos et al., 2000) and greater retention in treatment (Hser, Polinsky, Maglione, & Anglin, 1999; Moos et al., 2000; Pringle et al., 2002). Although satisfaction was not directly assessed in these studies, it seems reasonable to hypothesize that clients who receive the services they need would be more satisfied with treatment, and thus would choose to remain in treatment longer.

However, while research suggests that some phenomena predict positive treatment engagement and retention, regardless of the modality (Joe, Simpson, & Broome, 1999), other research suggests that treatment program characteristics interact with client and funding variables to produce differential retention rates in each treatment

modality (ODF, MM, LTR) for various subsets of clients categorized along different combinations of demographic and funding variables (Chou, Hser, & Anglin, 1998). This is not surprising given that other research suggests that statistically significant differences exist among several client level characteristics (e.g., depression, hostility, motivation, counseling rapport, peer support) across various treatment programs and treatment modalities (Joe, Broome, Rowan-Szal, & Simpson, 2002). Furthermore, other research that indicates that, even after controlling for client characteristics, there are still statistically significant differences in rates of retention among various programs within a given treatment modality (Rowan-Szal et al., 2000).

McKellar, Kelly, Harris, and Moos (2006) reported that clients who perceived the staff at a substance abuse treatment agency to be high in control and low in support were more likely to drop out than those who perceived the converse. Consistent with this finding, Ball, Carroll, et al. (2005) found that one of the more common reasons clients cited for premature treatment drop out was conflict with program staff. However, other research suggests that in program environments which clients perceived to be supportive and goal-directed, clients not only attended more treatment sessions, but reported higher levels of satisfaction with treatment as well (Moos & Moos, 1998). Moreover, DeLeon, Hawke, Jainchill, and Melnick (2000) found that an intervention which consisted of thrice weekly seminars delivered by senior staff members increased 30 day retention rates among new clients as compared to a standard, control condition. Intriguingly, the effect was most prominent among those clients who began treatment with the lowest initial motivation. Thus, it appears that differences in staff attitudes, control, and experience, as well as supportive and goal-oriented treatment environments can have a positive impact

on retention. Moreover, it also suggests that program environment variables interact with other demographic/process variables (e.g., motivation) to produce its influence on retention.

Although previous research has often focused on client variables as they relate to retention, the evidence cited above argues that examination of programmatic differences between substance abuse treatment agencies may help to better explain and strengthen the prognosticative models of treatment retention. Simpson, Joe, Broome, et al. (1997) perhaps best sum up the considerable variation in terms of treatment success and programmatic operations among individual programs within different modalities, “There continues to be wide diversity in how programs operate, whom they treat, their success in engaging and holding clients in treatment, and services delivered” (p. 289). The substantial programmatic variations, both in terms of services offered and clientele served, coupled with the importance of matching clients to service needs, renders the assessment of client satisfaction with services received a potentially critical consideration in the determination of the factors which predict treatment success, including retention. Client satisfaction provides a common metric which can be compared and aggregated across studies with far greater ease than programmatic variations and features.

As discussed above, satisfaction with treatment appears to be robustly correlated with positive substance abuse treatment outcomes (Dearing et al., 2005). Dearing et al. also found that treatment satisfaction had a positive, reciprocal relationship with treatment engagement (number of sessions attended), which is consistent with other research which has found a correlation between engagement and perceived utility of treatment (Fiorentine et al., 1999; Simpson et al., 1995), as well as between treatment

intensity and satisfaction with effectiveness of services (Carlson & Gabriel, 2001).

Regarding retention, treatment satisfaction and perceived helpfulness of treatment appear to increase the likelihood of remaining in treatment at least 90 days (Hser et al., 2004; Simpson, Joe, & Brown, 1997) and completing treatment (Roffman, Klepsch, Wertz, Simpson, & Stephens, 1993), whereas lower levels of satisfaction with services appear to increase the likelihood of treatment dropout (Marrero et al., 2005).

Joe et al. (1998) found that treatment readiness (conceptualized as an aspect of motivation) was significantly related to measures of perceived helpfulness of treatment at both 1 and 3 months during treatment. However, the relationship between motivation and early treatment engagement discussed above, coupled with the relationship between engagement and treatment satisfaction, suggests that the relationship between motivation and treatment satisfaction may be mediated by the variable of engagement. Moreover, other research has found that African-Americans and Hispanics report significantly less satisfaction with treatment than do Caucasian clients (Tonigan, 2003). These findings suggest that treatment satisfaction, like the other potential prognosticators of retention discussed above, interacts with other demographic/process variables to influence length of time in treatment. Although the sequential and interactional pathways through which treatment satisfaction exerts its impact on retention remain unclear, the evidence does suggest that it is related to retention.

Age. A large body of literature suggests that age is correlated with retention in substance abuse treatment. Older clients are more likely to initiate treatment (Jackson, Booth, McGuire, & Salmon, 2006), and the preponderance of evidence indicates that older clients tend to stay in treatment longer than younger clients (Chou et al., 1998;

DeLeon et al., 1997; Jackson et al., 2006; Maglione et al., 2000a, 2000b; Mammo & Weinbaum, 1993; McKellar et al.; Roffman et al., 1993; Rowan-Szal et al., 2000; Sarte, Mertens, Arian, & Weisner, 2004; Siqueland, Crits-Cristoph, Gallop, Barber, et al., 2002; Wickizer et al., 1994). However, some authors have found that younger age is related to increased risk of attrition only among male clients (Green, Polen, Dickinson, Lynch, & Bennett, 2002; Mertens & Weisner, 2000), whereas others (Sarte et al., 2004) have reported that older female clients have the greater treatment retention. This evidence underscores yet again the idea that retention is influenced by a complex interaction of various demographic/process variables, rather than by any one variable alone.

Consistent with the finding that older age is related to greater retention in treatment, other research has found a link between older age and positive substance use outcomes (Sarte et al., 2004; Simpson, Joe, & Rowan-Szal, 1997), and a recent meta-analysis of drug abuse treatment group comparison studies found better crime outcomes in substance abuse treatment programs which, on average, serve older clients (Prendergast et al., 2002). Thus, of the demographic variables reviewed, older age appears to be one of the most consistent predictors of positive outcomes, including increased length of time in treatment.

Gender. The relationship between gender and retention is less clear than that of age and retention. The research thus far conducted is inconsistent, with some studies reporting that women are more likely to remain in treatment for a shorter length of time than men (DeLeon et al., 1997; Hser et al., 2004; King & Canada, 2004; Klein, di Menza, Arfken, & Schuster, 2002; Mammo & Weinbaum, 1993; McCaul, Svikis, & Moore, 2001; Sayre et al., 2002; Siqueland, Crits-Cristoph, Gallop, Barber, et al., 2002).

However, other research has found that female clients are more likely to initiate substance abuse treatment (Weisner et al., 2001), more likely to remain in treatment at least 90 days (Joe et al., 1999), and less likely to drop out than men (Maglione et al., 2000a, 2000b). Moreover, Green-Hennessy (2002) found that females were more likely to seek out and use behavioral health services than males. Consistent with these findings, Vaughn, Sarrazin, Saleh, Huber, and Hall (2002) reported that women in both residential and outpatient treatment were more likely to participate in a research study, and those women in residential treatment were more likely to be retained by the research study. However, still other research has found no interaction between gender and retention (e.g., Roffman et al., 1993).

Interestingly, several studies which specifically compared the retention rates between men and women in substance abuse treatment reported no difference in retention rates between genders (Hser et al., 2005), but did find that the factors which predicted retention and outcomes varied considerably by sex (e.g., Green, Polen, Dickinson, Lynch, & Bennett, 2002; Mertens & Weisner, 2000). This is consistent with other research which indicates that there are both similarities and differences between women and men in the predictors of treatment engagement (Fiorentine et al., 1999), and outcomes (Hser, Huang, et al., 2003; Hser, Evans, et al., 2005). This suggests that gender both influences, and is influenced by, other factors to produce its impact on retention, a leitmotif noted throughout this review. For example, research suggests that gender interacts with variables such as psychiatric symptoms (Ross et al., 1997), treatment modality (Chou et al., 1998), and the therapeutic relationship (Morgenstern & Bux, 2003) to produce a differential impact on retention for women and men in substance abuse treatment. While

the exact extent and nature of these multifarious interactions among gender and other demographic/process variables remains to be elucidated, the evidence does appear to suggest that gender has an influence on retention (albeit an inconsistent one).

Ethnicity. The association between ethnicity and retention is similarly inconsistent. Several studies have found a relationship between ethnicity and retention (e.g., Siqueland, Crits-Cristoph, Gallop, Barber, et al., 2002; Siqueland, Crits-Cristoph, Gallop, Gastfriend, et al., 2002), while others have reported that ethnicity did not appear to be associated with either retention (e.g., Sayre et al., 2002) or engagement (Rosenheck & Seibyl, 1998). Of the research which has found a correlation, the majority suggests that Caucasian clients are more likely to attend more treatment sessions than minority clients (Brower & Carey, 2003; Morgenstern & Bux, 2003), as well as remain in treatment longer (Siqueland, Crits-Cristoph, Gallop, Barber, et al.; Siqueland, Crits-Cristoph, Gallop, Gastfriend, et al.). Other evidence indicates that African-American clients are more likely to drop out of treatment than Caucasian clients (DeLeon et al., 1997; King & Canada, 2004; Milligan, Nich, & Carroll, 2004; Patkar, Thornton, et al., 2004), whereas other research suggests that Hispanic clients may be less likely to both enter (Weisner & Matzger, 2002) and remain (White et al., 1998) in treatment compared to Caucasian clients.

However, closer examination of the literature reveals that among minority clients, there are subtle variations in retention among different ethnic categories. For example, some research suggests that of all ethnic minorities, Native Americans remain in treatment for the shortest period of time (SAMHSA, 2007b; Wickizer et al., 1994). Moreover, consistent with the theme echoed throughout this review, ethnicity appears to

interact with several other factors to produce its impact on retention. For instance, some research suggests that gender interacts with ethnicity to influence retention (Mertens & Weisner, 2000). In particular, African-American men appear to be at greater risk of dropping out of treatment than Caucasian men and women, but African-American women may be at greatest risk of all (McCaul et al., 2001).

Thus, the evidence regarding the association between ethnicity and retention is somewhat unclear, though there is evidence that ethnicity interacts with other variables to impact retention. Moreover, there does appear to be a trend for minority clients to stay in treatment for a shorter length of time than Caucasian clients. This is particularly concerning in light of research which suggests that Hispanic and African-American men demonstrate higher rates of intimate partner violence and cirrhosis mortality than Caucasian men, despite similar prevalence rates of alcohol abuse and dependence across the three ethnic groups (Caetano, 2003). This suggests that those clients most in need of treatment may be the most likely to drop out.

Substance type and severity of use. The relationship between type of substance abused and eventual treatment outcomes is also inconsistent. Some research suggests that the type of substance abused has little bearing on treatment outcomes (e.g., McLellan et al., 1994; Patkar, Thornton, et al., 2004), whereas other research has found that certain substances of abuse appear to be associated with poorer substance use outcomes (e.g., Paraherakis et al., 2000). Correspondingly, research on the impact of type of substance of abuse on retention has produced inconsistent results, with some authors finding no association between drug type and retention (King & Canada, 2004; McCaul et al., 2001; Rawson et al., 2000), while others have found a correlation between specific substances

of abuse and length of time in treatment (SAMHSA, 2007b). However, even within these specific substances of abuse, there is inconsistency in the type of substance found to exert an impact, as well as the direction of the impact of each specific substance (i.e., did the substance exert a positive or negative impact on retention?) (DeLeon et al., 2000; Mammo & Weinbaum, 1993; Mertens & Weisner, 2000; Rowan-Szal et al., 2000; Simpson, Joe, Broome, et al., 1997; Vaughn et al., 2002; Veach et al., 2000; Weisner & Matzger, 2002).

Looking beyond initial substance types, some authors have examined the impact of the severity of substance use on outcomes. For example, Siqueland, Crits-Cristoph, Gallop, Gastfriend, et al. (2002) reported that clients who were chronic cocaine users were more likely to drop out of treatment at intake and randomization compared to binge users, as were clients who reported more frequent monthly use, which is consonant with other research which has suggested a link between higher levels of drug use and greater rates of treatment attrition (Chou et al., 1998; McKellar et al., 2006). Other authors have found that drug use in the month before treatment predicted attrition prior to program completion (Alterman et al., 1996; White et al., 1998). This finding is consistent with other literature which suggests that greater severity of drug and alcohol problems at intake (as assessed by the ASI) predicted greater post-treatment substance use (McLellan et al., 1994), as well as research which indicates that number of pre-treatment abstinent days predicted a higher number of post-treatment abstinent days (Dearing et al., 2005). Other measures of severity include route of administration, and several studies have found that clients who injected drugs were less likely to remain in treatment than those utilized other methods of administration (Maglione et al., 2000a, 2000b; Marrero et al.,

2005). However, in contrast to this, Rawson et al. (2000) found that each year of heavy drug use resulted in increasing length of time in treatment.

Interestingly, once clients were in treatment, Siqueland, Crits-Cristoph, Gallop, Barber, et al. (2002) did not find an association between drug severity measures and treatment retention. However, other research has reported that level of during-treatment drug use has an inverse relationship with retention, such that those with the highest level of drug use remained in treatment for the shortest period of time, whereas those with the lowest levels were most likely to complete treatment (Roffman et al., 1993). Moreover, other research has found that lower drug use during treatment was related to increased engagement and retention (Simpson et al., 1995; Simpson, Joe, & Rowan-Szal, 1997; Simpson & Joe, 2004), which suggests that early treatment variables, such as motivation, the therapeutic relationship, and engagement, may mitigate the severity of a client's substance use (i.e., their level of use), which in turn exerts a positive impact on retention.

Thus, the evidence appears to suggest that while the impact of substance type on retention is unclear, the relationship between severity of substance use and length of time in treatment is more consistent and robust. Much like the research on psychiatric diagnoses and symptomatology, it appears that the severity of the substance abuse symptoms, rather than the mere presence of a particular substance use disorder or use of a particular type of substance, is a more reliable predictor of retention.

Social variables. Some research suggests that clients who live with others are more likely to begin treatment (Jackson et al., 2006), and those with more close friends are more likely to complete treatment (Lang & Belenko, 2000). However, the mere presence of potentially supportive friends and family is not uniformly associated with

longer retention. For example, Rowan-Szal et al. (2000) found that being unmarried increased the odds of remaining in treatment at least 90 days, which is consistent with other literature which has found that living alone decreased the likelihood of dropping out (Mammo & Weinbaum, 1993). Further, other research suggests that living situation may interact with other demographic variables. For instance, Siqueland, Crits-Cristoph, Gallop, Barber, et al. (2002) reported that African-American clients who lived with a partner were more likely to drop out of treatment than if they lived alone.

The inconsistent nature of the above literature suggests that the presence or quantity of the potential sources of social support may not be as important to retention and positive outcomes as the quality of the social support clients receive. Research indicates that as clients progress through treatment, they report receiving more support from non-substance abusing friends and family members than from those who use substances (MacDonald et al., 2004), and not surprisingly, Satre et al. (2004) found that older adults who had no close family or friends who encouraged alcohol or drug use were more likely to be abstinent five years post-treatment. Consistent with this, Booth, Russell, Soucek, and Laughlin (1992) reported that for clients who had been admitted to an inpatient alcohol treatment unit, high levels of reassurance of worth from family and friends consistently predicted greater length of time to readmission to the unit, which is consonant with other research which has documented an inverse relationship between degree of positive social support and relapse to weekly cocaine and/or alcohol use during the year following short-term, substance use treatment (Broome, Simpson, & Joe, 2002).

Regarding retention, social support has been found to be statistically significantly related to treatment attrition, with lower levels of perceived social support predicting

shorter length of time in treatment (Dobkin, De Civita, Paraherakis, & Gill, 2002), and higher levels of social conformity related to decreased risk of treatment drop out (Hiller, Knight, Saum, & Simpson, 2006; Lang & Belenko, 2000). White et al. (1998) found that clients who reported greater concern with family problems were less likely to remain in treatment. In contrast, Westreich, Heitner, Cooper, Galanter, and Guedj (1997) reported that lower initial levels of perceived support from family were related to increased odds of treatment completion on an inpatient substance use treatment unit. However, this finding is complicated by the fact that many of the program completers were homeless, and previous research suggests that homeless clients are more likely to remain in substance use treatment programs that have a live-in component, such as residential treatment programs (e.g., Orwin et al., 1999). Moreover, many homeless individuals often begin to experience conflict and estrangement from their families at a young age (e.g., Heffron, Skipper, & Lambert, 1997; Herman, Susser, Struening, & Link, 1997; Koegel, Melamid, & Burnam, 1995; Mallet, Rosenthal, & Keys, 2005; Rosenthal, Mallet, & Meyers, 2006), and would thus be unlikely to report high levels of support from them. Thus, the seemingly anomalous finding between perceived level of social support from family and treatment completion may have been confounded by the unique makeup of the sample and the interaction between living situation and treatment modality.

Social support does appear to be related to treatment retention, though the evidence appears to suggest that it is the quality of the support, rather than the quantity of those providing it, that confers a greater benefit on retention. Further, other research does indicate that, as with other variables enumerated above, both the quantity and the quality

of social support may interact with other variables (e.g., treatment modality, ethnicity) to exert its influence on retention.

Legal history. The evidence appears to suggest that clients who are referred to treatment through the criminal justice system remain in treatment for as long, or longer, than clients referred through other systems (e.g., Maglione et al., 2000a, 2000b; SAMHSA, 2007b). Consistent with this, some research indicates that involvement in the criminal justice system (Hser et al., 2004) and legal concerns (Sayre et al., 2002) are associated with greater length of time in treatment. However, this is not a uniform finding, as Vaughn et al. (2002) reported that clients referred through the criminal justice system were less likely to begin and remain in a research study, and other research has reported that current legal involvement at the beginning of treatment was negatively related to retention (Kirby, Festinger, Lamb, & Platt, 1997). Claus and Kindleberger (2002) found that clients on probation status were over three times more likely to drop out of treatment than those who were not. Moreover, as with most of the variables already discussed, legal issues and concerns probably interact with other variables to produce their influence on retention. For example, Joe et al. (1999) reported that legal pressure was not statistically significantly related to treatment retention in LTR, was positively statistically significantly associated in ODF, and was negatively statistically significantly associated in MM, thus suggesting that legal issues may interact with modality (or some unique variable within each modality) to influence retention.

A history of being booked or arrested has been found to be associated with decreased odds of receiving mental health services among clients with substance use disorders (Green-Hennessey, 2002), and Lang and Belenko (2000) reported that the odds

of treatment attrition for clients in an alternative to prison residential drug treatment program increased 1.72 times each previous felony conviction. This suggests that while immediate legal pressure may cause some clients to initiate and sustain treatment, a history of legal issues may be indicative of more longstanding difficulties with treatment engagement and retention. Interestingly, Ryan et al. (1995) reported that while a combination of intrinsic and extrinsic motivation (legal pressure is often placed in this latter category) was most potently associated with treatment retention, external motivation was related to treatment outcome *only* when it was accompanied by internal motivation.

Thus, the literature suggests that immediate legal pressure/concerns are inconsistently related to retention, while more longstanding legal problems appear to be associated with a greater likelihood of treatment attrition. However, it also appears that legal pressure/concerns interact with other variables, such as treatment modality and internal motivation and its correlates, to exert its impact on retention.

Employment. Some research appears to suggest that greater need for employment counseling at intake is related to longer lengths of stay in substance abuse treatment (McCaul et al., 2001). Other research suggests that gender interacts with employment issues to exert an impact on retention. For example, men who received work-place pressure to attend substance abuse treatment were three times more likely to initiate treatment than those men who did not (Weisner et al., 2001), and men who received work-place pressure to attend treatment were also more likely to complete treatment (Mertens & Weisner, 2000). Consistent with this, several studies have found that provision of or referral to employment counseling during treatment was positively

associated with greater retention (Hser et al., 1999; Simpson, Joe, & Brown, 1997).

Mertens and Weisner (2000) reported that women who were employed were less likely to complete treatment, perhaps because they experienced less acute need for treatment and potential ancillary services, of which employment counseling may have been a component.

However, other research has found that a greater need for employment counseling was associated with an increased risk of treatment dropout (Lang & Belenko, 2000). The presence of an interaction between employment issues and gender has also been found to influence this negative association as well, as Green et al. (2002) reported that women with higher Addiction Severity Index (ASI) -rated employment problems at baseline were less likely to complete treatment than other women. This interaction was not present with male clients. Consistent with this, other research has found that being employed predicted greater rates of treatment completion (Veach et al., 2000). Further complicating this empirical question, some research has found no relationship between employment status (Marrero et al., 2005) or provision of employment services (Pringle et al., 2002) and treatment retention.

Much like many of the variables reviewed above, employment issues appear to have an inconsistent relationship with retention, with some research finding an association between employment problems and greater length of time in treatment, some finding the converse, and others finding no evidence of a relationship. More consistent is the positive relationship between provision of or referral to employment counseling and increased retention. However, even this finding has not been homogeneous. The evidence does suggest that employment issues are related to retention, but, at this point, the

direction and strength of this relationship has yet to be determined, as does the potential interaction employment issues may have with other variables to influence length of time in treatment.

Education. The literature indicates that education, much like many of the aforementioned variables, has an inconsistent relationship with treatment retention. Several studies have demonstrated a positive relationship between educational level and greater length of time in treatment. For example, Siqueland, Crits-Cristoph, Gallop, Barber, et al. (2002) reported that for every additional year of education, there was an 8.1% increase in the likelihood of treatment completion, which is consistent with other findings (e.g., Meier et al., 2006; Sayre et al., 2002; Wickizer et al., 1994). However, complicating this relationship, Green et al. (2002) reported evidence of an interaction effect of education with gender, whereby men who did not graduate from high school spent fewer hours in treatment than men who did. This interaction was not present among female clients.

Other research has reported contradictory results, finding that clients who are less well educated are more likely to initiate (Weisner & Matzger, 2002) and complete treatment (Mammo & Weinbaum, 1993; Rowan-Szal et al., 2000) than those clients with more education. Moreover, Green-Hennessy (2002) found that more educated clients with substance dependence were more likely to seek out mental health treatment without a substance use treatment component. Several studies have found no relationship between education level and treatment retention (King & Canada, 2004; Marrero et al., 2005; Rawson et al., 2000; Roffman et al., 1993).

Receipt of educational programming during treatment has also been found to be related to treatment retention. Simpson, Joe, and Brown (1997) reported that for LTR clients, participation in educational programming conferred a six-fold increase in the odds of remaining in treatment at least 90 days, and that attending school while in treatment was positively associated with treatment retention of 90 days or more. Further, Pringle et al. (2002) reported that receipt of educational services was related to greater involvement in NA or AA meetings. However, it is as yet unknown if and how receipt of educational programming during treatment interacts with educational level to influence length of stay in treatment.

Thus, the relationship between level of education and retention in treatment is presently unclear. The contradictory findings, coupled with the research which has found no association, suggests that this is an empirical question requiring further research. In particular, this literature reviewed above argues that this research should examine whether education level interacts with other demographic and during-treatment factors (e.g., educational services provided) to exert its impact on length of time in treatment.

Contingency management and other therapeutic elements. Oddly, although no specific therapeutic approach has been shown to be differentially more effective than any other with regards to symptom improvement, there are two therapeutic techniques which have been shown to increase retention. The first is cognitive mapping, which is a technique which visually represents thoughts, feelings, and behaviors and how they are interconnected through symbols and pictures on a diagram showing these relationships (Dansereau, Dees, Chatham, Boatler, & Simpson, 1993). Some research suggests that the use of cognitive mapping in the treatment of substance use disorders is associated with

increased length of time in treatment (Simpson & Joe, 2004; Simpson, Joe, Rowan-Szal, & Greener, 1997).

The second type of approach which has demonstrated some efficacy at increasing retention is contingency management. Contingency management, which is the provision of some type of voucher or reward for achieving a desired behavior (such as abstinence), has been shown to be one of the more effective therapies at promoting reductions in the substance use during treatment (e.g., Dutra et al., 2008; Prendergast, Podus, Finney, Greenwell, & Roll, 2006). However, several large reviews suggest that contingency management approaches may also be effective at increasing rates of retention in substance abuse treatment as well (e.g., Stitzer & Petry, 2006).

For example, in their meta-analysis of psychotherapeutic treatments for drug use disorders, Dutra et al. (2008) reported that among the various psychosocial treatments (e.g., cognitive-behavior therapy, relapse prevention) for drug use disorders, contingency management demonstrated the lowest dropout rates. Research by Weinstock and colleagues (2007) found that clients with greater psychiatric severity were more likely to drop out of treatment early. However, the addition of contingency management to treatment mitigated this effect, such that there were no differences in retention among client groups, regardless of degree of psychiatric severity. Further, other evidence suggests that contingency management may be most effective among those clients with the greatest degree of chronicity. Petry (2008) reported that contingency management treatment appeared to increase retention only among those multiple prior treatment attempts, but did not enhance retention rates among clients with zero or one prior treatment attempt(s).

This literature strongly suggests that contingency management is robustly related to greater treatment retention. Interestingly, some evidence indicates that contingency management may be particularly effective with greater degrees of problem acuity and chronicity, which may make it an attractive option for more exigent clients, such as those with co-occurring substance use disorders or who are homeless.

Predictors of Retention Among Homeless Clients

The research examining predictors of retention among homeless clients is quite sparse, relative to that conducted on non-homeless clients. The limited evidence examining this question will be reviewed below, and a summary of the predictive factors among both non-homeless and homeless clients will be offered. This will be followed by a predictive model depicting the variables which predict retention among both non-homeless and homeless clients who abuse substances, and will incorporate research conducted on both client populations. This model will include the interactional and sequential relationships among the variables.

Psychiatric symptoms. Among homeless clients who abuse substances, some research suggests that while rates of Cluster B personality disorders are similar to other non-homeless clients with substance abuse disorders, rates of Cluster A and Cluster C personality disorders may be disproportionally higher (Ball, Cobb-Richardson, et al., 2005). Justus et al. (2006) found that clients diagnosed with a personality disorder were less likely to complete treatment as those without such a diagnosis. Consistent with research among non-homeless clients, other research with homeless clients has found that other DSM psychiatric diagnoses did not appear to be related to retention (Nuttbrock et al., 1997). However, this finding may not hold for clients with more severe mental

illness, as Wenzel et al. (2001) reported that clients with schizophrenia were nearly three times less likely to access treatment as client without said diagnosis.

However, Justus et al. (2006) also reported that clients with a diagnosis of depression were more likely to complete treatment. This is consistent with other literature which has reported that depressive symptoms were positively correlated with treatment retention in a therapeutic community, such that for every one point increase on the Center for Epidemiological Studies – Depression Scale, there was a 4% decrease in the likelihood of early treatment (within the first two months of treatment) attrition (Nuttbrock et al., 1997). Symptoms of hostility and suicidal thoughts predicted dropout (Nuttbrock et al.).

As noted above, research with non-homeless clients generally suggests that a greater degree of psychiatric chronicity is predictive of a shorter length of time in treatment. This phenomenon was also noted by Justus et al. (2006), whose research suggested that homeless clients with a history of psychiatric treatment remained in treatment for a shorter length of time and were less likely to complete the program than those homeless clients without a history of psychiatric treatment.

Ethnicity. The relationship between ethnicity and retention among homeless, substance-abusing clients, like many of the variables enumerated throughout this review, appears to be inconclusive, although the preponderance of literature suggests that African-American clients remain in treatment longer than Caucasian clients. For example, Wright and Devine (1995) reported that African-American clients averaged 26 more days in treatment than Caucasian clients, which is consistent with other research (Grella, 1993). However, other research has found the converse relationship, reporting

that non-Hispanic, minority clients were more than twice as likely to fail to complete treatment (Wenzel et al., 1995; Wenzel et al., 2001).

Surprisingly, Wenzel et al. (2001) also reported that African-American clients were three times more likely to access treatment than clients of other ethnicities, which is consistent with other literature which suggests that African-American clients on a waiting list are more likely to accept entry into a substance abuse treatment program than Caucasian clients (Grella, 1993). Complicating this question are the potential interactions ethnicity may have with other variables, such as gender, to produce its impact on retention among homeless clients (Grella, 1993).

Gender. Examining the impact of gender on retention among homeless client with substance abuse problems is complicated by the fact that males comprise over three quarters (78%) of admissions to treatment (SAMHSA, 2006), as well as the fact that men comprise a considerably greater proportion of homeless persons (National Coalition for the Homeless, 2007b). Moreover, many programs are limited to one gender (e.g., Lam et al., 1995). Thus, it is often quite challenging to find a mixed gender sample with sufficient numbers of each gender to examine the differential impact of gender on retention rates among homeless clients. Some of the limited evidence that does exist suggests that women are less likely to enter and remain in treatment as compared to male clients (Grella, 1993). However, other research has found that female clients were actually more likely to complete treatment (Justus et al., 2006).

Social support. Some research suggests that homeless clients who live with a partner was associated with odds of accessing substance abuse treatment that were three times lower than those clients who did not (Wenzel et al., 2001), which is consistent with

research on non-homeless clients (e.g., Mammo & Weinbaum, 1993). Although the reasons for this phenomenon are unclear, one possibility was suggested by Baier et al. (1996), who reported that among homeless clients who left against medical advice, many left treatment at the urging of family members who wanted the clients to come live with them after they (the clients) received their entitlement checks. However, this finding appeared to be based on anecdotal report alone, and should be interpreted with caution until it has received empirical scrutiny.

Sosin and Bruni (2000) reported that those homeless clients who reported a greater degree of conflict with family and friends tended to reject substance abuse services. They interpreted these findings to mean that individuals with “conflictual personalities” may have been more likely to experience isolation and disaffiliation, which might have predisposed them to reject services. Partial support for this idea was provided by research with non-homeless clients, which reported that conflict with staff was one of the more oft-cited reasons for early treatment dropout (Ball, Carroll, et al., 2005).

Age. Limited research has examined the impact of age on retention rates among homeless, substance-abusing clients. In contrast to the majority of research conducted on non-homeless clients, Justus et al. (2006) reported that younger clients were more likely to complete treatment than older clients. However, Wenzel et al. (1995) found that younger clients were more likely to receive an irregular discharge (a discharge occurring prior to treatment completion) than older clients, and Grella (1993) reported that younger clients were more likely to decline treatment entry than older clients.

Substance type and severity of use. Among homeless clients, some research suggests that type of substance used has an impact on outcomes. For example, Wright

and Devine (1995) reported that homeless clients who listed alcohol as either their first or second substance problem remained in treatment 26 more days than clients who did not, whereas clients who listed crack-cocaine as their first or second substance problem remained in treatment 43 days fewer than those who did not. While this is consonant with some research with non-homeless clients (e.g., Rowan-Szal et al., 2000), other research with non-homeless clients has not found a consistent relationship between type of substance abused and length of time in treatment (e.g., King & Canada, 2004).

On the other hand, severity of substance abuse issues has been found to be a more consistent predictor of length of time in treatment among non-homeless clients, and there is some evidence that this relationship is present among homeless clients as well. For example, Wright and Devine (1995) found that severity of alcohol use problems was inversely correlated with length of time in treatment, which was also reported by Wenzel et al. (1995). This is consistent with other research which has found that severity of alcohol and drug use, number of binge drinking days, and recent alcohol and/or drug use prior to treatment were negatively correlated with amount of treatment received (Wenzel et al., 2001).

Wright and Devine (1995) also reported that clients with a previous history of alcohol and drug treatment remained in treatment 18 days fewer than those without such a history. This stands in contrast to other research which indicates that previous alcohol and drug treatment is positively correlated with treatment completion (Justus et al. 2006), as well as research which has demonstrated that previous recent AODA treatment was associated with increased likelihood of current receipt of substance abuse treatment services (Wenzel et al., 2001). Moreover, Sosin and Bruni (2000) report that more

previous experience with drug treatment programs was associated with a decreased likelihood of rejecting proffered treatment.

Motivation. Compared to the literature on non-homeless clients, far less research has been conducted on the impact motivation has on treatment retention (or other outcomes, for that matter) in homeless, substance-abusing clients. Indeed, a review of the extant research revealed only one study (Erickson, Stevens, McKnight, & Figueredo, 1995), which examined the influence of motivation on retention. Motivation was found to be positively correlated with treatment retention, as well as drug use outcomes at follow up. Interestingly, retention in treatment was not associated with improved drug or alcohol use outcomes or employment outcomes. Retention was linked to housing stability at follow up.

Treatment modality and treatment components. In general, several programmatic components and modal factors appeared to be associated with longer lengths of stay or greater rates of program completion for homeless clients. For example, programs that offered some type of housing or living facilities, such as a therapeutic community, residential treatment program, or a program that offered transitional housing as part of its service package, appeared to have some of the highest rates of retention (Orwin et al., 1999). In fact, some research indicates that homeless clients remain in residential treatment centers longer than their non-homeless counterparts (Klein et al., 2002; Tommasello et al., 1999), and have shorter length of stay in outpatient treatment relative to non-homeless clients (Klein et al., 2002).

The importance of housing is consistent with other literature that has demonstrated the positive impact of a programmatic housing component to reduce drug

and alcohol use among homeless clients (Cheng, Lin, Kaspro, & Rosenheck, 2007; Milby, Schumacher, Wallace, Freedman, & Vuchinich, 2005), as well as reduce their emergency department visits and hospitalizations (Martinez & Burt, 2006). In fact, contingency management research with homeless client often utilizes abstinent-contingent housing as the “reward”. This research indicates that homeless clients attend more treatment sessions (Milby et al., 1996; Schumacher, Usdan, Milby, Wallace, & McNamara, 2000), and remain in treatment longer (Milby et al., 2005) when they are provided with rent-free, abstinent-contingent housing as part of their substance abuse treatment programs. Clark and Rich (2003) reported that the addition of supportive housing to case management also increased program retention rates among homeless clients with mental illness, including substance use disorders.

Moreover, some research suggests that rates of retention are similar between residential and outpatient treatment among non-homeless clients in substance abuse treatment (e.g., Simpson, Joe, & Brown, 1997), which further reinforces the obvious exigency of a housing component to homeless clients (Padgett, Henwood, Abrams, & Davis, 2008). Interestingly, Orwin et al. (1999) found that residential treatment centers with relatively less intense programming (e.g., fewer program components and less supervision) had higher rates of retention than those residential programs with higher levels of program intensity, which is consistent with other research which has found that homeless clients tend to reject treatment more frequently when recruitment into treatment stresses recreational services (Sosin & Bruni, 2000). Thus, it seems that obtaining the more basic needs of food and shelter are more important to homeless clients than are intensive programs that provide a high degree of structure to their day. It also suggests

that it may be necessary to modify contingency management strategies to meet the unique needs of this population in order to produce the most effective outcomes (e.g., providing housing versus vouchers for other products as a reward for remaining in treatment, providing clean drug screens, etc.), though this question awaits empirical inquiry.

Methodological Limitations of Research on Predictors of Retention for Both Non-Homeless and Homeless Clients

The following section will examine and synthesize the methodological limitations of the research on predictors of retention among non-homeless and homeless clients with substance abuse problems. As will soon become apparent, there are several consistent themes that arise throughout the literature.

Inadequate statistical models. As noted above, one of the limitations in some of the studies examining the relationship of certain variables with retention was the lack of complex, multivariate regression procedures. Some studies utilized only bivariate designs, reporting on factors which appeared to be related to retention through simple between-sample differences or bivariate correlations (e.g., Braucht et al., 1995; Roffman et al., 1993). Given the fact that nearly every variable reviewed above appears to influence retention through multiple interactions with other variables, it is clear that multivariate statistical procedures must be employed which match the breadth and complexity of the phenomenon under study, which in this case would be the interactive nature of the variables reviewed above and their relationship with substance abuse treatment retention.

Inadequate predictor variables. Another common methodological limitation throughout the research is a failure to adequately and appropriately assess pretreatment predictor variables. For example, some studies did not include assessments of motivation

(e.g., Veach et al., 2000), psychiatric symptom severity (e.g., Jackson et al., 2006), or legal status (e.g., Rohsenow, Martin, Eaton, & Monti, 2007). Evidence indicates that each of these variables may be related to retention, thus suggesting that any study of the predictors of retention in substance abuse treatment that does not include these variables will fail to account for a significant portion of variance in retention rates. Moreover, given the interactions many of these variables have with one another, failure to include these variables will also likely result in imprecise, or even inaccurate, descriptions of the relationships between these pretreatment variables and eventual length of time in treatment.

For example, as Grella (1993) reported, although men appeared to remain in treatment for longer periods of time than women in one of the treatment arms of their study, closer inspection revealed that gender interacted with ethnicity to produce these outcomes, such that African-American male clients appeared to complete treatment at higher rates than other subgroups of clients. It is clear from this example that simply discussing completion rates in terms of gender differences would not only be incomplete, but rather misleading. Thus, any study of the predictors of retention should attempt, at a minimum, to include as many of the potential prognostic variables identified in the literature as possible. Much like the earlier discussion on appropriate statistical analyses, the complexity and scope of assessment instruments employed should (to the extent possible) mirror the complexity and scope of the phenomenon being investigated.

Failure to account for during-treatment processes. An increasing body of literature is accumulating that suggests that within-treatment variables may be just as important as pretreatment variables with regards to retention (e.g., Simpson, 2001; 2004).

For example, as discussed above, while motivation at the outset of treatment may be important to initial treatment engagement, some research suggests that its influence may diminish as treatment progresses and other within-treatment prognostic variables become ascendant (e.g., Simpson, 2001; 2004). Further, other variables, such as treatment satisfaction (e.g., Hser et al., 2004), the therapeutic relationship (e.g., Meier et al., 2005), and treatment engagement (e.g., Simpson, Joe, Rowan-Szal, et al., 1997), which have been found to be robustly and positively related to retention can only be assessed once treatment has started. Thus, failure to adequately and appropriately assess within-treatment variables considerably reduces the power of any predictive model of treatment retention. Moreover, from a practical and clinical standpoint, many of the client variables most amenable to change are the dynamic, within-treatment variables listed above. As such, the absence of within-treatment variables from the assessment process precludes any determination of the influence on retention of the very factors which are most likely to be impacted by treatment interventions.

Variation in construct definitions. Throughout the literature there is tremendous heterogeneity in the definitions of constructs examined and/or employed. For example, as noted above, the idea of retention is complex and multifaceted, and is operationalized, assessed, and measured differently depending on the program, treatment modality, and research team. In many studies, retention is considered a dependent variable, and these variations make an attempt to aggregate and draw conclusions about the results across studies extremely challenging. As Orwin et al. (1999) argues, it may be unreasonable to compare program completion rates between two treatment centers that employ different operationalizations of treatment completion, one of which has lenient policies regarding

relapse, while the other has a strict, no-tolerance policy and asks clients to leave the program if they relapse. One might reasonably expect higher rates of treatment completion in the former program, but one could not necessarily conclude that the former program provided more effective therapeutic services.

Moreover, there is wide variability among studies regarding the definition of independent predictors of retention. For example, there are multiple conceptualizations of motivation (Klag et al., 2004), and thus multiple assessment approaches are needed to capture these various conceptualizations (e.g., DeLeon et al., 1997; Weisner et al., 2001). Another example of this heterogeneity within independent variables is the operationalization and assessment of psychiatric symptoms. Some programs use specific measures of psychiatric symptomatology to determine severity of symptoms (e.g., Broome et al., 1999), whereas others rely primarily on client self-report of number of days experiencing psychological problems within the past 30 via the ASI (e.g., White et al., 1998). Even within specific syndromes, such as depression, there exists wide variability in assessments employed (e.g., Broome et al., 1999; Curran et al., 2002). This lack of uniform definition and assessment on both sides of the predictive models of retention make it difficult to draw any meaningful conclusions about either the predictors of retention or the degree or type of retention they predict.

Sample composition. There is considerable variation in the sample compositions of the studies conducted on both non-homeless and homeless clients with substance abuse problems. For example, some studies are comprised almost exclusively of men (e.g., Humphreys & Rosenheck, 1998; Sayre et al., 2002), or of men and women in roughly equal proportions (e.g., Hser et al., 2003). This has important treatment implications for,

as noted above, although retention rates among men and women appear to be roughly equivalent, the factors (and their attendant interactions) which seem to be associated with retention appear to differ between the genders (e.g., Hser et al., 2005). Moreover, as was apparent in the review on factors associated with retention among homeless clients, there may be considerable treatment components that are more important to homeless clients than to non-homeless clients, such as housing and residential treatment (e.g., Orwin et al., 1999; Padgett et al., 2008). Unfortunately, the preponderance of literature, including several large scale studies like DATOS (e.g., Hubbard et al., 1997), has excluded homeless clients from their samples, thus limiting the generalizability of their results to this population, as well as precluding comparisons of predictors and retention rates between homeless and non-homeless clients.

Sample attrition. An issue that pervades the substance abuse literature is the problem of high pre- and early-study attrition. As noted above, there are high rates of pre-study attrition in both non-homeless (e.g., Siqueland, Crits-Cristoph, Gallop, Gastfriend, et al., 2002) and homeless samples (e.g., Nuttbrock et al., 1997). This has several ramifications for conclusions drawn from this research. First and foremost is the problem of self-selection bias. Within the research examining which variables are associated with retention, self-selection bias has the potential to skew the sample compositions of clients who seek and enter treatment. For example, motivation is a consistent predictor of early treatment engagement (e.g., Simpson, Joe, Rowan-Szal, et al., 1997), and has also been linked to length of time in treatment (e.g., Joe et al., 1998). However, one might reasonably expect that clients who are most motivated for treatment are those who are most likely to attend their initial appointment at a substance abuse treatment facility. This

may actually serve to decrease the strength of the relationship between motivation and early engagement/eventual retention, as it decreases the variance in whichever instrument has been employed to assess motivation. Early attrition, given its possible impact on the composition of the sample, also has the potential to limit the external validity of the study. If, for example, women with low motivation decline to enter substance treatment at greater rates than men, then this reduces the ability to draw meaningful conclusions about the associations between client and treatment variables and their interaction with gender, as well as the impact of this interaction on retention. Indeed, in this scenario, the only generalizations one may be able to make with the data at hand are, for example, those in regards to women who demonstrate high motivation at the outset of treatment, which obviously excludes a substantial portion of those in need of substance abuse treatment services.

Summary of the Literature and Predictive Models of Retention

What follows is a summary of the literature reviewed above on both non-homeless and homeless clients. Subsequently, a predictive model of retention for homeless clients will be offered. This model will be based upon the literature reviewed above, and also draws upon the treatment process research of D. Dwayne Simpson and colleagues at Texas Christian University (Joe et al., 1999; Simpson et al., 2001; Simpson, 2004; Simpson & Joe, 2004; Simpson, Joe, & Rowan-Szal, 1997; Simpson, Joe, Rowan-Szal, et al., 1997). The model will necessarily be complex and multivariate, as any quick perusal of the literature will demonstrate that variables which have been found to be statistically significantly related to retention in bivariate analyses are no longer statistically significant in multivariate analyses (e.g., Alterman et al., 1996; Lang &

Belenko, 2000). Further, as was noted time and again in the literature reviewed above, it is unlikely that any of the aforesaid variables act in isolation to influence retention, and most probably interact with each other in a complex treatment calculus, which includes client, intervention, client-therapist, and treatment environment factors, directly and indirectly interacting with one another both prior to and during treatment, to impact each client's eventual length of time in treatment (e.g., Chou et al., 1998).

Pre-treatment variables. Taken together, it appears that at the outset of treatment, several variables appear to influence, either by themselves or in concert with other variables, a client's initial motivation for treatment. Among these pre-treatment variables are more distressing issues, such as psychiatric symptom severity, which may impress upon clients the acuity of their problems and be impetus for them to seek treatment to alleviate these symptoms. This postulation would be consistent with other literature, which indicates that the more severe a client's psychiatric symptoms and social distress, the more likely she or he is to seek medical (Frostholm et al., 2005; Koopman & Lamers, 2007; McLaughlin, Khandker, Kruzikas, & Tummala, 2006; Rowan, Davidson, Campbell, Dobrez, & MacLean, 2002) and psychological treatment (Bland, Newman, & Orn, 1997; Mojtabai, 2005; Rickwood & Braithwaite, 1994; Thompson, Hunt, & Issakidis, 2004). As noted above, one proposed possibility is that these symptoms and the distress they engender increase a client's intrinsic motivation for treatment (Klag et al., 2004), though, interestingly, some research has found the converse to be true (Field, Duncan, Washington, & Adinoff, 2007).

The relationship between pre-treatment substance use severity and retention is more confusing. For example, some research suggests that substance use severity is

associated with initial client motivation for treatment (e.g., Freyer et al., 2005; Rapp, Li, Siegal, & DeLiberty, 2003; Varney et al., 1995; Wild, Cunningham, & Ryan, 2006), as well as treatment-seeking behavior (Mojtabai, 2005; Tucker, 1995). However, as reviewed above, there is considerable evidence among both non-homeless and homeless clients that more severe substance use problems at the outset of treatment are related to higher levels of treatment attrition (e.g., Alterman et al., 1996; Wright & Devine, 1995).

Although there is some evidence that while substance use severity is associated with initial motivation for treatment, motivation itself may not mediate the relationship between substance use severity and treatment utilization (Carpenter, Miele, & Hasin, 2002). This is consistent with research noted above which suggests that initial motivation is related to initial treatment engagement, but that other during-treatment process variables (e.g., drug use, therapeutic alliance) have a greater bearing on eventual length of time in treatment, as well as treatment outcomes (e.g., Joe et al., 1998; Simpson & Joe, 2004; Simpson, Joe, Rowan-Szal, et al., 1997). This may help to explain why initial substance use severity is positively related to pre-treatment motivation and early engagement, but not eventual length of time in treatment.

Interestingly, while severity of psychiatric symptoms appear to predict greater early engagement and retention, a history of psychiatric treatment and a higher degree of psychiatric chronicity appear to be related to shorter lengths of time in treatment (e.g., Justus et al., 2006; Lang & Belenko, 2000). The reasons for these somewhat paradoxical findings are unclear, though they suggest that while acute distress may increase initial motivation and early engagement in treatment, a longer history of psychiatric issues may be indicative of more long-standing and pervasive psychological and social

maladjustment problems that would preclude or render more difficult engagement in treatment and the larger social systems in which treatment is embedded. Providing partial support for this hypothesis is the fact that although research has not found an association between most DSM diagnoses and retention, personality disorders, which, by definition, are long-standing and pervasive (American Psychiatric Association, 2000) appear to be the exception (e.g., Siqueland, Crits-Cristoph, Gallop, Barber, et al., 2002). On the other hand, there is some evidence that a history of previous substance abuse treatment does appear to confer some benefits on treatment retention, such that those clients who have received prior episodes of treatment seem to remain in treatment longer than those who have not (e.g., Justus et al., 2006). Thus, psychiatric and substance abuse chronicity, much like psychiatric and substance use severity, appear to differentially influence retention, with psychiatric chronicity exacerbating the likelihood of treatment attrition, and previous substance abuse treatment predicting greater lengths of time in treatment (as noted earlier, these relationships are reversed when considering the influence psychiatric symptom severity and substance use symptom severity on retention).

A large body of research indicates that motivation is one of the most consistent and robust predictors of treatment engagement and retention (e.g., DeLeon et al., 1997; Joe et al., 1998), though, as noted earlier, some research suggests that the impact of motivation on retention decreases the further the client progresses in treatment (Simpson, Joe, Rowan-Szal, et al., 1997). Motivation is one of the most complicated of the prognostic variables, with multiple conceptualizations (e.g., intrinsic versus extrinsic motivation) (Klag et al., 2004), multiple origins (e.g., mandated treatment versus problem severity) (Ryan et al., 1995), as well as multiple interactions with other variables (Klag et

al.). Moreover, it is a highly dynamic variable, and research suggests that it fluctuates over the course of treatment (e.g., Simoneau & Bergeron, 2003).

Several pre-treatment variables, such as education level, legal issues, and employment status, may be linked to retention through both direct and indirect channels. As is the case with many of the variables discussed above, each of these variables appears to be inconsistently related to retention, when considering their direct associations. For example, both greater (e.g., Sayre et al., 2002) and lesser (Rowan-Szal et al., 2000) amounts of education have been related to longer lengths of time in treatment. Similarly, employment status has been inconsistently related to length of time in treatment, with some research reporting that being employed at the outset of treatment is related to greater retention, whereas others have found the converse (e.g., Mertens & Weisner, 2000; Veach et al., 2000). Further complicating this question are the many potential interactions employment has with other variables, such as gender (e.g., Green et al., 2002). Although some authors have reported that probationary status is linked to higher rates of treatment attrition (Claus & Kindleberger, 2002), legal status appears to have a somewhat more consistent relationship with retention, such that the presence of legal problems at the beginning of treatment seem to be correlated with longer lengths of time in treatment (e.g., Maglione et al., 2000a; Hser et al., 2004).

However, as noted above, these three variables may also be related to retention through a more indirect pathway, through the mediating variable of motivation. For example, multiple authors have argued that legal pressure, such as mandated treatment, can provide a powerful incentive to initiate and remain in treatment, thus acting as a potential source of external motivation (e.g., Klag et al., 2004). Moreover, the

opportunities for educational and employment counseling afforded by some programs may serve as a motivating factor to remain in treatment for some clients who lack such skills or training. In support of this conjecture, some research does suggest that provision of these services does increase length of time in treatment for some clients (e.g., Pringle et al., 2002), particularly those clients who have expressed a need for such services (Hser et al., 1999). However, the relationship of these variables to motivation and retention should, of course, be considered in the context of the other variables which interact with them to influence length of time in treatment.

Other pre-treatment demographic variables, such as age, ethnicity, and gender, have been found to be related to treatment retention. Thus far, age appears to be the only variable that has demonstrated both a consistent relationship, as well as a consistent direction of that relationship, with the majority of the literature suggesting that older clients tend to stay in treatment for a longer period of time than younger clients (e.g., Rowan-Szal et al., 2000). The existence and direction of the relationships between ethnicity and gender on treatment retention has been somewhat less consistent than that of age. The available evidence does suggest that Caucasian clients may be more likely to remain in treatment than minority clients (Milligan et al., 2004). However, as noted above, there appear to be variations in retention rates among the different ethnic groups, and some evidence indicates that Native American clients may have the lowest rates of retention among the ethnic groups (Wickizer et al., 1994). The relationship between gender and retention has demonstrated even less consistency. However, what does appear to be a stronger trend is the finding that even when rates of retention are similar between

male and female clients, the moderating variables which interact with gender to influence retention appear to differ between men and women (Green et al., 2002).

Social support has a complicated relationship with treatment retention. Although measures of social support have been reported to be positively related to longer lengths of time in treatment (Dobkin et al., 2002), other research suggests that the mere presence of close friends or family members does not account for greater lengths of time in treatment (e.g., Mammo & Weinbaum, 1993). In fact, for reasons that are not entirely clear, presence of a significant other has sometimes been found to predict early attrition from treatment (e.g., Wenzel et al., 2001). This argues that the mere presence or size of a social support network may not be as important as the quality of the social support provided by those in the network in terms of increasing the likelihood of greater lengths of time in treatment (e.g., Dobkin et al., 2002).

Just as the provision of various services within treatment can impact length of time in treatment, so can treatment modality. The evidence generally appears to suggest that rates of retention are longer for MM treatment than for residential and outpatient treatment (e.g., Simpson, Joe, & Brown, 1997). This is not surprising given that the usual recommended length of treatment is much longer for MM. However, when considering the interaction of housing status with treatment, an interesting phenomenon arises. Homeless clients seem to remain in treatment for a longer period of time if they are receiving treatment that has residential component (e.g., Orwin et al., 1999), and are less likely to remain in outpatient or drop-in treatment (e.g., Klein et al., 2002).

During-treatment variables. Related to the discussion of treatment modality is the issue of treatment environment. Moos (2003) argued that treatment environment factors

are important components of effective programs. Accordingly, client-rated quality of interaction with staff appears to be positively related to treatment retention. Moreover, research also indicates that homeless clients are also less likely to remain in treatment with a residential component if that treatment is highly structured and intensive (e.g., Orwin et al., 1999). This argues once again for the importance of using increasingly complex multivariate models to examine the influence of any of these variables on eventual retention rates, as simply examining the impact of treatment setting on retention would be insufficient if one examined only the treatment setting, and failed to account for the wide structural variations within a specific type of setting.

Another within-treatment variable to consider is treatment satisfaction, which appears to be positively associated with greater length of time in treatment (e.g., Hser et al., 2004). Both early treatment engagement and the development of the therapeutic relationship early in treatment have been documented to be positively related to length of time in treatment (e.g., Simpson, 2001; Simpson, Joe, & Rowan-Szal, 1997). During treatment, drug use has also been found to be related to length of time in treatment. More precisely, lower levels of drug use during treatment appear to be inversely correlated with retention (e.g., Simpson, 2004; Simpson, Joe, & Rowan-Szal).

Predictive Variables Used in Present Study

Although many of the variables described above most likely interact with one another, not all of these hypothesized relationships are presented below, nor are all the variables reviewed above included in the model below. This is because several of the variables were not collected during the data collection phase of this study, and are thus not available for inclusion in the proposed model.

Although many of these interactions have yet to be elucidated among non-homeless clients, as noted earlier, research on predictors of retention among homeless clients is even more scarce compared to research conducted on non-homeless clients. Thus, one of the main purposes of the proposed study is to examine the interactions among the various combinations of the pre-treatment variables discussed above, as well as how these interactions influence retention of homeless clients in substance abuse treatment.

Of the variables reviewed above, motivation, psychiatric severity, social problem severity, legal problem severity, employment problem severity, alcohol and drug problem severity, race, and age have all been utilized as pre-treatment variables in the path models discussed above. The decision to include these variables in the study was determined in part by previous research suggesting that they might have an impact on retention, and in part because they were collected as part of a standardized intake battery administered to every client who entered the clinic in which this study was conducted.

In addition to these variables, number of psychiatric diagnoses, perceived consequences of substance use, and medical problem severity will also be employed as pre-treatment variables in the path models below. Although these latter variables were not generally discussed in the retention literature, it was theorized they might have an impact on motivation for treatment, and therefore indirectly related to retention through motivation. Further, these variables were also routinely collected as part of the standardized intake battery.

Engagement will be the sole process variable utilized in the path analyses in this study. Engagement was included because of previous research which indicated that it is

associated with retention, as well as the fact that attendance measures (e.g., whether a client attended a session or not, length of the session attended, type of session attended) were regularly collected on clients in treatment. Although there were many other potential process variables reviewed above which could be employed (e.g., the therapeutic alliance, during-treatment motivation, treatment satisfaction), these variables were not available in the data set for the current study.

CHAPTER III: METHODOLOGY

Overview

The purpose of this chapter is to describe the methodology of the current study. As the data for this study was already collected, it was retrospective in nature. This chapter provides a description of the sample utilized for this study and the treatment setting in which the data were collected. It then discusses the instrumentation used to collect the data for the study, as well as provides some basic psychometric information about these instruments. It concludes with a description of the data analysis plan, as well as the results of the study.

Program

The data was collected at the 7Cs Community Counseling Clinic in the Guest House of Milwaukee, an all-male homeless shelter located in downtown Milwaukee, Wisconsin. Marquette University's Department of Counselor Education and Counseling Psychology formed a partnership with the Guest House in the summer of 2005, under the leadership of Todd Campbell, Ph.D., chair of this dissertation committee. Under the terms of the partnership, Marquette University agreed to provide clinical outpatient substance abuse treatment services to the residents staying at the shelter who screened positive for substance abuse issues, in exchange for the clinical space in the Guest House where these services would be provided. This clinic was called the 7Cs Community Counseling Clinic (hereafter referred to as the 7Cs Clinic), and was in operation from August of 2005 until May of 2008.

In addition to substance abuse treatment services, the Guest House also offers case management services, long-term housing placement services, and residential

manager training services (among others). The Guest House has the capacity to provide shelter to approximately 80 residents per night, of whom approximately 65-70% have substance abuse problems, according to case manager estimates. The 7Cs Clinic, with a staff of three full-time counselors and six to eight practicum students, carried an average client caseload of approximately 45-55 clients at any given point in time.

The services provided by the 7Cs Clinic were primarily individual and group counseling. These services were based on the principles of Motivational Interviewing (Miller & Rollnick, 2002) and Relapse Prevention (Larimer, Palmer, & Marlatt, 1999). Counseling services were delivered in a standard, outpatient format of approximately one individual session and two group sessions per week. In September of 2007, Intensive Day Treatment outpatient programming was added to the clinical services offered by the 7Cs Clinic. In addition to clinical services, the 7Cs Clinic, in conjunction with case management, also worked with each client to create Individual Service Plans, which were treatment plans that addressed multiple domains of functioning for each client.

As stated above, the substance abuse services were provided by three full-time counselors and between six to eight practicum students. The full-time counselors included two masters level therapists and one substance abuse counselor, and the practicum students consisted of students enrolled in masters and doctoral training programs. Todd Campbell, Ph.D., Lynn Catlin, Ph.D., and Terry Young, Psy.D, supervised all counselors and practicum students.

Assessment Schedule at the 7Cs Clinic

Because the 7Cs Clinic was housed within the larger Guest House organization, the vast majority of clients who entered treatment did so through referrals from the case

management services provided at the Guest House. Upon entering the shelter, new residents would generally make contact with their assigned case managers within approximately 7-10 days. During their initial appointment with their case manager, shelter residents were assessed with a brief screening questionnaire based on the eMINI. If they were flagged for either substance use problem or co-occurring mental health and substance problems, the case manager would then refer them to an “orientation group,” during which they were introduced to the general structure and philosophy of the 7Cs Clinic. Following this initial group, the residents (or rather, clients) were then assigned to an individual counselor. However, because of continuous high client volume, several days would generally elapse between a client’s initial contact with the 7Cs Clinic, or his initial appointment with his primary counselor, and his intake assessment.

Intake assessments were administered by first year graduate students enrolled in the masters in counseling program in the Department of Counselor Education and Counseling Psychology at Marquette University, who were trained by doctoral-level students enrolled in the counseling psychology doctoral program at Marquette University. These doctoral students were responsible for training the masters level students to administer and score the aforementioned assessments, and they were also charged with creating and coordinating an intake schedule for all the masters students. As with the counselors and practicum students, Drs. Campbell, Catlin, and Young supervised all staff members involved in the intake process.

During this intake assessment, clients were given a comprehensive battery, which consisted of the ASI, InDUC, eMINI, and SOCRATES. In the fall of 2007, the SOCRATES was replaced by the URICA, which was deemed a better assessment of

client readiness to change. The instruments in this battery were selected to provide a comprehensive, biopsychosocial picture of the clients who entered treatment at the 7Cs Clinic, and helped to guide client conceptualization and treatment planning. Moreover, the information collected was utilized during assessment feedback sessions with the clients. These assessment feedback sessions were modeled on the principles of MI, and they served as initial rapport-building and intervention strategies. Upon entry to treatment at the 7Cs Clinic, clients signed an informed consent form, in which they acknowledged the risks and benefits associated with treatment and consented to the potential use of their intake data for research purposes at some later point in time. Thus, this battery was also selected for its potential research applications.

During their tenure at the Guest House, in addition to the substance abuse treatment provided by the 7Cs, clients could receive a range of case management services, including referrals for employment, housing, medical treatment, dental care, and eye care. They were also provided with educational opportunities, such as psychoeducational classes and resident manager training, a program offered by the Guest House that was designed to train the shelter residents how to become live-in managers of half-way houses and other residential programs. As noted above, the Guest House offered long-term housing placement services, though these services were limited to residents who were either physically or mentally disabled.

Length of time in treatment for 7Cs clients was determined by simply subtracting their first contact with a 7Cs clinician (either intake assessor or counselor) from their last date of treatment contact. Data was collected on all clients who entered the clinic between September of 2006 and May of 2008. All collected data was obtained from

client charts or completed assessments, and entered into an SPSS database designed specifically to track client retention.

Sample

The data set that was used for this study was collected at the 7Cs Clinic between September of 2006 and May of 2008. The data from approximately 260 clients was available for the analyses. Although over 300 clients entered the 7Cs Clinic during this time period, as discussed earlier, there was often a lag of several days between each client's initial appointment with his counselor or initial contact with the 7Cs Clinic and his intake assessment appointment, and some clients left treatment during this gap in services. Further, many clients began the intake battery, but did not complete it, thus leaving many clients with incomplete data. The impact of these factors on the final size of the sample is discussed below.

Instrumentation

Mini-International Neuropsychiatric Interview (MINI). The MINI is a brief diagnostic tool administered by an assessor, which renders diagnoses based on Axis I disorders in the DSM-IV TR. The only Axis II disorder assessed by the MINI is antisocial personality disorder. It is comprised of screening questions, which, if answered in the affirmative, lead the examiner to a specific diagnostic module. If the patient endorses the requisite criteria in a given module, he or she is accorded that module's diagnosis (Sheehan et al., 1998).

Research has demonstrated that both the English and Japanese versions of the MINI have high concordance with the psychiatric diagnoses of the SCID-P (Structured Clinical Interview for the DSM, Patient Version) (Otsubo et al., 2005; Sheehan et al.,

1998), as well as the Composite International Diagnostic Interview for the English version (Sheehan et al., 1998). However, other research has found less consistent results. For example, Jones et al. (2005), in a sample of patients with chronic epilepsy, reported that the MINI shared high concordance rates with the Structured Clinical Interview for DSM-IV Axis I Disorders – Research Version for diagnoses of major depression – current and manic episodes – past (Kappa coefficients of .86 and .79, respectively), but poorer agreement between the two for other mood disorders (.31 - .49). Moreover, although the developers of the MINI reported good concordance between MINI diagnoses and expert opinion (Sheehan et al., 1998), Otsubo et al. (2005) reported that concordance rates of the Japanese version of the MINI with clinical judgment were poor. A recent pilot study found the MINI to be more sensitive to the presence of Axis I disorders in a prison population than clinical judgment, producing diagnostic prevalence rates similar to those found in the Epidemiological Catchment Area survey in prison populations (Black, Arndt, Hale, & Rogerson, 2005). Jones et al. (2005) found evidence for the concurrent validity of the MINI, reporting that individuals diagnosed with major depression via the MINI also had statistically significantly greater levels of depressive symptomatology as assessed by the Beck Depression Inventory – II and the Center for Epidemiological Studies – Depression Scale.

Research on the reliability of the MINI is sparse. However, inter-rater agreement between diagnoses obtained in two separate administrations of the Japanese version of the MINI was reported to be excellent (lowest Kappa coefficient = .72) (Otsuba et al., 2005). Test-retest stability of diagnoses obtained from the Japanese version of the MINI was also reported to range from acceptable (Kappa coefficients = .45

- .49) to excellent (Kappa coefficients greater than .75). Only one Kappa value was reported to be less than .45 (dysthymia).

Thus, the MINI appears to be a useful diagnostic tool with acceptable psychometric properties. It is an ideal instrument to use in a longer battery of assessments, given its ability to quickly identify major Axis I disorders in a community-based, outpatient setting.

Addiction Severity Index – Fifth Edition (ASI). The ASI is a comprehensive, semi-structured biopsychosocial instrument administered by an assessor, which assesses for presence and severity of problems in seven life domains: 1) medical status, 2) employment and support, 3) drug use, 4) alcohol use, 5) legal status, 6) family/social status, and 7) psychiatric status. It is used to gather information on recent (past 30 days) and lifetime problems in all of the problem areas. It includes items that allow for the patient's appraisal of the severity of problems and need for treatment in each domain, as well as the appraisal of the assessor (McLellan et al., 1992).

Although widely used, the psychometric properties of the ASI appear to be somewhat inconsistent. Regarding reliability, for example, Zanis, McLellan, and Corse (1997), in a sample of clients with co-occurring severe and persistent mental illness and substance use disorders, reported that while the legal composite score demonstrated poor internal consistency (Cronbach's Alpha = .57), the remaining six composite scores yielded Alphas ranging from .67 to .85. This is consistent with other research which has found that the ASI's composite scores are generally, but not uniformly, internally consistent (Zanis, McLellan, Cnaan, & Randall, 1994). However, it should be noted that other research utilizing the seven-factor structure (corresponding to the seven domains)

has found more satisfactory internal reliability coefficients, ranging from .65 to .89 (Leonhard, Mulvey, Gastfriend, & Shwartz, 2000).

Factor analytic research with the ASI suggests that a five-factor model may provide a better fit to the data, rather than the traditional seven-factor model based on the seven domains assessed by the ASI (Currie, el-Guebaly, Coulson, Hodgins, & Mansley, 2004). However, Currie et al. (2004) reported that the more parsimonious five-factor model yielded internal consistency scores that were not superior to research utilizing the seven-factor model as well, ranging from .62 to .75. In a critical literature review of the available research conducted on the psychometric properties of the ASI, Makela (2004) reported that internal consistency coefficients of the composite scores on the ASI ranged from a high of .92 (alcohol) to a low of .46 (also alcohol).

Zanis et al. (1997) noted that the ASI demonstrated moderate to excellent inter-rater reliability (Spearman-Brown coefficients ranging from .71 to .95), and other research indicates that intensive interview training can further increase the inter-rater reliability of the ASI scores (Stoffelmayr, Mavis, & Kasim, 1994). Unfortunately, Zanis et al. reported that the ASI has yielded highly inconsistent test-retest stability over a 3-5 day period among Pearson coefficients ranging from excellent (.95), to extremely poor (.14), and correlations between Spearman-Brown coefficients ranging from excellent (.95) to poor (.25). Other research has found more stable reliability estimates over a 3-4 day period (Zanis et al., 1994). Makela (2004) noted that while the test-retest stability of the ASI composite scores ranged from “excellent” (.95) to “unsatisfactory” (less than .40).

Zanis et al. (1997) conducted limited research on the validity of the ASI, but they report that there was poor agreement between client self-report of drug use and actual urinalysis results, although their sample was too small to perform statistical analyses on these questions, which is consistent with other research conducted on the concordance of ASI self-reported drug use and urinalyses (Zanis et al., 1994). In contrast, in a psychometric study utilizing the Michigan Alcohol Screening Test, Beck Depression Inventory, Symptom Checklist 90, and Risk Assessment for AIDS Behavior, Zanis et al. (1994) reported that “ASI alcohol, drug, and psychiatric CSs (composite scores) and SRs (severity ratings) have good discriminant and concurrent validity among the other conceptually standard measures” (pp. 546). Research by Calsyn et al. (2004) provided further evidence of the concurrent validity of the ASI, demonstrating that the ASI’s medical and psychiatric composite scores were statistically significantly and robustly correlated (inversely so) with the physical and mental health scales and summary components of the Medical Outcomes Study Short Form 36-item health survey. These findings are consistent with other research that has found evidence of good predictive validity over a two year period for 5 out of the 6 ASI composite scores with specific, conceptually related criteria (e.g., alcohol intoxication, psychiatric hospitalizations, and criminal charges) (Bovasso, Alterman, Cacciola, & Cook, 2001).

Other research has demonstrated that the ASI alcohol and drug composite scores were able to identify DSM-IV diagnoses of drug and alcohol dependence with a sensitivity of 85% and a specificity of 80%, suggesting that the ASI is able to identify the presence of substance use disorders (Rikoon, Cacciola, Carise, Alterman, & McLellan, 2006). In a sample of homeless clients with substance use problems, Argeriou, McCarty,

Mulvey, and Daley (1994) reported that 5 of the 7 composite scores were sensitive to client change over time (with the legal and family composite scores being the exception), and were able to accurately differentiate those clients who had relapsed and those who were “presumed to be doing better” (p. 364). Although the criterion validity of the data produced by the ASI appear to be fairly consistent across studies, Makela (2004), in his review of the ASI literature, notes, “The correlations between the ASI summary measures and outside criterion variables are by no means uniformly high” (p. 403).

In sum, although the ASI’s psychometric properties are somewhat less consistent than other measures, it does appear to produce data that demonstrate adequate reliability and validity, particularly criterion validity, for the purposes of the current study. It also appears to be sensitive to change over time. Further, the broad nature of its seven domains make it a useful instrument to help clinicians begin to develop a comprehensive, biopsychosocial conceptualization of their clients.

Stage of Change Readiness and Treatment Eagerness Scale (SOCRATES). The SOCRATES is a 19-item rating scale delivered by an assessor designed to measure a patient’s readiness to change his or her alcohol and drug use based on his or her recognition of the problem, as well as whether or not he or she is taking steps to change. It yields scores on three dimensions: 1) taking steps to change, 2) recognition of problem, and 3) ambivalence about problem. The instrument is reported to have good psychometric properties, with internal consistency scores for each dimension: taking steps (.83 - .84), recognition (.85 - .93) and ambivalence (.60 - .71) (Miller & Tonigan, 1996; Mitchell, Francis, & Tafrate, 2005). Test-retest stability of the SOCRATES is excellent, with r coefficients of .83 for Ambivalence, .99 for Recognition, and .93 for

Taking Steps (Miller & Tonigan, 1996). Moreover, Miller and Tonigan (1996) reported that the three SOCRATES subscales appeared to be assessing different latent factors, as there was little correlational overlap between the three subscales, which has been corroborated by other research (Demmel, Beck, Richter, & Reker, 2004).

Factor analytic studies have generally provided support for the original three-factor structure of the SOCRATES (Miller & Tonigan, 1996). For example, principle components factor analysis revealed that 14 of the 19 items loaded with coefficients greater than .40 on at least one of the three hypothesized factors of the SOCRATES (six items loaded Recognition, five on Taking Steps, and three on Ambivalence), and these three factors accounted for 71% of the variance in scores (Mitchell et al., 2005). The factor structure of the SOCRATES was also replicated in a psychometric study of a German-language version of the SOCRATES (Demmel et al., 2004). However, factor analytic research with adolescents, despite providing evidence for the three-factor model, suggested that a two-factor model (Taking Steps and Recognition) might be more parsimonious (Maisto, Chung, Cornelius, & Martin, 2003). Alphas for each these two factors were excellent (Recognition = .88, Taking Steps = .93).

In general, the evidence suggests that the SOCRATES produces data with acceptable criterion validity, with patterns of correlations in hypothesized directions. For example, among adolescents, scores on the Taking Steps subscale were positively correlated with treatment participation, and scores on the Recognition subscale were correlated with substance use outcomes at 12 months (Maisto et al., 2003). Further, Miller and Tonigan (1996) reported that the Recognition subscale was correlated with substance use severity at intake. Regarding the predictive validity of the data yielded by

the SOCRATES, Demmel et al. (2004) reported that the Taking Steps and Recognition subscales of the SOCRATES predicted 9.4% of the variance in 3-month, post-treatment drinking outcomes, and Zhang et al. (2004) found that the Ambivalence subscale was positively correlated with greater alcohol use severity at 9 month post-treatment.

The University of Rhode Island Change Assessment (URICA). The University of Rhode Island Change Assessment (URICA) is a 32-item, self-report inventory, which assesses attitudes and behaviors that correspond to 4 of the 6 Stages of Change (Precontemplation, Contemplation, Action, and Maintenance) within the Transtheoretical Model (Pantalon & Swanson, 2003). These four stages each represent a subscale of the URICA. A Readiness score is derived from the URICA by summing the average subscale scores of Contemplation, Action, and Maintenance, and then subtracting the average Precontemplation score (Pantalon & Swanson, 2003).

Both exploratory and confirmatory factor analytic research has supported the proposed four-factor structure of the URICA (Pantalon & Swanson, 2003). However, cluster analytic research with adolescents suggests that the data produced by the URICA might be better represented by three clusters, which they labeled Precontemplation, Uninvolved, and Participation, and which appeared to correspond to the stages of Precontemplation, Contemplation, and Action (Greenstein, Franklin, & McGuffin, 1999).

The internal consistency generated by these four subscales ranged from Cronbach's alpha coefficients of .76 to .83 (Pantalon & Swanson, 2003). Other research has replicated these internal consistency estimates. For example, Shields and Hufford (2005) reported internal consistency scores ranging from .80 to .90 (Cronbach's alpha) across the four subscales for clients with co-occurring alcohol use disorders and

depression, while Greenstein, Franklin, and McGuffin (1999), in a study of adolescent clients in inpatient treatment, reported internal consistency estimates of the data produced by the four subscales that ranged from .77 to .82 (Cronbach's alpha). Carey, Purnine, Maisto, and Carey (1999), in their review of readiness to change instruments in the substance abuse field, conclude that while there appears to be evidence for internal reliability estimates of the URICA, the evidence for the temporal stability of the URICA scores are lacking.

The correlations among the various subscales on the URICA generally appear to follow hypothesized patterns, which are consistent with the Stages of Change, with Precontemplation correlating negatively with the other three subscales (e.g., Greenstein et al., 1999; Shields & Hufford, 2005). Research on the criterion validity of the URICA is inconsistent. Scores obtained on the URICA do appear to predict outcomes, though not always in the expected direction. For example, Callaghan et al. (2005) reported that assignment to the Precontemplation stage (and only the Precontemplation stage) predicted attrition from treatment in a culturally diverse sample adolescents in inpatient substance abuse treatment, and other research suggested that higher motivation for treatment, as assessed by the URICA, were associated with lower rates of drinking (e.g., Project MATCH Research Group, 1997; Pantalon, Nich, Frankforter, & Carroll, 2002). Conversely, other research has found that higher ratings of motivation, as assessed by the URICA, were statistically significantly negatively correlated with client engagement and retention (Pantalon & Swanson, 2003; McMurrin, Theodosi, & Sellen, 2006).

Inventory of Drug Use Consequences (InDUC). The Inventory of Drug Use Consequences (InDUC) is "a self report inventory of adverse consequences related to

drug use” (Tonigan & Miller, 2002, p. 165). It is comprised of 50 items and five subscales, which are designed to assess the impact of alcohol and/or drug use in the five domains of (a) Impulse Control, (b) Social Responsibility, (c) Physical, (d) Interpersonal, and (e) Intrapersonal. Psychometric research with the InDUC indicates that the data produced by the measure demonstrates good to excellent test-retest reliability over a two day period on 4 of the 5 subscales, with r coefficients ranging from .75 - .93 (Tonigan & Miller, 2002). The Intrapersonal subscale demonstrated poor test-retest stability, with an r coefficient of .34. In contrast, later research has reported good to excellent test-retest reliability estimates for all five subscales (.89 to .97) (Gillaspy & Campbell, 2006).

Confirmatory factor analysis indicated that a four-factor model best represented the latent constructs assessed by the InDUC (Tonigan & Miller, 2002). However, other research suggests that the five subscales on the InDUC have a high degree of interrelation with one another (Blanchard, Morgenstern, Morgan, Labouvie, & Bux, 2003; Gillaspy & Campbell, 2006), and a subsequent exploratory factor analysis suggested that not only were the items on the scale best represented by a single factor, which accounted for 45.4% of the overall variance, but the internal consistency of all the items on the instrument was extremely high (Cronbach’s alpha coefficient = .96) (Blanchard et al., 2003).

Blanchard et al. (2003) reported that, consistent with theorized relationships, a shortened version of the InDUC demonstrated evidence of criterion validity, yielding statistically significant, though low, correlations with frequency of substance use, alcohol and drug use severity, number of dependence symptoms met for primary disorder, and psychiatric severity, which is consistent with other research on the validity of the data

produced by the full InDUC (Gillaspy & Campbell, 2006). Moreover, the shortened version of the InDUC appeared to capture hypothesized changes in substance use consequences as a result of treatment (Blanchard et al., 2003), results that have subsequently been replicated by Gillaspay and Campbell (2006).

Data Analysis

Initial descriptive statistics of the demographics (e.g., average age, percent of clients married, etc.) of the sample are provided. A path analysis was conducted to analyze the relationships among the various intake variables and treatment engagement and retention. Path analysis is defined as “a statistical technique that makes use of multiple regression to test causal relationships between variables” (Foster, Barkus, & Yavorsky, 2006, p. 89). The advantages of path analysis over multiple regression are that path analysis allows for more than one dependent variable, and also enables one to simultaneously determine the relationships among independent variables (if they are hypothesized to be related) (Foster et al., 2006).

Within the path analysis model, independent variables are termed *exogenous variables*, while dependent variables are termed *endogenous variables*. Exogenous variables are those determined to be external to the model because their causal sources are believed to be external to the model, whereas endogenous variables are named thusly because at least some portion of their causal sources are postulated to lie within the model (Loehlin, 2004). Because path analysis allows for multiple endogenous variables, a given endogenous variable may function as both a dependent variable, as well as a mediator variable for other variables (or as an independent variable itself). For example, an exogenous variable may exert a direct effect on an endogenous variable, and through

that endogenous variable, an indirect effect on a second endogenous variable which is located *downstream* of the first endogenous variable. Moreover, the exogenous variable may also exert a direct effect on this second endogenous variable. Thus, path analysis allows one to model several direct and indirect relationships simultaneously.

Model 1 will treat age, race, employment problems, legal problems, family/social problems, psychiatric problems, number of psychiatric diagnoses, medical problems, drug use problems, and alcohol use problems as exogenous variables. Employment problems, psychiatric problems, medical problems, and drug and alcohol use problems will be assessed via the composite scores from the ASI. Age and race will be obtained from the demographic section of the ASI. Perceived consequences of substance use, ambivalence about one's substance use problem, recognition of one's substance use problem, and taking steps to change one's substance use problem will be endogenous variables in Model 1, as will engagement and length of time in treatment. Perceived consequences will be assessed via the InDUC. Ambivalence, recognition, and taking steps will all be assessed via the SOCRATES. See Model 1 in *Figure 1* on page 14.

Model 2 will treat age, race, employment problems, legal problems, family/social problems, psychiatric problems, number of psychiatric diagnoses, medical problems, drug use problems, alcohol use problems, and perceived consequences of substance use as exogenous variables. Ambivalence about one's substance use problem, Recognition of one's substance use problem, and Taking Steps to change one's substance use problem will be endogenous variables in Model 2, as will engagement and length of time in treatment. See Model 2 in *Figure 2* on page 15.

Each participant's age, race, employment problems, legal problems, family/social problems, psychiatric problems, medical problems, drug use problems, and alcohol use problems were assessed via the ASI's composite scores, an approach which has been widely used in the literature (e.g., Weisner et al., 2001). Perceived consequences of substance use was assessed via the InDUC, and motivation was assessed with both the SOCRATES and URICA. Engagement in treatment was assessed by dividing the total number of sessions each client attended by the total number of sessions he was scheduled to attend. Retention was determined by subtracting the date of a client's first clinic appointment from the date of his final appointment, thus reflecting his total number of days in treatment.

Should the path analytic models (Models 1 and 2) demonstrate poor fits with the data, then a more parsimonious, exploratory path analysis will be conducted. This path analytic model will only include those variables with statistically significant path coefficients. It will also utilize the modification indices to determine if there are other paths which might be drawn which might help to improve the model fit (Loehlin, 2004). All data was analyzed with the Statistical Package for the Social Sciences, version 17 (SPSS 17) and Analysis of Moment Structures 17 (AMOS 17).

CHAPTER IV: RESULTS

Final Sample Size

The original sample contained 263 participants. However, as noted above, the assessment protocol was modified during the data collection period, replacing the SOCRATES with the URICA. Unfortunately, only 50 URICAs were administered, which provided too few data to include in a separate path analysis. It was therefore decided to only include participants who had been administered the SOCRATES in the analyses. Moreover, many of the participants had incomplete assessment data, such that some of the participants were administered some of the intake assessments, but not others. Participants who had been administered the URICA and/or were missing other assessments were removed, which left a total of 152 participants.

Missing Data

There are several methods commonly employed to handle missing data, including: sample and group mean substitution, case mean substitution, hot-deck imputation, regression imputation, maximum likelihood and maximization expectation, and multiple imputation (Fox-Wasylyshyn & El-Masri, 2005). The first method, sample and group mean substitution, “tends to ascribe values that are more likely to be closer to the values of other cases,” thus reducing the variance of the replaced values and artificially lowering the correlations between values (Fox-Wsylyshyn & El-Masri, pp. 491). However, while mean substitution is theoretically the weakest of the procedures for handling missing data, others argue that the differential impact on outcomes between mean substitution and other imputation methods are so small as to be of little practical significance (B. Griffin, Personal Communication, 10/19/2009). Therefore, it was

decided to use mean substitution to replace missing values in the data set. Further, visual inspection of the missing data did not suggest any systematic pattern to the missing data points, as there were missing values across different participants for different items within different variables. It was thus determined that the data was likely missing at random (Fox-Wsylyshyn & El-Masri).

Approximately 1.3% (152/2) of the data were missing for client age, 2.0% (152/3) for client race, and less than 1% (152/1) were missing for the ASI employment composite score. Approximately 2.6% (152/4) of the data were missing for the alcohol, drug, and legal composite scores of the ASI, and nearly 10% (152/15) of the data from the family/social composite score of the ASI were missing. No data were missing from the ASI psychological composite score, the three subscale of the SOCRATES, the total score from the InDUC, the engagement variable, or the retention variable.

Data Normality

All the variables were subjected to the Shapiro-Wilk W test to determine if they were normally distributed (Norusis, 2005). The distribution of all the variables was statistically significantly different from normal. However, closer inspection of the skew of each variable with the models indicated that while most of the variables fell within the +/- 1 range, which is generally considered an acceptable deviation from non-normality (Norusis; Peat & Barton, 2005), a few fell outside that range, including the Taking Steps subscale of the SOCRATES and length of time in treatment. These variables were thus subjected to transformations depending on whether or not they were positively (logarithmic transformation) or negatively (square root transformation) skewed (Hair, Anderson, Tatham, & Black, 1998). Several of the variables proved amenable to

transformation (ASI Alcohol Composite Score and Length), while others did not (The Taking Steps subscale of the SOCRATES). The author also attempted to conduct several other types of transformations, including squaring, cubing, and inverse with those variables that did not respond to the standard transformations, though these were unsuccessful as well at normalizing the distribution of these obstinately non-normal variables. These variables were therefore analyzed as they were.

Demographics

As noted above, the Guest House is a shelter for homeless men, thus, all study participants were male. The average age of participants was 44.22 years ($SD = 10.0$). Over 70% of the sample identified their race as black, 22.4% (152/34) identified as white, and the remainder (6.6%, 152/10) identified as Native American, Asian-Pacific Islander, Hispanic-Mexican, Hispanic-Puerto-Rican, or Unknown. On average, participants completed approximately 11.96 years of education ($SD = 1.59$). One subject did not report the number of years of education he completed.

Approximately 38.2% (149/58) of the participants described their usual employment pattern over the past three years as “full-time,” with “unemployed” and “part time – regular hours) the next highest frequencies at 23.0% (149/35) and 19.7% (149/30), respectively. The remaining participants described their employment patterns at “part time – irregular hours,” “retired/disabled,” “student,” or “in a controlled environment,” while three participants did not answer the question. However, this question asks participants to “average” their employment pattern during the last three years, and thus may not accurately depict their current employment status. Indeed, 78.9% (152/120) of the participants reported that they had not been paid for working in the last

30 days, suggesting more immediate and acute employment problems than their longitudinal employment patterns would indicate. Over half of the sample reported that they had never been married (56.6%, 152/86), 30.9% (152/47) stated that they were divorced, and only 5.3% (152/8) were currently married. See Table 1 below for an overview of participant demographics at intake.

Table 1

Demographic and Retention Characteristics at Intake

Demographic/Retention Characteristics	Total Sample (N = 152)
Mean Days in Treatment (n = 152)	120.08 (SD = 124.00)
Median Days in Treatment (n = 152)	87.00
Average Number of Sessions Attended (n = 152)	29.38 (SD = 36.12)
Median Number of Sessions Attended (n = 152)	17.00
Average Number of No-Shows (n = 152)	8.29 (SD = 10.87)
Average Percentage of Sessions Attended (n = 152)	79.67 (SD = 15.61)
Age in Years (n = 152)	44.22 (SD = 10.00)
Race in Percentage Points (n = 152)	
White	22.4
African American	71.1
Native American	1.3
Hispanic (Mexican & Puerto Rican)	1.4
Asian/Pacific Islander	.7
Other	3.3

Years of Education (n = 151)	11.96 (<i>SD</i> = 1.59)
Marital Status in Percentage Points (n = 152)	
Married	5.3
Never Married	56.6
Divorced	30.9
Separated	4.6
Widowed	2.6
Employment Pattern (%) (Prior 3 three years) (n = 150)	
Full-time (35+ hours)	38.2
Part-time	19.7
Student	1.3
Retired/Disability	4.6
Unemployed	23.0
Other	3.3
Mean Number of Days Paid for Working in Last 30 Days	2.17 (<i>SD</i> = 5.24)
Percent of Clients Paid 0 Days For Working in Last 30 Days	78.9

Path Analysis

Path analysis using AMOS 17.0 was used to examine the hypothesized relationships among study constructs. Generalized Least Squares was chosen as the estimate. Model fit was evaluated using multiple indicators of fit: Model Chi-Square and Goodness of Fit Index (GFI). Model Chi-Square examines the discrepancy between the proposed model's covariance structure and the observed covariance matrix for the data. A statistically significant discrepancy between these two suggests that the proposed model is a poor fit to the data, while non-significant results suggest an adequate fit (Byrne, 2001). Although ChiSquare is sensitive to sample size and is almost always significant when sample sizes are larger than 200, it is considered an appropriate goodness-of-fit

index for sample sizes of 75-200 (Stage, Carter, & Nora, 2004). The χ^2 is a very conservative test of goodness-of-fit, given that it is quite sensitive to sample size; larger samples tend to inflate the χ^2 statistic, which often leads to Type II errors (rejecting a model as ill-fitting when in fact, the model is an adequate representation of the data) (Byrne, 2001). GFI is an index of the percent of observed covariance explained by the covariance implied by the proposed model. Convention suggests that GFI's of .90 or greater indicate acceptable model fit (Byrne), though others suggest that the GFI should be greater than .95 (Garson, 2009).

Both Model 1 (as represented in Figure 3) and Model 2 (as represented in Figure 4) demonstrated an extremely poor fit with the data, $\chi^2 = 121.884$, $df = 56$, $p = .000$, GFI = .899, and $\chi^2 = 63.363$, $df = 30$, $p = .000$, GFI = .948, respectively, suggesting the need for modification of both models. As discussed in Chapter Three, at this point the analysis transitioned from a confirmatory path analysis to an exploratory path analysis (Loehlin, 2004). Thus, the modification index of both models was examined to determine if there were other covariances or paths between variables which might strengthen each model's fit and were theoretically plausible. Further, in the interest of parsimony, the author decided to simplify each model by removing paths and/or variables with weak and insignificant correlations (Klem, 1995). Thus, only those variables with path weights of $p \leq .05$ were retained. Both of these steps (addition of new paths based on the modification indices and removal of statistically insignificant paths) were done in a systematic, sequential manner. Each time a path was added or removed, the entire model was analyzed again. There was never more than one path removed/added between each analysis of a given model.

The results suggested that Revised Model 1 represented an adequate fit with the data, $\chi^2 = 25.535$, $df = 31$, $p = .743$; GFI = .972. This model explained approximately 15% of the variance in length of time in treatment. Revised Model 2 explained approximately 15% of the variance in length of time in treatment as well. Although it also appeared to be an adequate fit with the data, it was a poorer fit than Revised Model 1, with $\chi^2 = 17.896$, $df = 17$, $p = .395$; GFI = .974.

One of the first steps to improving the fit of both models was to remove engagement as the penultimate step in the predictive chain to length of time in treatment. While engagement was strongly correlated with length in both models, it was poorly correlated with nearly all the other variables in the model, particularly the motivational variables. Thus, running the path through engagement appeared to obscure relevant relationships between other variables within the models and length of time in treatment, as well as contributed to the overall poor fit of both models. Moving engagement to a more peripheral position within the models enabled it to contribute statistically significant variance to length of time in treatment while simultaneously allowing other relationships with length to emerge.

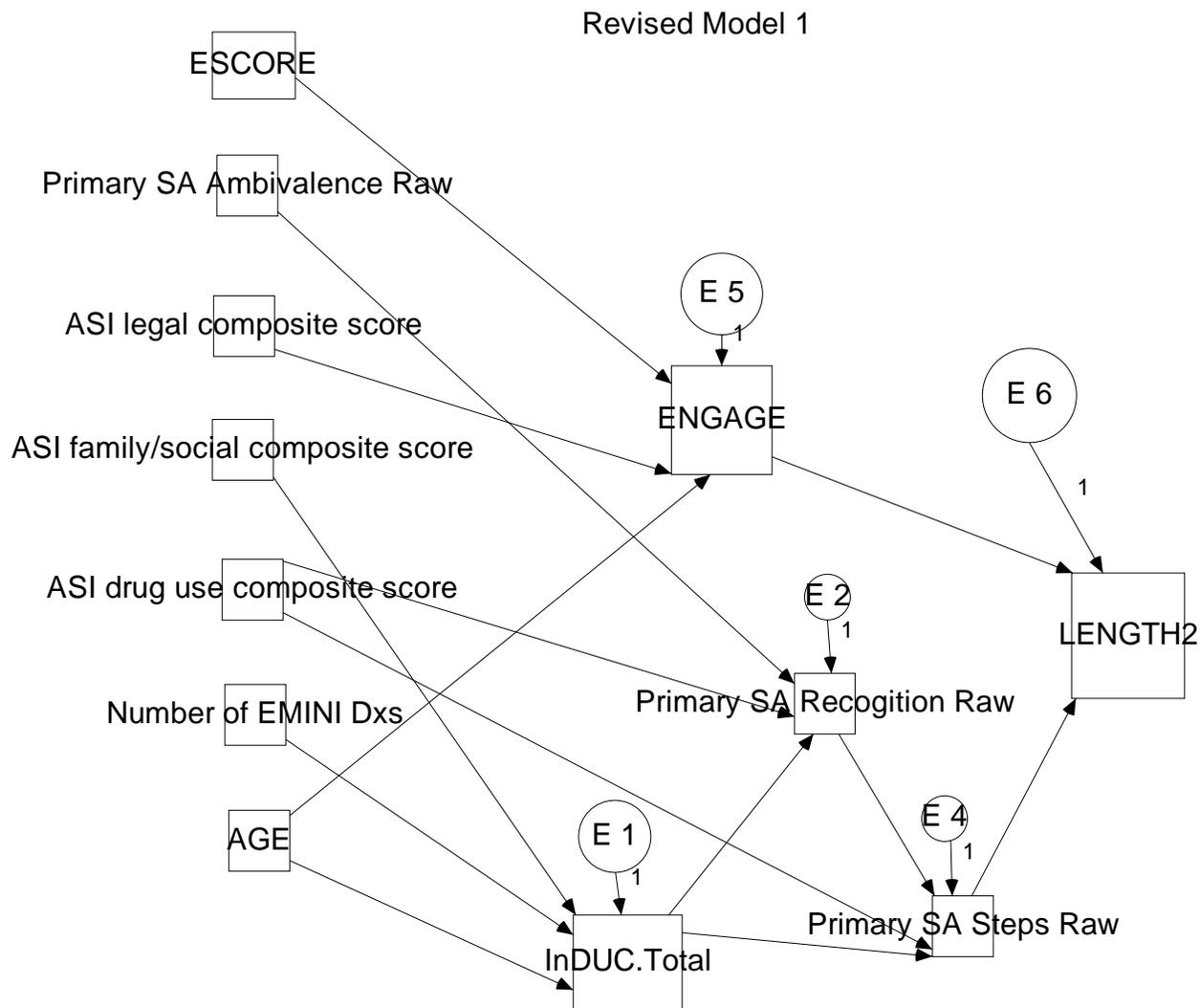
Second, the variable measuring a client's ambivalence about his perception of his substance abuse problem (the Ambivalence subscale of the SOCRATES) was weakly correlated with all exogenous variables, as well as with the endogenous variable which assessed perceived consequences of substance abuse (the InDUC). Moving the ambivalence variable into an exogenous position within both models increased the fit of each and allowed ambivalence to continue to contribute statistically significant variance to intermediate endogenous variables as well. The results of each model will now be

discussed separately.

Revised Model 1

See Figure 3 for the Revised Model 1. As noted above, Revised Model 1 represented an adequate fit with the data, $\chi^2 = 25.535$, $df = 31$, $p = .743$; GFI = .972, and explained approximately 15% of the variance in length of time in treatment. This discussion will now turn to the statistically significant total, direct, and indirect effects within the model. A direct effect is defined simply as the regression coefficient between two variables (Klem, 1995). An indirect effect is the sum total of the products from all the regression coefficients located in a path chain from one variable to another, including all the mediator variables located between one variable and another (Klem). A total effect represents the sum of the direct and indirect effects of a given variable (either exogenous or endogenous) on an endogenous variable (Klem). The statistically significant squared multiple correlations will then be discussed, followed by an overview of the relationships within the model.

Figure 3: Revised Model 1



Direct Effects. Age, number of EMINI diagnoses, and the family composite score from the ASI all had statistically significant direct effects on InDUC scores. The ASI drug use composite score, InDUC, and Ambivalence subscale of the SOCRATES all had direct effects on the Recognition subscale. The drug use composite score of the ASI and the Recognition subscale of the SOCRATES both had direct effects on the Taking Steps subscale. The ASI legal composite score and age both had direct effects on engagement. The Taking Steps subscale of the SOCRATES and engagement both had direct effects on

length of time in treatment. Please see Table 2 below for a full listing of these direct effects.

Indirect Effects. Age, number of EMINI diagnoses, and the family composite score of the ASI all had statistically significant indirect effects on the Recognition subscale of the SOCRATES. The Ambivalence subscale, number of EMINI diagnoses, age the family and drug use composite scores of the ASI, and the InDUC all had indirect effects on the Taking Steps subscale of the SOCRATES. The legal and family composite scores of the ASI, the Ambivalence and Recognition subscales of the SOCRATES, number of EMINI diagnoses, and the InDUC all had indirect effects on length of time in treatment. Please see Table 3 below for a full listing of these indirect effects.

Total Effects. Age, number of EMINI diagnoses, and the family composite score of the ASI all had statistically significant total effects on InDUC scores. The Ambivalence subscale of the SOCRATES, the drug and family composite scores from the ASI, age, number of EMINI diagnoses, and the InDUC all had total effects on the Recognition subscale of the SOCRATES. The Ambivalence and Recognition subscales, age, the family composite score, number of EMINI diagnoses, and the InDUC all had total effects on the Taking Steps subscale. The legal composite scores of the ASI, as well as age had total effects on engagement. The family and legal composite scores, all three subscales of the SOCRATES, number of EMINI diagnoses, the InDUC, and engagement all had total effects on length of time in treatment. Please see Table 4 below for a full listing of these total effects.

Length	-.054	.029*	.079**	-.004	-.034	.049**	.031**	.129**	.166**	NA	NA

* Indicates statistical significance at p = or < .05 level; ** Indicates statistical significance at p = or < .01 level
 NA represents indirect effects that were not calculated

Table 4.0: Total Effects for Revised Model 1

	Employment Score	Ambivalence	Legal Score	Drug Score	Age	EMINI	Family/Social Score	Consequences	Recognition	Taking Steps	Engagement
InDUC	NA	NA	NA	NA	.279**	.381**	.242**	NA	NA	NA	NA
Recognition	NA	.177*	NA	.310**	.153**	.209**	.133**	.548**	NA	NA	NA
Taking Steps	NA	.121**	NA	-.018	.147**	.201**	.127**	.527**	.681**	NA	NA
Engagement	.175*	NA	-.257**	NA	.226**	NA	NA	NA	NA	NA	NA
Length	-.054	.029*	.079**	-.004	-.034	.049**	.031**	.129**	.166**	.244**	-.308**

* Indicates statistical significance at p = or < .05 level; ** Indicates statistical significance at p = or < .01 level
 NA represents total effects that were not calculated

Squared Multiple Correlations. All squared multiple correlations in Revised Model 1 were statistically significant at $p \leq .001$. Approximately 33% of the variance in the InDUC was explained by the model. The model accounted for 50% and 53% of the variance in both the Recognition and Taking Steps subscales of the SOCRATES, respectively. The model explained approximately 13% of the variance in engagement and accounted for approximately 15% of the variance in length of time in treatment. See Table 5 below for a listing the squared multiple correlations.

Table 5

Squared Multiple Correlations for Endogenous Variables within Revised Model 1 (N = 152)

Variables	Estimate	Lower	Upper	P
InDUC	.327	.248	.469	.001
SOCRATES – Recognition	.495	.390	.630	.001
SOCRATES – Taking Steps	.532	.403	.667	.001
Engagement	.130	.060	.281	.001
Length of Time in Treatment	.154	.055	.335	.001

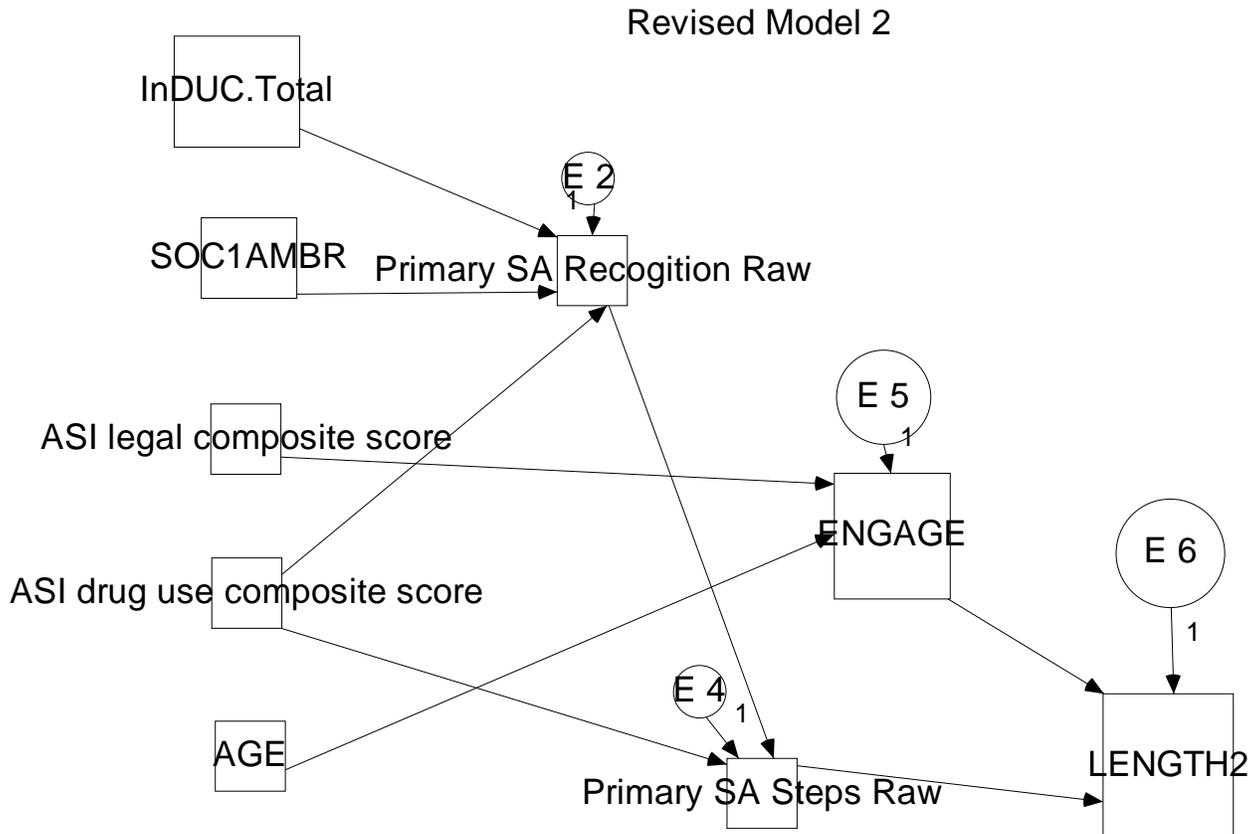
Revised Model 1 overview. Overall, the results indicated that clients who were older, had higher levels of family/social problems, and more psychiatric diagnoses, perceived that substance use had caused greater deleterious consequences in their life. Older clients with greater drug use severity, more psychiatric diagnoses, more perceived consequences of their substance use, and higher levels of ambivalence about their substance use, tended to report a greater degree of awareness of their substance use problems. Older clients with greater awareness of their substance use problems, more

psychiatric diagnoses, more family/social problems, and more perceived consequences of their substance use, reported more efforts to address these problems. Older clients with greater employment needs tended to have higher levels of engagement. However, as the severity of clients' legal problems increased, their levels of engagement decreased. Finally, clients who were more ambivalent about their substance use, had greater recognition of their substance use, and were or already had taken steps to address their perceived substance abuse problems, tended to remain in treatment longer. Clients who remained in treatment longer also tended to have more legal problems, more psychiatric diagnoses, more family/social problems, and more perceived consequences of their substance use. Clients who remained in treatment longer actually tended to have lower levels of engagement during treatment. Age and drug use severity at intake ultimately did not have an impact on length of time in treatment.

Revised Model 2

See Figure 4 below for the Revised Model 2. As noted above, Revised Model 2 represented an adequate fit with the data, $\chi^2 = 17.896$, $df = 17$, $p = .395$; GFI = .974, and explained approximately 15% of the variance in length of time in treatment. The statistically significant total, direct, and indirect effects within the model will now be addressed. As with Revised Model 1, the statistically significant squared multiple correlations will then be discussed, followed by an overview of the relationships within the model.

Figure 4: Revised Model 2



Direct Effects. The Ambivalence subscale of the SOCRATES, the InDUC, and the drug use composite score of the ASI had statistically significant direct effects on the Recognition subscale of the SOCRATES. The drug use composite score and the Recognition subscale both had direct effects on the Taking Steps subscale of the SOCRATES. The legal composite score of the ASI had a direct effect on engagement, and both the Taking Steps subscale and engagement had direct effects on length of time in treatment. Please see Table 6 below for a full listing of these direct effects.

Indirect Effects. The Ambivalence subscale of the SOCRATES, the drug use composite score of the ASI, and the InDUC all had statistically significant indirect effects on Taking Steps subscale. The Ambivalence and Recognition subscales, the legal

composite score of the ASI, age, and the InDUC all had significant indirect effects on length of time in treatment. Please see Table 7 below for a full listing of these indirect effects.

Total Effects. The Ambivalence subscale of the SOCRATES, the drug use composite score of the ASI, and the InDUC all had statistically significant total effects on the Recognition subscale. The Ambivalence and Recognition subscales and the InDUC all had total effects on the Taking Steps subscale of the SOCRATES. The legal composite score of the ASI had a significant total effect on engagement. The Ambivalence, Recognition, and Taking Steps subscales, the legal composite score of the ASI, age, the InDUC, and engagement all had significant total effects on length of time in treatment. Please see Table 8 below for a full listing of these total effects.

Table 6: Direct Effects for Revised Model 2

	Ambivalence	Legal Score	Drug Score	Age	Consequences	Recognition	Taking Steps	Engagement
Recognition	.185*	NA	.301**	NA	.566**	NA	NA	NA
Taking Steps	NA	NA	-.238**	NA	NA	.779**	NA	NA
Engagement	NA	-.236*	NA	.183	NA	NA	NA	NA
Length	NA	NA	NA	NA	NA	NA	.231*	-.317**

* Indicates statistical significance at p = or < .05 level; ** Indicates statistical significance at p = or < .01 level
NA represents direct effects that were not calculated

Table 7: Indirect Effects for Revised Model 2

	Ambivalence	Legal Score	Drug Score	Age	Consequences	Recognition	Taking Steps	Engagement
Recognition	NA	NA	NA	NA	NA	NA	NA	NA
Taking Steps	.144	NA	.235	NA	.440	NA	NA	NA
Engagement	NA	NA	NA	NA	NA	NA	NA	NA
Length	.033	.075	-.001	-.058	.102	.180	NA	NA

* Indicates statistical significance at p = or < .05 level; ** Indicates statistical significance at p = or < .01 level
NA represents indirect effects that were not calculated

Table 8: Total Effects for Revised Model 2

	Ambivalence	Legal Score	Drug Score	Age	Consequences	Recognition	Taking Steps	Engagement
Recognition	.185*	NA	.301**	NA	.566**	NA	NA	NA
Taking Steps	.144*	NA	.003	NA	.440**	.779**	NA	NA
Engagement	NA	-.236*	NA	.183	NA	NA	NA	NA
Length	.033*	.075*	-.001	-.058*	.102*	.180*	.231*	-.317**

* Indicates statistical significance at p = or < .05 level; ** Indicates statistical significance at p = or < .01 level.

NA represents total effects that were not calculated

Squared Multiple Correlations. All squared multiple correlations in Revised Model 2 were statistically significant at $p \leq .001$. The model accounted for 51% and 52% of the variance in both Recognition and Taking Steps subscales of the SOCRATES, respectively. Revised Model 2 explained approximately 9% of the variance in engagement and accounted for approximately 15% of the variance in length of time in treatment. See Table 9 below for a listing the squared multiple correlations.

Table 9

Squared Multiple Correlations for Endogenous Variables within Revised Model 2 (N = 152)

Variables	Estimate	Lower	Upper	P
SOCRATES – Recognition	.510	.403	.634	.001
SOCRATES – Taking Steps	.516	.385	.648	.001
Engagement	.090	.031	.205	.001
Length of Time in Treatment	.153	.053	.335	.001

Revised model 2 overview. Clients with greater drug use severity, more perceived consequences of their substance use, and higher levels of ambivalence about their substance use, also tended to report a greater degree of awareness of their substance use problems. Clients who reported more perceived consequences of their substance use, as well as greater levels of ambivalence about and awareness of the their substance use problems, reported that they were taking steps to address these problems. Older clients tended to have higher levels of engagement, although clients with greater legal problems tended to be less engaged. As with Revised Model 1, clients who reported more ambivalence about their substance use problems, recognition of their substance use

problem, and who tended to mobilize greater efforts to address their substance abuse problems, tended to remain in treatment longer. Clients who remained in treatment longer also tended to be younger, had more legal problems, and perceived more consequences of their substance use. Clients with greater levels of engagement tended to have shorter treatment durations.

CHAPTER V: DISCUSSION

Overview

Overall, the results of the path analyses suggested that both models represented adequate fits for the data. There are no specific criteria by which to determine which of two potential path models are “more correct” (Stage et al., 2004). However, Garson (2009) suggests that when selecting among alternative models, one should first seek the model with the best fit for the data, and then proceed from the least parsimonious to the most parsimonious. This presents a bit of a quandary when selecting the “best” of the two models under scrutiny in the present study. Although Revised Model 1 ($\chi^2 = 25.535$, $df = 31$, $p = .743$; GFI = .972) appeared to be a better fit for the data than Revised Model 2 ($\chi^2 = 17.896$, $df = 17$, $p = .395$; GFI = .974), Revised Model 2 is the more parsimonious of the two. Further, neither model had greater explanatory power over the other, as each accounted for approximately 15% of the variance in retention. However, Garson also notes that fit indices rule out poor-fitting models, but do not prove that one model best represents the data. With this in mind, both models appear to represent acceptable possible explanations or “fits” of the data. The implications of each model will now be discussed.

Revised Model 1: Direct Effects

Revised Model 1 tested the hypothesis that problem severity at intake would predict greater recognition of the consequences of substance use. Greater perceived consequences of substance use would predict greater motivation for treatment, which would in turn predict greater engagement in treatment and lead to greater length of time in treatment. Revised Model 1 provided partial support for these hypothesized paths. This

discussion will first address the statistically significant direct effects found among the variables in the model, and will then discuss the statistically significant total effects of these variables on length of time in treatment. Indirect effects will not be explicitly discussed as their variance is assumed when discussing total effects.

Perceived consequences of substance use. More family and social problems were significantly associated with greater perceived consequences of substance use. This makes conceptual sense insofar as the InDUC has several questions that ask about the interpersonal consequences of substance. Thus, one would expect that clients reporting more family/social problems would report more interpersonal consequences of their substance use. Recent research with a shortened version of the InDUC supports this conjecture, reporting statistically significant correlations between both a drug and alcohol version of the InDUC and the family/social composite score of the ASI (Alterman, Cacciola, Ivey, Habing, & Lynch, 2009).

Number of psychiatric diagnoses also predicted perceived consequences of substance use. This is not a surprising finding given that substance use disorders are more common among those persons with psychiatric disorders (SAMSHA, 2006b), as well as the fact that the presence of each type of disorder has the capacity to exacerbate the other (Riggs, Levin, Green, & Vocci, 2008). Therefore, greater psychiatric severity (as defined by more psychiatric diagnoses) would be expected to be related to greater substance use problems, which would in turn be expected to be related more perceived consequences of substance use.

The relationship of age to perceived consequences of substance use was unanticipated, but makes conceptual sense as well. Clients who are older have had the

opportunity to accumulate more years of substance use-related consequences than younger clients whose use history is relatively short in duration. Indeed, one study of older clients with opioid addictions reported that nearly 60% of them reported fair to poor physical health (Rosen, Smith, & Reynolds, 2008), and rates of cirrhosis due to alcohol consumption tend to increase as age increases (Mann, Smart, & Govani, 2004).

Motivational measures. Consistent with Miller and Rollnick's (2002) theory of motivation to change, greater ambivalence about one's substance use was related to increased recognition of the fact that one had a substance use problem. Further, as predicted, greater perceived consequences of substance use were related to increased recognition that one had a substance abuse problem in the first place. This is supported by research which indicates that clients who perceived more problems related to their substance use also expressed more motivation for treatment (Blume & Marlatt, 2000; Simpson, Joe, Rowan-Szal, & Greener, 1997).

Further, other research indicates that clients with more drinks per drinking day and more days of illicit drug and alcohol use tended to have higher scores on the InDUC (Gillaspy & Campbell, 2006), while other evidence suggests that clients with greater drinking severity scored higher on the Recognition and Taking Steps subscales of the SOCRATES (Ray, Hutchinson, & Bryan, 2006). Clients with higher drug use severity also had greater recognition that they had a substance use problem. These findings are consistent with other research on the SOCRATES that has found that greater severity of alcohol-related consequences, greater levels of drinking, and the presence of alcohol dependence were strongly associated with increased perception that one had a problem with alcohol (Bertholet, Cheng, Palfai, Samet, & Saitz, 2009; Bertholet, Dukes, et al.,

2009). This suggests that, consistent with the paths hypothesized in the study, greater severity of substance use problems are related to more perceived consequences of substance use, which in turn are related to greater recognition of one's substance abuse problem.

Greater perceived consequences of one's substance abuse problems and greater recognition that one had a substance abuse problem were associated with greater self-reported "taking action" to address the problem. Interestingly, the relationship between the perception of substance use consequences and Recognition was stronger than the relationship between perception of consequences and Taking Steps to address the problem. This is consistent with the findings of Bertholet, Dukes, et al. (2009), and suggests that as clients' perceptions of the severity and consequences of their substance use increases, so does their recognition, which in turn increases the actions they take to address the problem.

The inverse relationship between severity of drug use and taking steps to change the problem is a bit more complicated to explain and warrants additional attention. The most likely explanation is that clients with lower perceived severity of drug use problems were already engaged in action to address their problems. Indeed, the wording of some the questions from the Taking Steps subscale of the SOCRATES are suggestive of previous action, such as, "I was using drugs too much at one time, but I've managed to change that," or "I have already changed my drug use, and I am looking for ways to keep from slipping back into my old pattern." Clients who had already changed their drug use habits would be expected to strongly endorse these items, but might also be expected to have lower drug problem severity scores on the ASI (given that they had already

addressed them). Clients with more significant drug use problems at intake would not be expected to endorse these items, as they would still be in the midst of dealing with their addiction issues (i.e., their drug use was not “past tense” for them). Thus the inverse relationship between severity of drug problem and the Taking Steps subscale of the SOCRATES may reflect the verbiage of some of the items on the SOCRATES.

In support of this hypothesis, research by Maisto, Chung, Cornelius, and Martin (2003) reported remarkably similar results, finding that degree of alcohol consumption at baseline was inversely related to the Taking Steps subscale of the SOCRATES. They proposed that those clients with lower consumption at baseline had already effected changes in their alcohol consumption (i.e., had already “taken steps”, so to speak), thus explaining the negative correlation.

This dynamic also helps to explain why there was a positive association between drug problem severity and recognition in the current study, as well as between dependence severity/alcohol consumption levels and recognition in previous research (Bertholet, Cheng, et al., 2009; Bertholet, Dukes, et al., 2009). Many of the questions on the Recognition subscale of the SOCRATES point to a recognition of a substance use problem that has not yet been addressed (e.g., “I really want to make changes in my use of drugs,” or “If I don’t change my drug use soon, my problems are going to get worse”). One would expect that a client who has already taken steps to address his drug use problem to not only score lower on a measure of drug problem severity at intake, but to also negatively endorse items such as these because they imply that the problem has not yet been addressed. However, clients with current drug use problems at intake would be more likely to endorse these questions in the affirmative because they are indicative of

awareness of yet unaddressed problems (and may not be as applicable to clients who have already taken steps). Thus, consistent with study hypotheses, as severity of one's drug use problem increases, so does one's recognition of the problem and one's intent to change it.

The wording of some of the questions on the Taking Steps subscale also reflected a "present tense" approach to a client's substance use problems (e.g., "I have already started making some change in my use of drugs," or "I am working hard to change my drug use"). Clients who have substance use problems that they believe are in need of immediate attention (reflecting higher scores on the Recognition subscale) would also be expected to endorse these items of the Taking Steps subscale more strongly precisely because they *are* in treatment and beginning to address their substance abuse issues. Ultimately, it may be that the vacillating tense of the questions on both the Recognition and Taking Steps subscales of the SOCRATES helps to explain ostensibly odd pattern of relationships among the drug use composite score of the ASI and the Recognition and Taking Steps subscales.

Relationship between Taking Steps and retention. The Taking Steps subscale positively predicted greater length of time in treatment, which is consistent with prior research. For example, evidence indicates that the Taking Steps subscale is positively associated with increased likelihood of engaging in treatment (Magura, Rosenblum, Fong, Villano, & Richman, 2002), increased rates of treatment session attendance (Maisto et al., 2003), increased rates of treatment completion (Penn & Brooks, 2000), and decreased likelihood of treatment dropout (Ray, Hutchinson, & Bryan, 2006). However, it should be noted that other studies have reported no association between Taking Steps and retention (Brocato & Wagner, 2008) or treatment completion (Mitchell & Angelone,

2006). The results of the present study suggest that those clients who were engaged in behavior to change their substance use were more likely to remain in treatment longer.

The reasons for this association are not immediately clear. The most obvious possibility is that clients who are engaged in steps to change their use are more committed to their recovery process than patients who are at an earlier stage of change regarding their use. However, research with the SOCRATES and measures of self-efficacy suggest another potential explanation. Some evidence suggests that the Taking Steps subscale of the SOCRATES is associated with treatment self-efficacy (Demmel, Beck, Richter, & Reker, 2004; Sklar & Turner, 1999). A wealth of evidence suggests that self-efficacy is associated with lower substance use in addiction treatment (e.g., Adamson, Sellman, & Frampton, 2009; Maisto, Clifford, Stout, & Davis, 2008). Finally, reductions in substance use during treatment have consistently been associated with greater length of time in treatment (Simpson, Joe, Rowan-Szal, & Greener, 1997). Thus, one possible explanation for the impact of Taking Steps on retention is that clients who are engaged in behavioral changes regarding their substance use have more self-efficacy with regards to their ability to continue to make positive behavioral changes. This self-efficacy is related to lower within-treatment substance use (and possibly lower pre-treatment substance use, given the inverse relationship between drug use severity and taking steps articulated above), which would then be related to retention. Future research should include assessment of within-treatment drug use and self-efficacy to determine if this proposed model holds explanatory merit.

Age, employment, legal problems, engagement, and retention. Clients with greater severity of employment problems were more likely to attend a greater percentage of

possible sessions, while clients with more legal problems at intake attended fewer possible sessions. Given the inconsistent relationships between employment and legal problems and retention discussed above, these findings are not surprising. However, the inverse relationship between engagement and retention was unanticipated, making the relationships between legal and employment problems and engagement more confusing. In fact, the relationships between legal and employment problems may be best understood within the context of engagement's inverse relationship with retention.

One possible reason for this odd relationship lies in the particular service needs some clients had when entering the shelter. Many of the clients who came to the Guest House were extremely eager to obtain employment. Although there are no systematic data to corroborate this, anecdotally the writer encountered many clients who listed their greatest service need as gainful employment, even above obtaining permanent housing. Many appeared to view the Guest House as a temporary respite that would provide them just enough stability to get a job and begin making money again. Although these clients were flagged for substance abuse problems during their initial case management session, they appeared to believe that their lack of employment was more important than their substance abuse problems. As discussed in the results section, the vast majority of clients who came to the 7Cs had not worked at all during the past 30 days, suggesting that employment was an exigent concern for many of these clients. Indeed, the employment composite score was by far the highest of all the composite scores ($M = .88, SD = .18$), with the medical composite score coming in at a distant second ($M = .39, SD = .35$). These clients may have come to the 7Cs Clinic at the request of their case manager and then left treatment almost immediately after obtaining employment.

Further, some evidence suggests that money may be a trigger for clients in substance abuse treatment, particularly for men (Levy, 2008). It is also possible that men who were also seeking employment when they entered treatment began to earn some money, which precipitated a relapse and prompted their early departure from the shelter. Although clients were not asked to leave shelter when they relapsed, the Guest House did publically espouse a “no-tolerance” policy, and many clients who appeared to relapse simply never returned to shelter or treatment.

Many of the jobs clients obtained were temporary, low-wage, unskilled labor positions that offered little flexibility with regards to treatment. Thus, it was not uncommon for a client to stop attending treatment simply because his work schedule conflicted with his treatment schedule. Moreover, if, as hypothesized above, clients who came into the 7Cs believing that their employment problems were their chief concern, it would be reasonable to assume that when their employment and treatment schedules clashed, they would choose employment.

However, regardless of whether they were simply seeking a temporary stable living environment while attempting to gain employment, relapsed after obtaining money, or had scheduling conflicts, it is possible that these clients came to the clinic, attended the first three orientation sessions (discussed above), found a job, and then left very early on in treatment. In this scenario, clients who left early did not stay in treatment long enough to have the opportunity to miss therapy sessions. Although initially counter-intuitive, it may be that clients who remained in treatment longer had lower engagement scores simply because they had more opportunities to miss scheduled sessions. Thus,

clients with higher employment problems may have attended a greater percentage of their treatment sessions because they dropped out of treatment so early.

This hypothesis regarding percent of scheduled sessions attended and length of time in treatment may also help to explain the inverse relationship between legal problems at intake and engagement. Some research suggests that greater legal problems at intake are associated with longer treatment retention (Maglione et al., 2000a, 2000b; SAMHSA, 2007b) and reduced risk of dropout (Perron & Bright, 2008). Further, recall that the indirect relationship between two variables is the sum of products for all paths connecting them. Thus, the relationship between legal problems and retention in the current study is actually *positive* (i.e., the negative relationship between legal problems and engagement multiplied by the negative relationship between engagement and retention). This indicates that clients with legal problems were more apt to stay in treatment longer, and therefore had more opportunities to miss scheduled sessions. Thus, it may be that the negative relationship between legal issues and engagement resulted from the greater lengths of stay among clients who entered treatment with more legal problems.

The robust relationship between age and engagement initially made conceptual sense, given that older age has been a consistent predictor of retention (e.g., Jackson et al., 2006), and engagement has also been found to predict retention (e.g., Simpson & Joe, 2004). Thus, one might expect that older clients would not only attend a greater percentage of possible sessions as well, but would remain in treatment longer as a result – a hypothesis for which there is some evidence (Oslin, Pettinati, & Volpicelli, 2002).

However, as noted above, engagement was inversely related to retention, which makes the positive association between age and engagement rather confusing.

It is possible that age was a proxy for substance use chronicity and high relapse potential. Some research suggests that clients with multiple episodes of prior treatment tend to be older than clients who are on their first episode of treatment (SAMHSA, 2007a). Further, other evidence indicates that clients with multi-episodic treatment histories tend to have higher levels of substance use severity than those clients on their first episode (Neale, Robertson, & Bloor, 2007). Anecdotally, there was a subset of clients who had multiple stays at the Guest House and multiple episodes of treatment at the clinic. Their treatment stays were both frequent and brief in duration. Given the inverse relationship between engagement and retention, it may be that the positive relationship between age and engagement reflected this subset of clients who had chronic substance use problems and frequent but relatively shorter treatment episodes. Indirect support for this hypothesis is provided by research that indicates that clients with multiple episodes of prior treatment reported lower self-efficacy to resist drugs (Grella, Hser, Joshi, & Anglin, 1999) and poorer post-treatment outcomes compared to those clients in treatment for the first time (Hser, Grella, Hsieh, Anglin, & Brown, 1999).

Finally, although previous research has found a relationship between treatment attendance and retention (Hser et al., 2004; Villano, Rosenblum, Magura, & Fong, 2002), the current study revealed an unanticipated negative relationship between engagement and retention. As noted above, it is possible that defining engagement as the percentage of sessions attended divided by possible number of sessions a client could attend may have been misleading, as clients may not have remained in treatment long enough to

actually regress to a mean of average number of missed sessions. In fact, secondary analyses appeared to bear out this hypothesis. Clients who remained in treatment 14 days or less missed an average of .26 sessions ($SD = .45$), whereas clients who remained in treatment longer than 14 days missed an average of 9.72 sessions ($SD = 11.21$), a statistically significant difference ($t(150) = -4.04, p < .001$).

Previous research has utilized the number of sessions attended during clients' first 30 days in treatment to determine if early engagement influences long-term retention in treatment (e.g., Simpson, Joe, Rowan-Szal, & Greener, 1997). Unfortunately, this was not possible in the current study, as operationalizing the variable in this way requires that only those clients who remained in treatment 30 days or longer are included in the analyses. Limiting the current sample to only those clients who remained in treatment 30 days or longer reduced the sample size by nearly a third, from 152 to 109 clients, significantly reducing the power of the current sample to the extent that it may no longer have been appropriate to conduct path analyses (Garson, 2009).

Thus, several approaches were taken to create an engagement variable appropriate for this sample. Initially, a simple count of the number of treatment sessions attended during treatment was utilized. However, as one might expect, the longer clients remained in treatment, the more sessions they generally attended. The beta weight between this early version of an engagement variable and retention was so high in both models ($\beta = .89$), that it was clear they were measuring the same construct. The author then attempted to divide the number of sessions attended by length of time in treatment. Unfortunately, the relationship between this engagement variable and retention was quite high as well, with beta weights over .60. Further, it created a statistical confound because the ultimate

dependent variable (retention) was being used to calculate engagement, which also artificially increased the relationship between the two variables. It was finally decided to determine engagement by dividing the number of sessions attended by the number of sessions scheduled, as the author reasoned that this would prove an unbiased measure which would help to differentiate between those clients who were sporadically attending treatment (and therefore less “engaged”) and those whose attendance was much more consistent (and therefore more “engaged”). Unfortunately, the confound between percentage of sessions attended/missed and length of time in treatment was unanticipated. Ultimately, clients who missed more sessions appeared to do simply because they remained in treatment longer and had more opportunities to miss sessions. This had the net impact of artificially inflating the relationship between engagement and retention because as length of time in treatment increased, so did number of missed sessions (and therefore percentage of sessions attended decreased). Further, the artificially robust relationship between engagement and retention in the current study almost certainly inflated the amount of variance predicted in retention, which would most likely be considerably lower than the 15% predicted by both models.

Future research would benefit from examining the impact of alternative measures of engagement (e.g., total number of sessions attended, types of sessions attended, length of time to first individual session, etc.) on retention. Qualitative research may also help to elucidate the “function” of clients’ stays in shelter and the impact this may have on their intent to initiate and remain in treatment. For example, did some clients come to shelter with the intent of staying only a brief period of time while transitioning from one living quarters to another, while others were intent on seeking more intensive services and

planned to stay much longer? This type of inquiry might help to identify those clients who stay in treatment might be expected to be short, and this subset of clients could be controlled for in statistical analyses examining the impact of engagement on retention.

Revised Model 1: Total effects on Retention. Consistent with Miller and Rollnick's (2002) formulation, clients who reported greater feelings of ambivalence about their substance use also appeared to have greater recognition of their substance abuse issues, which in turn led them to engage in more behaviors to address their problems. Clients who reported taking more steps to address their substance abuse issues tended to remain in treatment for greater lengths of time. Clients with more family/social problems and with more psychiatric diagnoses tended to report more perceived consequences of the substance use. These clients also appeared to be more aware that they had a substance abuse problem, reported greater efforts to address these problems, and tended to remain in treatment longer as well. Clients who reported more legal problems at intake tended to attend a lower percentage of possible scheduled sessions, likely because they also tended to remain in treatment longer than who attended their first few appointments and then dropped out.

Severity of drug use problems at intake ultimately was unrelated to length of time in treatment, likely because its indirect effects on Recognition and Taking Steps cancelled each other. Employment problems, while significantly predictive of attendance of a higher percentage possible treatment sessions, also was not predictive of length of time in treatment. Finally, the indirect relationship of age to retention through engagement was negative, while its indirect relationship to retention through perceived

consequences of substance use and then through the motivational measures was positive, thus negating its total effect.

Revised Model 2

The main modification made to Model 2 was that the InDUC was no longer employed as a mediator variable, but rather was treated as an exogenous variable. This was done primarily because the InDUC's questions ask about lifetime consequences of substance use, while the measures of problem severity at intake are focused more directly on immediate acuity and need. Thus, the writer hypothesized that while the InDUC and the other measures of problem severity would be modestly correlated with one another, that clients with shorter substance abuse histories, even those with high problem acuity at intake, might not endorse as many items on the InDUC simply because they did not have enough time to accrue as many consequences as clients who had longer substance abuse histories. It was thought that the presence of the InDUC as a mediator variable between the problem severity variables and the motivational measures might obscure potentially relevant relationships among these variables. It was therefore moved into an exogenous position within the model. As with Revised Model 1, the discussion of Revised Model 2 will first address the statistically significant direct effects found among the variables in the model, and will then discuss the statistically significant total effects of these variables on length. Indirect effects will not be explicitly discussed as their variance is assumed when discussing total effects.

Revised Model 2: Direct Effects

As is immediately apparent, the vast majority of direct relationships that were present in Revised Model 1 were preserved in Revised Model 2. Thus, rather than

recapitulate all of these relationships, this discussion of Revised Model 2 will focus primarily on the major differences between the models.

Once the InDUC was moved into an exogenous position, clients' number of psychiatric diagnoses was no longer a significant predictor of retention within the model. It originally had a robust relationship with the InDUC ($\beta = .38, p < .001$), a relationship that disappeared once the InDUC was no longer a mediator variable. By itself, number of psychiatric diagnoses did not appear to be a predictor of treatment motivation or retention either. This likely reflects the fact that the SOCRATES was specifically designed to assess motivation to change substance use and not motivation for psychotherapy in general.

Research indicates that substance use severity and psychiatric symptoms have a positive reciprocal relationship with one another (Booth et al., 2010; Flynn, Walton, Curran, Blow, & Knutzen, 2004). However, within the confines of the current study, if psychiatric severity (as assessed by number of psychiatric diagnoses) was not mediated by a measure which assessed consequences of substance use (which included items related to the impact of substance use on psychological health), it was unlikely to be related to a motivational measure specific to substance use and substance use treatment. Indeed, future research should examine whether or not the SOCRATES has adequate criterion validity with clients with dual diagnoses, and future treatment providers might consider using measures that assess motivation for more general behavior change, such as the University of Rhode Island Change Assessment (Pantalon & Swanson, 2003) or the Client Motivation for Therapy Scale (Pelletier, Tuson, & Haddad, 1997).

The removal of the InDUC as an endogenous variable also negated the predictive utility of family/social problems with regards to motivation or retention as well. Much like the number of psychiatric diagnoses, the family/social composite score of the ASI was strongly associated with the InDUC ($\beta = .24, p < .001$) and through which it exerted the majority of its impact on retention (also like the number of EMINI diagnoses). This robust relationship was not surprising given that the InDUC has an entire subscale dedicated to assessing interpersonal consequences of substance use and recent research with a shortened form of the InDUC found correlations between the ASI family/social composite score and the InDUC of similar strength (Alterman et al., 2009).

Much like a number of EMINI psychiatric diagnoses, it may be that the substance use-specific language of the InDUC helped to mediate the relationship between family/social problems at intake and substance use-specific SOCRATES (and eventually, between family/social problems and retention). Thus, if a client did not believe his family/social problems were precipitated by his substance use, he would not be expected to express a high degree of motivation to enter substance abuse treatment to address these problems.

Employment problems at intake lost their ability to predict to engagement once the InDUC was moved to its exogenous position and allowed to freely covary with the other endogenous variables. The reasons for the reduction of this relationship are not entirely clear. One possibility is that the covariance function of path analysis operates much in the same way as a multiple regression analysis (R. Griffin, personal communication, April 12, 2010). Thus, the regression weights represent the amount of unique variance accounted for in the dependent variable by the change in the predictor

variable, while holding the shared variance among the predictor variable and the other independent variables constant (Heppner, Wampold, & Kivlighan, 2008). Thus, the InDUC may have “absorbed” common variance it shared with employment scores at intake, thereby reducing the strength of its relationship to engagement (which was only marginally significant in Revised Model 1 in the first place). Partial support for this hypothesis comes from the fact once the InDUC became an exogenous variable, the strength of the relationship between age and engagement was reduced as well, suggesting that the InDUC shared common variance with age. Further, the only covariate with which the employment scores variable was statistically significantly correlated in Revised Model 1 was age ($r = -.18, p = .034$). It therefore seems reasonable to assume that the InDUC might have shared common variance with the employment composite score of the ASI as well. Thus, the marginally significant relationship between employment problems at intake and engagement may have been reduced below the level of statistical significance because of the shared variance between the InDUC and employment scores.

The final difference between the two models was that the relationship between the InDUC and the Taking Steps subscale of the SOCRATES was no longer significant. This may have been because the InDUC, in its new position as an exogenous variable in Revised Model 2, shared common variance with age. As noted above, once the InDUC was moved into an exogenous position, the relationship of age to engagement was reduced slightly. It may be that a similar phenomenon occurred between the InDUC and the Taking Steps subscale (which was only marginally significant in Revised Model 1), once the common variance the InDUC shared with age was held constant.

Revised Model 2: Total effects on retention. The remainder of the relationships within Revised Model 2 were similar in both direction and magnitude to Revised Model 1. Thus, the discussion will now turn to an overview of the statistically significant total effects on retention.

With its positive indirect path through the InDUC removed, age emerged as a marginally statistically significant predictor of retention, such that older clients tended to attend a greater percentage of possible sessions, but also tended to drop out of treatment earlier. As noted above, this may be because age was a proxy for substance abuse history, such that older clients have more extensive substance abuse histories, a factor which has been found to correlate with poorer post-treatment outcomes (Hser, Grella, et al., 1999).

As with Revised Model 1, clients with greater ambivalence about their substance use and more perceived consequences of their substance use tended to be more cognizant that they had a substance use problem, which led them to engage in more behaviors to address their problem. Clients engaged in more behaviors to curtail their substance use also tended to remain in treatment longer. Also similar to Revised Model 1, clients with more legal problems at intake attended a lower percentage of possible sessions, but generally remained in treatment longer than those clients with fewer legal problems. Finally, clients' severity of drug problems was not predictive of retention because, as in Revised Model 1, the positive and negative indirect paths from drug use severity through Recognition and Taking Steps, respectively, annulled one another.

Summary of Models

In general, both models found that greater problem severity, greater ambivalence about substance use, and more perceived consequences of substance use were related to

increased substance use problem recognition. Increased substance use problem recognition was related to increased efforts to change the problem, which was related to increased retention. Retention was also predicted by attendance of a lower percentage of possible sessions, likely because clients who left treatment early had fewer opportunities to miss scheduled sessions.

The models had similar patterns of relationships, both in direction and strength. The main difference between them was that once the InDUC was moved into an exogenous variable position in Revised Model 2, several of the problem severity variables (the ASI family/social composite score and number of psychiatric diagnoses), which had statistically significant total effects on length of time in treatment in Revised Model 1, as partially mediated by the InDUC, lost their explanatory power and were removed from Revised Model 2. Thus, Revised Model 2, while still predicting 15% of the variance in retention, was slightly less descriptive of the client factors which predicted retention than Revised Model 1.

Interestingly, while problem severity indicators (e.g., family/social, number of psychiatric diagnoses) decreased in importance in Revised Model 2, perceived consequences of substance use remained a very robust predictor of motivation for treatment and eventual treatment retention. This suggests that mere level of problem severity at intake is not, by itself, sufficient to motivate clients to remain in treatment. It may be that unless clients perceive that their problems are *due* to their substance use, they are unlikely to be motivated to engage in treatment specifically designed to address their substance use (Blume & Marlatt, 2000).

Study Limitations and Recommendations for Future Treatment/Research

Study limitation: Sample limited to homeless men. This study had a number of limitations. Among the most significant of these was the fact that the sample on which the data was ultimately collected may not have been representative of the population of homeless substance abusers. The most obvious reason for this was because the sample was drawn from a clinic located in a homeless shelter exclusively for men. Thus, any inferences drawn from the study should be extended to homeless women who abuse substances with considerable caution, if at all.

First of all, there are several important distinctions between homeless men and women who abuse substances. For example, among homeless persons who present for substance abuse treatment, the overwhelming majority (over 75%) are male (SAMHSA, 2003). Other data suggest that homeless men are generally unaccompanied during their shelter stays, whereas homeless individuals who are accompanied by their family overwhelmingly tend to be women (Baier et al., 1996; HUD, 2007). Many women become homeless because they are fleeing domestic violence (National Coalition for the Homeless, 2007b), and often stay at domestic violence shelters, rather than homeless shelters (HUD, 2007). Homeless women tend to report greater reliance on families and friends for sustenance and money than men, and also turn to prostitution to generate income, while men more frequently report resorting to theft (Grella, 1993). Some data indicates that homeless women in substance abuse treatment have better substance abuse outcomes than men, but worse employment outcomes (Wright & Devine, 1995). Thus, homeless women may differ from homeless men in a number of important ways, which

likely results in different service needs in addition to substance abuse treatment needs, such as child care facilities and domestic violence counseling.

Provision of desired service needs has been linked to greater retention among non-homeless clients in substance abuse treatment (Hser et al., 1999), and it seems reasonable to assume that the ability (or lack thereof) of a treatment center to meet the service needs of homeless women would have an impact on their retention rates as well. Further, as noted above, there is evidence that some of the factors that predict retention among non-homeless substance abusing women may be different than those for men (e.g., Green et al., 2002). Although this question has not been adequately addressed in the literature with regard to homeless women who abuse substances, the fact that the evidence suggests that some of the factors which promote retention among non-homeless women with substance abuse problems may be different than those for men argues for caution when attempting to generalize the results of the current study to homeless women with substance use problems.

Recommendations for future treatment/research: Sample limited to homeless men.

There is a need for additional research to determine if there are differences in the factors that promote both treatment retention and positive outcomes among homeless men and homeless women. Homeless women often have a number of important demographic and social differences than homeless men (e.g., Grella, 1993), and may have different pathways into homeless as well (National Coalition for the Homeless, 2007b). Thus, homeless women may have some treatment needs that are different than homeless men, needs which, depending on whether or not they are met, may differentially influence their retention in treatment compared to homeless men. Future research should attempt to

examine the factors that predict retention separately for homeless men and women in order to determine if there are important distinctions between the two. This might have important treatment implications with regard to services provided to each gender. Further, if contingency management strategies are employed, it will be critical to understand if gender differences influence the salience of different types of rewards or vouchers.

Study limitation: Attrition prior to treatment entry or initial assessment. Even if one restricts the interpretation of the results to homeless men who abuse substances, the generalizability of this study is constrained by the fact that many of the clients who entered the Guest House who likely had substance abuse problems never made it to the 7Cs in the first place. This is likely because of the rather cumbersome process by which clients who had substance problems eventually presented for treatment at the 7Cs.

Clients who sought shelter at the Guest House first had to go through an initial screening process in which basic demographic information was collected for the purposes of registration and to determine if they met the definition of “homeless.” These intakes occurred in the evening during a client’s first night in the shelter. Once admitted to the shelter, the client needed to meet with his case manager in the shelter, who was responsible for coordinating the services he received during his shelter stay. It was at this point that the client was screened for the presence of substance abuse problems. However, it was often several days after entry to the shelter that this appointment with the case manager occurred. Once the presence of a substance use disorder was suspected, the case manager made a referral to the 7Cs’s orientation group, which occurred three days per week, on Monday, Wednesday, and Friday. Thus, clients often had to wait up to

another 2-3 days before beginning treatment. Ultimately, up to a week could elapse between the time they entered the shelter and when they presented for treatment at the 7Cs. This service lag is particularly concerning in light of research discussed above which suggests that there are considerable rates of attrition among homeless clients before they even begin treatment (Burnam et al., 1995; Liberty et al., 1998; Nuttbrock et al., 1997; Orwin et al., 1999). This suggests that there may have been many clients with substance abuse problems who may have left the shelter before they could even initiate treatment at the 7Cs.

Further, some clients referred to the 7Cs Clinic did not remain in treatment long enough to receive the battery of assessments from which the data was drawn. This occurred because, as noted above, clients who entered the 7Cs initially began treatment in an orientation group, which met for approximately three sessions and introduced them to the basic structure and philosophy of the treatment they would receive at the 7Cs. Following their third session, they were then scheduled for their intake assessment, at which time they received the battery of assessments from which the data used for this study was drawn. However, many of the clients dropped out of treatment during this initial orientation period before they could receive the initial assessment battery. Thus, the data from this study (and therefore, the results) represent only those homeless male clients with substance abuse problems who remained in treatment long enough (i.e., one to two weeks) to receive the intake battery.

Thus, the data from this study was drawn from a group of clients who not only had to remain in shelter for approximately one week, but then may have spent up to one week in treatment before they were assessed. Ironically, the result of this service lag is

that it may have inadvertently pre-selected for clients who were more likely to remain engaged in treatment, thus inflating retention rates in the study, given that some clients may have had to remain in shelter for approximately two weeks (or more) before any data could be collected on them. Further, it is ironic that this service lag prevents one from generalizing the results of this study to the very cohort about which substance abuse treatment providers might be most concerned – clients who struggle to access and engage in treatment, and who ultimately drop out early.

Recommendations for future treatment/research: Attrition prior to treatment entry or initial assessment. Future treatment efforts should focus on streamlining and expediting the intake and referral process so that clients in need of substance abuse services receive them with greater dispatch, thus minimizing early attrition. Accurate identification of the possible presence of substance use disorders may also help to expedite the referral process, possibly by allowing the Guest House to bypass the case manager during the referral process. Further, future research efforts should attempt to assess potentially relevant predictors of retention at intake so that those who leave treatment early can be compared to those who have longer treatment tenures (at least on some variables). This will hopefully enable treatment centers to better identify and intervene with clients who are at greater risk for early dropout at their first contact with treatment.

There are tools that might help with early attrition, such as the four-item CAGE (Ewing, 1984), the four-item CAGE-Adapted to include drugs (Brown & Rounds, 1995), or even the Two Item Conjoint Screen for Alcohol and Other Drug Problems (Brown, Leonard, Saunders, Papasouliotis, 1997), all of which have sound psychometric

properties. Should a client flag for possible substance abuse issues, they could be administered the Pretreatment Readiness Scale (Rapp, Carr, Lane, Redko, & Carlson, 2008), which is designed to assess the motivation for clients who have not yet begun substance abuse treatment.

Early awareness of substance abuse issues and motivation for treatment (or lack thereof) at shelter intake may enable the shelter and clinic to engage clients at risk for dropout and refer to them to treatment much sooner, which would hopefully reduce pre-treatment hemorrhaging. The need for rapid treatment engagement is supported by other research, which suggests that the shorter the delay between initial contact with a substance abuse treatment provider and first appointment, the more likely clients are to attend the first treatment session (Festinger, Lamb, Kountz, Kirby, & Marlowe, 1995).

Study limitation: Lack of process data. A third limitation to the current study is the lack of process data. This is of importance given that research indicates that pre-treatment variables only account for a portion of the variance of length of time in treatment, and adding process (such as engagement, treatment satisfaction, therapeutic alliance, drug use during treatment, therapeutic techniques used during treatment) to predictive models of retention renders them considerably more robust (e.g., Joe et al., 2001; Simpson & Joe, 2004). As Simpson, Joe, Rowan-Szal, and Greener (1997) write, “Treatment process components are relatively more important than patient demographic and background variables since their inclusion in the model made only marginal improvements” (pp. 571).

This was certainly evident in the current study, as a host of pre-treatment variables was only able to account for 15% of the variance in retention, regardless of the

model. Moreover, utilizing only pre-treatment variables, even if they are not static variables such as race or age, implicitly assumes that these variables themselves will not change over the course of treatment. This is, of course, clearly not the case. Research suggests that many of the variables assessed at pre-treatment during the current study are highly dynamic in nature. For example, research indicates that psychiatric symptoms (e.g., Stulz, Lutz, Leach, Lucock, & Barkham, 2007), motivation (e.g., Cahill et al., 2003), the therapeutic alliance (e.g., Bachelor & Salame, 2000; Botella et al., 2008), and drug use (e.g., Simpson, Joe, Rowan-Szal, & Greener, 1997) all change during the course of treatment.

However, only assessing these variables at intake presumes either that they are static or that the influence they exert on retention is static. Conceptually this makes little sense. One would assume that if, for example, psychiatric and drug use severity are related to initial motivation for treatment, then as psychiatric and drug use severity decreased, motivation for treatment would either decrease itself or would be fueled by other factors. Thus, one would also assume that the factors which predict early engagement and retention in treatment will not be the same factors which predict engagement and retention later on in treatment. In fact, as discussed above, research appears to bear this out, as process variables such as the therapeutic alliance, treatment satisfaction, early engagement, and drug use during treatment appear to have stronger relationships with retention than other pretreatment variables (e.g., Hser et al., 2004; Simpson, Joe, Rowan-Szal, & Greener, 1997).

Moreover, several of the variables discussed above can only occur during treatment, such as treatment satisfaction, therapeutic alliance, and therapeutic techniques.

Thus, one cannot assess these variables at pre-treatment and must assume that any impact they have on retention in treatment occurs during treatment. Ultimately, the lack of process variables in this study not only leads to a predictive model which accounts for less overall variance in retention, but fails to capture the dynamic nature of the therapeutic process over time, particularly in terms of the relative salience of different factors over time as they relate to retention.

Along these lines, several of the variables discussed in Chapter Two as being predictive of retention were not included in this study, such as the therapeutic relationship, treatment satisfaction, or during-treatment drug use, for example. This almost certainly reduced the predictive power and of the statistical model employed in this study. Further, the absence of certain variables may have resulted in a predictive model that was not as clinically comprehensive and accurate as it could have been. As noted above, it is very likely that there are multiple complex interactions among the predictive variables outlined in the Chapter Two, and it is through an examination of these interactions that a more detailed and precise predictive model of retention emerges.

Moreover, other than retention and engagement data, no other types of during-treatment process data were collected while clients were in treatment at the 7Cs. Thus, even with the variables that were assessed at the outset of treatment, there was no way to determine their change trajectories over the course of treatment, nor was it possible to determine the relative influence of the change in these variables on treatment retention (i.e., mediators of retention; Kazdin, 2007). Ultimately, not only were potentially important variables missing from the study, but the lack of during-treatment assessment

precluded any analysis of the meditational influence of the absent variables and the variables that *were* collected at pre-treatment on length of time in treatment.

Both the lack of process data and the absence of certain important variables from the study were the result of several factors. First and foremost is the fact that this study was retrospective in design, and was conducted with pre-existing data. Thus, while the literature review conducted by the writer identified a number of pre-treatment and process variables that might potentially be important in the prediction of retention, there was no way to retroactively incorporate these assessments into the existing database.

A second issue which arose during the assessment process was the fact that although there were several instruments which were to be administered every 30 days during treatment, such as the Outcomes Questionnaire 45.2 (Lambert et al., 1996), the follow-up version of the Addiction Severity Index (McLelland et al., 1992), and the SOCRATES (Miller & Tonigan, 1996), these instruments were not systematically or frequently administered. This occurred for several reasons: lack of time on the counselors' part, failure to monitor its implementation, and a lack of a systematic process by which counselors were reminded of the need to conduct follow-up assessments, among others.

Another process/outcome measure that was missing from the current study was an objective measure of substance use. As reviewed above, lower levels of during treatment drug use appeared to positively predict length of time in treatment (Simpson, Joe, Rowan-Szal, & Greener, 1997). Ironically, urine drug screens were administered during the timeframe in which data was collected by the 7Cs Clinic at the Guest House. Unfortunately, these urine drug screens, which were administered by Guest House case

managers, were collected on only a fraction of 7Cs clients (many never received a urine drug screen), and those that were dropped were not dropped every week. In fact, the case managers selected clients on which to perform drug screens, often based on whether or not they suspected the client was using. There was no randomization of which 7Cs clients were given urine drug screens, or when. Thus, these factors argued against using the few urine drug screens that were collected in the present analyses.

The result was that there were almost no during-treatment assessments of a number of process variables which might reasonably be expected to change over the course of treatment, and which might also reasonably be expected to differentially influence retention, depending on the respective degree of change in each. This likely reduced the predictive power of the models and precluded the opportunity to draw any inferences about the mediational relationship between during treatment process factors and retention.

Recommendations for future treatment/research: Lack of process data. Future treatment and research would benefit from more comprehensive intake and process batteries, as well as a treatment infrastructure, which facilitates and monitors the systematic, continued administration of these batteries throughout the course of treatment. Simpson (2004) writes:

The purpose of treatment and process and outcome research... is four-fold. First, it should promote the use of patient performance and monitoring indicators that serve as interim criteria related to treatment planning and effectiveness. Second, it should demonstrate the stages of patient change in treatment and how specific interventions can be used to address particular needs throughout the recovery process. Third, it should clarify the rationale for using individual-level and aggregated patient records of engagement and performance as indicators for feedback to counselors and patients, program performance monitoring, and management of services. Finally it should be a foundation and guide for studying

treatment gaps and improving organizational functioning and change (i.e., technology transfer, or moving science to services) (pp. 101).

The intake battery was administered to every client within their first week or two at the 7Cs. Clinic policy stipulated that this battery was to be repeated every 30 days in treatment. Unfortunately, due to several factors, this assessment battery was almost never administered after a client's initial intake. Further, this battery was also to be administered at the end of treatment, but rarely did clients leave treatment because of a scheduled discharge – the vast majority simply left without warning. This lack of during-treatment assessment is regrettable, because systematic, 30-day (or even more frequent) administration of the assessment battery at the clinic would help to address many of the aspects of process and outcome research Simpson enumerated above, from treatment planning, to the assessment of counselor and program effectiveness, to the identification of service gaps. Moreover, 30-day assessments also would allow for the last assessment to be carried forward for those clients who leave without a formal discharge session and treated as their end-of-treatment data. Simpson also points out that the data provided by systematic administration of an assessment battery can also provide information about clients' stages of change through treatment. It can therefore help to elucidate the relative importance of different client, therapist, treatment, and organizational factors throughout the course of treatment, factors that are expected to fluctuate in salience as therapy progresses.

It is also important to note that the “process” data portion of the assessment can be further enhanced by the addition of assessments that are unique to the treatment process (i.e., cannot occur outside the context of treatment), such as measures of the

therapeutic alliance and group cohesion, measures of satisfaction with treatment and program, and specific techniques employed during psychotherapy.

Thus, a well-designed battery can serve to provide intake, process, and outcome data, as long as it is faithfully implemented. Building these assessments into the counseling process is critical to their systematic administration. Often clients and counselors at the 7Cs viewed assessments as “something they had to get through” before they could get to the real work of counseling. Unfortunately, this engendered an attitude toward assessment among clients and clinicians that was at best, blasé, and at worst, rather vitriolic. This is unfortunate given that Simpson and colleagues research suggests that within treatment improvements in drug use can have positive repercussions on retention (e.g., Simpson & Joe, 2004). Moreover, there is some evidence that pre-treatment assessment of current substance use may result in considerable reductions in substance use by the first therapy session (Epstein et al., 2005). This indicates that assessment can be “therapeutic,” both in terms of treatment retention and substance use. The most obvious implication this research has for treatment is its ability to shift both client and clinician perceptions of the assessment process as something to be endured to something that has therapeutic potential. Future treatment should endeavor to modify the attitudes of staff and clients towards assessment so that it can be accepted as a viable and important component of treatment evaluation process, as well as a therapeutic tool. This increase in staff and client “buy-in” may help to improve the likelihood that 30-day assessments will be routinely implemented.

Study limitation: Lack of certain therapeutic elements during treatment. There is, as discussed in Chapter Two, evidence that certain therapeutic approaches and strategies

increase the likelihood of greater retention. There is preliminary support for cognitive mapping (Simpson & Joe, 2004; Simpson, Joe, Rowan-Szal, & Greener, 1997), as well as robust support for contingency management. Although the bulk of the work on contingency management has been conducted with non-homeless persons with substance use disorders, there is some evidence, particularly with abstinent-contingent housing, that contingency management strategies can be effective at increasing retention among homeless clients as well (e.g., Milby et al., 2005).

Unfortunately, neither of these approaches was employed at the 7Cs clinic. Although counselors were aware of the cognitive mapping strategy, time constraints and lack of systematic follow-through led to considerable difficulties with its clinic-wide implementation. This is lamentable, given that generally no one specific therapeutic strategy has greater demonstrable effectiveness relative to any other (Wampold, 2001). The discovery that one particular approach may be differentially more effective than others with regard to retention begs further research.

Lack of funding hampered the implementation of contingency management interventions at the 7Cs, particularly with regard to providing vouchers or monetary incentives. Interestingly, the Guest House does have a supported housing program. However, this program was only for Guest House residents who were disabled, and thus was not available to most of the 7Cs clients. Moreover, this housing was not “contingent” housing, and the few 7Cs clients who did receive supportive housing were not required to provide clean drug screens in order to keep it. Thus, this housing program could not be systematically employed by the 7Cs in a contingent manner to encourage abstinence or retention.

Recommendations for future treatment/research: Lack of certain therapeutic elements during treatment. Future treatment and research should focus on implementing contingency management (e.g., Dutra et al., 2008) and cognitive mapping strategies (Simpson & Joe, 2004) in the Guest House's clinic. Funding is a serious issue when considering whether or not to implement a contingency management approach. Future treatment efforts should attempt to seek grant assistance to help provide different types of vouchers to clients who remain in treatment past certain critical lengths, such as 90 days (Hubbard et al., 1997) and beyond. Further, the clinic should work closely with the HomeLinc program, the My Home supportive housing program, and the new Prairie Apartment transitional housing complex to offer housing that is contingent on treatment retention and abstinence. This will require significantly stronger linkages between the clinic and the housing program at the Guest House, including increased collaboration with regards to treatment planning and process and outcome evaluation for each client who is receiving both services.

With regard to the successful implementation of the cognitive mapping strategies, a systematic approach to training should be adopted. These manuals are available in the public domain from the Institute of Behavior Research's website at Texas Christian University (<http://www.ibr.tcu.edu/downloads.html>). Further, there are training manuals available on the website to help facilitators teach counselors how to use these valuable resources (Bartholomew, Dansereau, & Simpson, 2009). Finally, there are also guidelines available which provide comprehensive recommendations regarding how to monitor fidelity when attempting to implement a given psychotherapeutic approach (e.g., Bellg et al., 2004). These resources and guidelines should be utilized to not only facilitate training

and implementation of the cognitive mapping strategies, but to ensure quality and faithfulness of implementation as well.

Study limitation: Lack of outcome and follow-up assessment. Simpson (2004) writes, “retention represents a cumulative index for a mixture of patient, therapeutic, and environmental factors that contribute to treatment progress and effectiveness” (pp. 100). Thus, retention is really the penultimate goal of substance abuse treatment. Indeed, greater retention matters little if it is not associated with symptom and functional improvement during the course of treatment, at the end of treatment, and at post-treatment follow up. As noted above, greater retention is related to both better end-of-treatment outcomes (Hser et al., 2004), as well as better long-term, follow-up outcomes in substance abuse treatment (Moos & Moos, 2003).

However, no end-of-treatment or long-term follow-up assessments were conducted at the 7Cs on any measures, whether of substance use, psychiatric symptoms, or general functioning. Not only did this prevent any analysis of how these factors may have influenced length of time in treatment (discussed above), but it also precluded any analysis of how retention may have impacted these factors post-treatment and at follow-up. There was no way to determine if greater lengths of time in treatment were actually beneficial with regards to symptom and functional improvement for 7Cs clients while they were in treatment, or if they maintained any gains they made after they left treatment.

Recommendations for future treatment/research: Lack of outcome and follow-up assessment. As noted above, the Guest House does conduct urinalyses on a regular basis. However, they do not collect these urinalyses on every clinic member and do not collect

them on a regular basis on those clients who do provide urinalyses. Moreover, they keep the results in an entirely separate database, which is in a different software format than the clinic databases and is not linked to the clinic databases in any way. Moreover, when the writer worked at the Guest House, he did not even have permission to access this database of urinalysis results.

Implementing a systematic, random urinalysis procedure for all clinic clients during the duration of their treatment at the clinic would allow for statistical analysis of the reciprocal influence of drug use during treatment and retention rates. Creating stronger linkages between the clinic and Guest House case management staff (who were responsible for the urinalysis results) would greatly facilitate these efforts. The relationships and flow of data among the systems in the clinic should reflect their inter-relatedness.

Collecting follow-up data is considerably more challenging with homeless persons, many of whom do not have stable addresses or contact information once they leave the shelter. There is some evidence that provision of supported housing is associated with greater follow-up rates (e.g., Milby et al., 2005), though as noted above, this service was not offered to all Guest House clients. However, the principle of providing some type of voucher to encourage discharged clients to return for follow-up assessments may be useful here, given the literature on the positive impact of contingency management on retention.

Outreach strategies, which have demonstrated some evidence at increasing early engagement rates of homeless clients who might otherwise not present for treatment (Tommesello et al., 1999), could be modified and coupled with vouchers to encourage

discharged clients to return for follow-up. Another potential strategy to facilitate long-term follow-up is the dedication of an “aftercare specialist,” who is in charge of keeping in contact with clients once they are discharged from treatment. Murray and colleagues (1997), utilizing an aftercare specialist who “maintained telephone contact with former clients; tracked their progress; and offered support, supplies, home visits, and crisis intervention, when appropriate” (pp. 46), were able to obtain one-year follow-up assessment rates of nearly 80%.

All these strategies, separately or in conjunction with one another, have the potential to increase long-term follow-up rates. They also require funds set aside specifically to set up the infrastructure necessary for follow-up services (e.g., for the purchase of vouchers, to hire staff to conduct outreach and/or follow-up). However, the absence of these services precludes any analysis of the long-term impact of treatment retention on outcomes, or rather, whether or not treatment is truly a sound investment from a preventative standpoint.

Study limitation: Failure to account for broader therapeutic milieu. It would be a mistake to view retention in the 7Cs Clinic as a phenomenon occurring in isolation, uninfluenced by the larger social and organization context in which it is embedded. As discussed above, the 7Cs Clinic was housed in the Guest House of Milwaukee, a homeless shelter for men. The clinic provided but one of many services offered to men in the shelter, services which included transitional and long-term housing, employment referrals, referrals for medical care, psychiatric treatment, vocational training, and psychoeducational classes, as well as a variety of community activities. Men were not only provided sleeping quarters, but were also provided meals several times per week.

The residents became intimately acquainted with one another, shelter office staff, case managers, and substance abuse counselors.

There were several interpersonal and organization networks which 7Cs clients had to negotiate while they resided in the shelter, all of which influenced their length of stay in the Guest House, and thus in the 7Cs Clinic. It was not uncommon for a 7Cs client to become frustrated at shelter policies, become upset with his case manager, or become embroiled in an altercation with shelter office worker and decide to leave the Guest House. Although the policy of the 7Cs Clinic was that clients who left the Guest House could remain in treatment at the clinic, it was extremely uncommon for a client to continue to engage in treatment once he left the shelter (or, if he had violated shelter rules, was asked to leave). Often, when a client left the shelter, he left treatment as well.

Thus, a client's retention in the 7Cs clinic was often influenced by his relationships with the staff, as well as the larger organizational milieu of which the clinic was a part. However, the present study did not attempt to assess any of the shelter "milieu" or interpersonal factors which might have helped to influence a client's retention in the clinic.

This is potentially crucial data, given that some evidence suggests that a positive helping alliance with a case manager is predictive of reduced symptom impairment and better overall outcomes (Neale & Rosenheck, 1995), as well as fewer days homelessness at 12 months post-treatment (Chinman, Rosenheck, & Lam, 2000). Calsyn and colleagues (2002) found that clients who had stronger helping alliances with their case managers also tended to be more satisfied with the treatment they received, which is itself significant given the relationship of client satisfaction to retention (e.g., Hser et al.,

2004). Further, as discussed in the literature review, there is evidence that when clients perceive that staff are supportive, they are more likely to remain in treatment longer (McKellar et al., 2006). This evidence suggests that relationships with shelter staff may exert an influence on client outcomes, including retention rates.

The present study also did not incorporate data on the services clinic clients received from their case managers. These data may also have important implications for retention, given that some research suggests that services that are properly tailored to each client's needs may increase their length of stay in treatment (Hser et al., 1999). It is reasonable to assume that 7Cs clients who received the services of which they were most in need from their case managers were more likely to stay in the shelter, and thus in the 7Cs clinic, than those who did not.

Moreover, although not technically a therapeutic community, the shelter does function in some ways very similar to one. Men dine and sleep together, attend treatment together, and often spend considerable time together, even when outside the shelter. The Guest House staff work to foster a sense of community and mission within the shelter. This is the social backdrop to the services the clinic provides, and it is likely that this social context had an influence on retention rates in the clinic and the shelter. Indeed, some research with therapeutic communities for substance abuse suggests that a more positive response within the first week of treatment to the social processes of the community (e.g., greater perceived levels of social support within the community, greater perceived responsibility to the community) predicted higher rates of early retention in the community (Mandel, Edelen, Wenzel, Dahl, & Ebener, 2008). It is possible that similar social and community dynamics were operant at the Guest House as well, dynamics that

may have impacted clients' retention in the 7Cs clinic. Unfortunately, these dynamics were not assessed during the current study nor was their impact on retention rates analyzed. The above suggests that any attempt to better understand the factors that influence retention in the 7Cs clinic will be incomplete without consideration of the larger social and organizational context in which the clinic was ensconced.

Recommendations for future treatment/research: Failure to account for broader therapeutic milieu. Future research should assess how the broader social (involving both staff and other shelter residents) and the organizational context influenced clients' length of stay in the clinic. There are tools to conduct this type of research. For example, the Working Alliance Inventory has been modified to assess the alliance with case management (Neale & Rosenheck, 1995), and the Dimensions of Change Instrument (Orlando et al., 2006) is an assessment designed specifically to measure treatment processes in residential and therapeutic community treatment. The Community-Oriented Programs Environment Scale (Moos, 1988) and the Treatment Perceptions Questionnaire (Marsden et al., 2000) were both designed to assess clients' perceptions of programs and program staff. All of these instruments could be employed to measure how different dimensions of clients' relationships with shelter staff, case managers, and other residents may impact treatment retention. Further, there are several instruments that have been designed to assess services received by clients while in treatment, including the Treatment Services Needed and Received (Rich & Clark, 1997) and the Treatment Services Review (McLellan, Alterman, Cacciola, Metzger, & O'Brien, 1992).

Implementation of even one of these instruments might considerably augment the predictive power of any future models of retention at the Guest House. Future research on

treatment retention should seek to broaden the scope of its efforts to examine the relative influence of progressively larger concentric circles of relationships and systems.

Substance abuse treatment, particularly treatment for homeless clients in a homeless shelter like the Guest House, does not occur in a vacuum.

Conclusions

In sum, neither Revised Model 1 nor Revised Model 2 appeared to be a “better” model than the other. Both models were an acceptable fit for the data, although Revised Model 1 appeared to be a slightly better fit. Both models explained approximately 15% of the variance in retention, although Revised Model 1, with its relatively greater complexity, explained more variance in other endogenous variables (other than retention). Revised Model 2, on the other hand, was a more parsimonious model. Ultimately, the author’s preference was for Revised Model 1. With its more complex set of relationships and greater explanatory power for the mediator endogenous variables, it appeared to have greater potential to elucidate the intricate sequential chain of interactions that occur when a client enters treatment that help to predict how long he will remain in treatment.

In general both models provided partial support for the hypothesis that clients who entered treatment in greater distress and who perceived more consequences of their substance use tend to be more motivated for treatment, and those clients who were more motivated for treatment tend to remain in treatment longer. However, it is important to note that several of the problem severity variables, which were indirectly related to motivation (and ultimately retention) in Revised Model 1, were no longer statistically significantly related to motivation or retention in Model 2 once the InDUC was removed

as a mediator variable. As noted above, this indicates that problem severity at intake may have little to do with motivation for substance abuse treatment, if these problems are not perceived by the client as resulting from his or her substance use (Blume & Marlatt, 2000). Indeed, the robust relationship between perceived consequences of substance use and motivation for substance use treatment observed in the current study, regardless of the model, suggest that clients who believe that their problems are due to their substance use tend to be much more motivated to address these problems in treatment (and also tend to remain in treatment longer).

This robust link between perceived consequences of substance use and motivation for treatment also suggests that motivation itself may be better conceptualized as a treatment goal, rather than a pre-treatment prerequisite for successful treatment engagement and outcome. Thus, increasing motivation for treatment would be an explicit focus of treatment, as opposed to something that is assumed must be present in order for a client to be in treatment in the first place.

The relationship between perceived consequences of substance use and motivation for substance use treatment also suggests a possible mechanism for the effectiveness of treatments designed to increase motivation for substance abuse treatment, such as Motivational Interviewing (Miller & Rollnick, 2002). One of the explicit foci of Motivational Interviewing is an emphasis on developing discrepancy between the client's current situation and the goals she or he would like to attain in her or his life, as well as helping the client understand how her or his misuse of substances might be an obstacle to her or his goals (Miller & Rollnick). In light of the findings of the current study, it is possible that one of the ways in which Motivational Interviewing

exerts its influence on motivation is through its increasing a client's awareness of the impact of substance use on his or her life, the goals he or she would like to achieve, and his or her ideal self-concept. As this study implies, clients with greater awareness of the impact of substance use on their life tend to be more motivated for treatment to address their substance use problems.

To take this line of reasoning one step further, some research suggests that the use of Motivational Interviewing increases rates of substance abuse treatment retention (Carroll et al., 2006; Secades-Villa, Fernande-Hermida, & Arnaez-Montaraz, 2004). The data from the current study suggest that one of the ways that Motivational Interviewing may impact retention rates is by increasing clients' ambivalence about their substance use problems by raising their awareness of the consequences of their substance use problems. This increasing ambivalence leads to increased motivation for and willingness to engage in treatment, which ultimately leads to greater retention rates.

Conceptualized this way, motivation thus becomes a critical focus of treatment and the assessment of motivation at intake may help to direct treatment planning and interventions. In other words, low motivation could be added to a "treatment goals" list, rather than conceived of as something that must be present before the real "treatment goals" can be achieved. Clients who score low in motivation at treatment outset could be given interventions designed to increase their ambivalence about their substance use. The current study suggests that one of the ways to raise clients concerns about their substance use is by helping them to become more cognizant of the fact that many of the problems they have in their life currently are the result of their substance use. Consistent with this conjecture, some evidence indicates that Motivational Interviewing may be *most*

effective at increasing treatment completion (Stotts et al., 2001) and reducing substance use (Rohsenow et al., 2004) in clients with *low* initial motivation.

In sum, motivation may be best conceptualized as a treatment process/outcome factor, rather than a treatment prerequisite. The results from this study indicate that facilitating clients' awareness of their problems as resulting from their substance use may be a key factor in increasing their motivation for substance use treatment and may represent a key focal point of interventions during the treatment process.

Clients who attended a greater percentage of possible sessions tended to drop out of treatment earlier, though this appeared to be the result of the fact that these clients simply did not remain in treatment long enough to actually accumulate missed sessions. As noted above, this confound between engagement and retention likely artificially inflated the variance accounted for in retention in both models and implies that the models ultimately predicted less than 15% of the variance in length of time in treatment.

As discussed above, this is likely the result of several factors. First, a number of variables that likely would have contributed to the variance in retention were not assessed in the current study, such as the therapeutic alliance, self-efficacy, or substance use during treatment. Second, process variables were not collected during each client's treatment episode. Thus, there was no way to determine if changes in certain variables (e.g., motivation, psychiatric distress) over the course of treatment had differential effects on retention at various stages of treatment (e.g., early treatment, middle treatment, later treatment). Third, as noted above, the 7Cs Clinic was embedded within the larger shelter system. Unfortunately, broader system-wide, contextual variables (e.g., alliance with case managers, services received while in the Guest House – such as supportive housing,

alliance with the general shelter community) were not assessed, which made it impossible to determine if these organizational/community-wide variables exerted any impact on the length of time clients remained in treatment at the 7Cs Clinic.

Finally, the high levels of attrition that likely occurred before potential clients even entered treatment at the 7Cs, as well as the significant attrition that occurred before clients received their first assessment, may have decreased the variance in the retention variables itself. As discussed above, this may have occurred because the time and efforts required for potential clients to actually remain in the shelter long enough to become actual clients in the 7Cs Clinic may have resulted in a sample predisposed to longer stays in treatment in the first place. If the variance in retention was indeed artificially reduced, this may have limited the strength of the relationships between the variables employed in the study and the retention variable. Ultimately, this may have also contributed the rather meager portion of variance in retention that was explained by both models.

In sum, it is likely that the true variance in retention predicted is even lower than the results obtained in this study because of the confound between engagement and retention. Further, the absence of certain potentially key variables, the lack of process data, the failure to take into account broader system-wide variables, and the potentially restricted variance in the ultimate dependent variable of retention all may have resulted in extremely modest amount of variance in retention that was explained by the current study. Future research which attempts to rectify these statistical errors, account for even some of the aforementioned missing variables will likely experience greater success in predicting treatment retention than the current study.

Ultimately, this study was notable as much for its limitations as its results. Among the most concerning of these were a lack of process and outcome data, a lack of contextual/organizational data, and a lack of data on pre-treatment attrition. These limitations very likely contributed to each model's rather meager explanatory power with regards to retention and circumscribed the generalizability of the results to those clients who might already be predisposed to initiate and remain in treatment in the first place. This latter point is particularly ironic, considering that the client cohort whom this study failed to capture is the very cohort that might benefit the most from retention research and about whom treatment providers may be most concerned – clients who experience early treatment attrition.

Although the “active ingredients” of substance abuse treatment remain to be elucidated, research does strongly indicate that, for some clients, retention in treatment is important in order for these “active ingredients” to exert their impact and for some clients to reap the potential benefits of substance abuse treatment. Moreover, retention can be a particular challenge with homeless clients, who often present with greater exigencies and are more transitory than non-homeless clients. It is hoped that, despite its flaws, this study will help to lay a foundation for future research efforts designed to increase retention among homeless clients, as well as provide an additional piece to the jigsaw puzzle that is effective substance abuse treatment.

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