

EXAMINING THE RELATIONSHIP BETWEEN TREATMENT READINESS AND  
SUBSTANCE USE TREATMENT INITIATION AND ENGAGEMENT

by

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Initiation and Engagement

A Dissertation submitted in partial fulfillment of the requirements for the degree of  
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## **DEDICATION**

To Erica, for always being an amazing person to me throughout the years. To my family and friends for their unwavering love, encouragement and support over the years. There are truly no words to thank you enough.

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## TABLE OF CONTENTS

	Page
List of Tables .....	viii
Abstract .....	ix
Chapter One: Introduction .....	1
Treatment Readiness: Background and Unanswered Questions .....	5
Theoretical Framework .....	5
Research Questions .....	6
Importance and Scope of the Study .....	7
Organization and Explanation of Research .....	8
Chapter Two: Review of Relevant Literature .....	9
Prevalence of Substance Use among Criminal Justice Populations .....	10
Treatment Initiation and Engagement .....	11
Defining Treatment Initiation and Engagement .....	12
Demographic Factors as Predictors of Treatment Initiation and Engagement .....	13
Age .....	13
Gender .....	15
Race/Ethnicity .....	17
Socioeconomic Status .....	18
Diagnostic Factors Related to Treatment Initiation and Engagement .....	20
Substance Use History .....	20
Prior Treatment Episodes .....	22
Referral Source .....	23
Legal Activities .....	24
Family and Clinical Factors of Treatment Initiation and Engagement .....	26
Family/Emotional Stability .....	26
Mental Health and Physical Health .....	26
Critique of the Current Literature .....	27

Treatment Readiness and Treatment Initiation and Engagement.....	28
Chapter Three: Theoretical Framework.....	32
Transtheoretical Model of Change.....	32
Stages of Change .....	33
Empirical Status.....	35
Explaining the Transtheoretical Model and Substance Use .....	36
Explaining the Transtheoretical Model and Treatment Readiness.....	39
Theoretical Critiques .....	40
Summary.....	42
Chapter Four: Methods .....	44
Research Questions and Hypotheses.....	44
Data .....	47
Measures.....	49
Dependent Variables.....	49
Independent Variables .....	49
Demographic Characteristics.....	50
Diagnostic Factors .....	51
Family and Clinical Factors.....	51
Motivational Factor .....	52
Additional Data Considerations .....	54
Analytic Strategy.....	57
Conclusion.....	58
Chapter Five: Results .....	59
Introduction .....	59
Descriptive Findings of Key Demographic Characteristics .....	60
Bivariate Findings.....	65
Initiation.....	65
Engagement .....	71
Multivariate Findings .....	77
Initiation.....	77
Summary of Multivariate Findings for Initiation .....	81
Engagement .....	85



Summary of Multivariate Findings for Engagement.....	89
Chapter Six: Discussion, Limitations & Conclusion .....	92
Summary Findings for Initiation.....	94
Summary Findings for Engagement.....	97
Explaining the Low Nagelkerke R <sup>2</sup> Value .....	99
Policy Implications.....	103
Areas for Future Research.....	107
Limitations .....	112
Conclusion.....	113
References.....	116

## LIST OF TABLES

Table	Page
Table 1. Research Questions and Hypotheses .....	46
Table 2. Variables for the Current Study .....	53
Table 3. Multicollinearity Diagnostics for Independent Scales.....	56
Table 4. Descriptive Statistics for Demographic Characteristics of Study Sample.....	60
Table 5. Descriptive Statistics for Diagnostic Characteristics of Study Sample .....	62
Table 6. Descriptive Statistics for Family/Clinical Characteristics of Study Sample .....	63
Table 7. Descriptive Statistics for Motivational/Outcomes of Study Sample .....	64
Table 8. Demographic Characteristics and Comparison of Differences between those who Initiate and Did not Initiate Substance Use Treatment .....	67
Table 9. Point-biserial Correlations for Initiation and Substance Frequency, Employment, CJS, Illegal Activities .....	70
Table 10. Demographic Characteristics and Comparison of Differences between those who Engage and Did not Engage in Substance Use Treatment.....	73
Table 11. Point-biserial Correlations for Engagement and Substance Frequency, Employment, CJS, Illegal Activities.....	76
Table 12. Binary Logistic Regression Predicting Substance Use Treatment Initiation....	83
Table 13. Binary Logistic Regression Predicting Substance Use Treatment Engagement .....	90

## **ABSTRACT**

### **EXAMINING THE RELATIONSHIP BETWEEN TREATMENT READINESS AND SUBSTANCE USE TREATMENT INITIATION AND ENGAGEMENT**

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With nearly 70 percent of the criminal justice population experiencing substance use related issues, treatment is a sound strategy to combat these issues (Chandler, Fletcher, & Volkow, 2009). Despite the promising nature of substance use treatment, roughly 40 percent of individuals terminate treatment within six months of initiating (Joe, Simpson, Dansereau, & Rowan-Szal, 2014). To achieve gains in efforts to use treatment as a tool to address substance abuse needs, it is important to understand the factors that influence positive or negative treatment outcomes. One under researched area is treatment readiness, which is defined as, “the presence of characteristics (states or dispositions) within either the client or the therapeutic situation, which are likely to promote engagement in therapy and which, thereby, are likely to enhance therapeutic change” (Ward, Day, Howells, & Birgden, 2004, p. 650). It is theorized to be important to both initiation and engagement in substance use treatment services, without which it is nearly

impossible to complete treatment. Initiation and engagement are referred to as treatment process measures and are important because they are actionable and they help to identify ways to improve substance use services offered to individuals (Horgan & Garnick, 2005). This dissertation examines the impact of treatment readiness on initiation and engagement in substance use treatment programs. Using the transtheoretical model (TTM) of change, this research explores the following general hypotheses: 1) Treatment readiness will significantly predict substance use treatment initiation; 2) Treatment readiness will significantly predict substance use treatment engagement; 3) Treatment readiness will increase the likelihood of initiating substance use treatment, controlling for other relevant factors; and 4) Treatment readiness will increase the likelihood of engaging in substance use treatment, controlling for the other factors. Data for these analyses are derived from the 2012 Substance Abuse and Mental Health Services Administration and the Center for Substance Abuse Treatment (SAMHSA/CSAT) data set (n = 5,443). Stepwise binary logistic regression models were created to identify the factors that affect both treatment initiation and engagement. The findings of this dissertation provide support for the overall effect of treatment readiness on substance use treatment initiation but not engagement. Individuals having support from family and friends are more likely to initiate substance use treatment. Engagement is more likely to occur for those individuals who experience more substance use and have more physical health problems. Treatment readiness is also affected by demographics (e.g., race, gender, age). Treatment readiness significantly predicts initiating but does not predict engaging in substance use treatment. From a policy perspective, interventions should be used to enhance

individuals' levels of treatment readiness before being referred to treatment services thus increasing their likelihood of initiating and engaging in treatment services. Further research is needed in the area of engagement to better understand factors that predict outcomes.

## **CHAPTER ONE: INTRODUCTION**

The 2013 National Survey on Drug Use and Health (NSDUH) reports that 24.6 million Americans aged 12 and older were illicit drug users in the past month (e.g., marijuana, cocaine and heroin), 136.9 million were consumers of alcohol and 66.9 million used tobacco products. Nearly 21.6 million were classified as being substance dependent or abusers where the use of illicit substances and alcohol is a problem interfering with routine life and requiring treatment to address the problem behaviors. Only 2.5 million individuals, however, participated in treatment services. Even though substance abuse disorders affect 21.6 million Americans only 10 percent are engaged in treatment services. An understanding of why individuals do not seek assistance for their substance abuse problem or why they do not fully benefit from treatment is an understudied area (Green-Hennessy, 2002).

Very little information exists about why individuals with substance abuse problems are not actively engaged in treatment. According to respondents in the NSDUH, individuals do not participate in treatment because: 1) they are not ready to stop using (40.3%); 2) they do not have health care coverage and could not afford treatment (31.4%); 3) the possible negative effect on their job (10.7%); 4) the concern about treatment resulting in neighbors/community having a negative opinion (10.1%); 5) they do not know where to go for treatment (9.2%); and 6) there is no program with the type

of treatment an individual needs (8%) (National Household Survey on Drug Use and Health, 2013). Of those individuals who do participate in treatment, 44% complete treatment and 56% do not complete treatment. Individuals do not complete treatment for a variety of reasons including: 1) dropping out (26%); 2) being transferred (15%); 3) being terminated by the program (7%); 4) being incarcerated (2%); and 5) other reasons (5%) (Center for Behavioral Health Statistics and Quality, 2013). To address the burden of addiction, participation and completion of treatment is needed to reduce the impact it has on society.

Addiction to substances remains a major public concern. Not only does it have a direct effect on the drug using individual, society is also broadly affected by addiction. The costs of addiction, including tobacco, alcohol and illicit drug use and abuse, average more than \$700 billion annually (NIDA, 2015). This figure is associated with the overall cost of addiction to our nation; however, it can be broken down into specific areas including health care. For example, addiction to tobacco contributes roughly \$130 billion annually to the health care system whereas alcohol and illicit drugs contribute \$25 billion and \$11 billion, respectively. Many social problems derive from addiction such as drunk driving incidents that result in approximately 10,000 fatalities a year (National Highway Traffic Safety Administration, 1997), increased use of incarceration that costs \$74 billion to the criminal justice system (Institute for Health Policy, 1993) and \$300 billion due to accidents or lost work days at the workplace (SAMHSA, 1997).

Many individuals with addiction disorders do not change their behavior. A body of research evidence that indicates it is not uncommon for individuals who struggle with

addiction to relapse on several occasions. For example, Hser and Anglin (2011) discuss how recovery is a process and relapse is, more often than not, experienced by addicts who are attempting to change their behavior. When entering treatment, many substance abusers often go through several treatment episodes before reaching a point of diminishing addictive behaviors (Hser, Longshore, & Anglin, 2007; Anglin, Hser, & Grella, 1997). Hser and colleagues (2007) have described a treatment career framework to better understand how individuals' substance use patterns change over time, rather than abruptly. It is through a combination of multiple treatment episodes and dissecting the complexity of addiction that leads to a more fruitful understanding of how individuals change (Hser, Anglin, Grella, Longshore, & Prendergast, 2001; Hser et al., 2007). The completion of substance use treatment is important for addicted individuals; however, the steps to get to the point of completion are important as well.

Completing substance use treatment is important for many reasons. Much of the empirical support surrounding substance use treatment suggests it is effective in treating individuals' substance use issues, repeat criminal activity, and increasing individuals' social functioning capabilities (Anglin & Hser, 1990; 1992; Gerstein & Harwood, 1990; Hubbard, Marsden, Rachal, Harwood, Cavanaugh, & Ginzburg, 1989; Fiorentine, Nakashima, & Anglin, 1999; Garnick et al., 2014). Several strategies focus on what makes substance use treatment more effective for some and not others, including the amount of treatment services offered (Webb, Robinson, & Brower, 2009), duration of treatment (Simpson, Joe, Fletcher, Hubbard, & Anglin, 1999) and individuals' satisfaction with treatment services (Sanders, Trinh, Sherman, & Banks, 1998). These



approaches are often considered as individuals near the end of a treatment episode thus leaving out the important steps that individuals take early on in the process. For example, scholars often examine the distal (i.e., long term) outcomes of substance use treatment, including completion of substance use treatment (Decker, Peglow, & Samples, 2014) without taking into consideration the process measures (i.e., initiation and engagement) that act as the foundation of guiding individuals to completion of substance use treatment. Scholars have begun to emphasize the impact of learning more about the process that affects how individuals complete substance use treatment. Treatment has been divided into stages - initiation, engagement, retention, and completion - to demonstrate that attention to the early steps is needed to improve outcomes.

Scholars discuss the importance of initiation (i.e., another treatment episode within 14 days of new treatment episode) and engagement (i.e., receiving two additional services within 30 days after initial treatment) in increasing the likelihood of completing substance use treatment, remaining in substance use treatment longer and reducing their criminal activity (Garnick et al., 2014; Fiorentine & Anglin, 1996a; 1997; Simpson, Joe, Rowan-Szal, & Greener, 1995). A further area of consideration is why some people do or do not initiate, and how initiation affects engagement in substance use treatment. The literature discusses several factors that are predictive of initiation and engagement including personal characteristics (e.g., race) (Hepburn & Albonetti, 1994; Allison & Hubbard, 1985); diagnostic factors (e.g., criminal history) (Allison & Hubbard, 1985); and family/clinical factors (e.g., treatment history) (Gainey, Wells, Hawkins, & Catalano, 1993; Joe & Simpson, 1975). An important indicator of the treatment process is the

concept of treatment readiness (Mossière & Serin, 2014; McMurren & Ward, 2010) where treatment readiness is “the presence of characteristics (states or dispositions) within either the client or the therapeutic situation, which are likely to promote engagement in therapy and which, thereby, are likely to enhance therapeutic change” (Ward, Day, Howells, & Birgden, 2004, p. 650). There is some support of treatment readiness as a predictor of substance use treatment initiation and engagement; however, the evidence is mixed (Kim et al., 2011; Brown et al., 2011).

### **Treatment Readiness: Background and Unanswered Questions**

The definition of treatment readiness provided by Ward and colleagues (2004) often assumes treatment readiness is similar for most individuals; an assumption that can be problematic. In fact, treatment readiness will differ depending on the type of individual and their substance use. Therefore, this dissertation will examine the nature and extent of treatment readiness’ predictive validity on initiating and engaging in substance use treatment using a series of stepwise binary logistic regression models. The use of these models will help to examine how treatment readiness predicts both initiating and engaging in substance use treatment. This approach can help to advance the transtheoretical model (TTM) of change (Prochaska & DiClemente, 1984) by using the stages of change to better understand individuals’ levels of treatment readiness.

### **Theoretical Framework**

The primary theoretical framework for this dissertation is the transtheoretical model (TTM) of change (Prochaska, DiClemente, & Norcross, 1992). The TTM consists of five stages, including 1) precontemplation; 2) contemplation; 3) preparation; 4) action;

and 5) maintenance. In the precontemplation stage, for example, individuals are often ambivalent about change whereas in the maintenance stage, individuals are sustaining the change made in their lives. These are but two examples of the stages of change that will be discussed in further detail in the proceeding chapters. For the purposes of this dissertation, the TTM will be used to help interpret the study findings.

### **Research Questions**

Several research questions guide this study. These answers contribute to the existing body of knowledge surrounding the predictors of substance use treatment initiation and engagement. I briefly summarize the research questions in this section and outline them more completely in the methods chapter. For this endeavor, I plan to examine the impact of treatment readiness on substance use treatment initiation and engagement using a series of stepwise binary logistic regression models. Therefore, the first study research question is: What individual-level factors predict substance use treatment initiation in this sample? I hypothesize that several demographic characteristics, diagnostic factors, family/clinical and motivational factors will predict substance use treatment initiation. A second research question is: What individual-level factors predict substance use treatment engagement in this sample? I hypothesize the same demographic characteristics, diagnostic factors, family/clinical and motivational factors will predict substance use treatment engagement. A third research question is: Does treatment readiness predict substance use treatment initiation? I hypothesize treatment readiness will significantly predict substance use treatment initiation. A fourth research question is: Does treatment readiness predict substance use treatment

engagement? I hypothesize treatment readiness will significantly predict substance use treatment engagement. A fifth research question is: Does treatment readiness predict initiating substance use treatment controlling for demographic characteristics, diagnostic factors and family/clinical factors? I hypothesize that treatment readiness will increase the likelihood of initiating substance use treatment, controlling for the other factors. Finally, a sixth research question is: Does treatment readiness predict engaging in substance use treatment controlling for demographic characteristics, diagnostic factors and family/clinical factors? I hypothesize that treatment readiness will increase the likelihood of engaging in substance use treatment, controlling for the other factors.

### **Importance and Scope of the Study**

To better understand behavioral change processes such as initiation and engagement, it must be understood that some indicators of initiation and engagement, including treatment readiness, may not only consist of internal factors that motivate individuals, but a host of external factors as well. Understanding how these factors contribute to an individual's treatment readiness is important because it means that individuals should be willing to make some sort of change in their lives. This study presents a unique opportunity to gain a more complete understanding of treatment readiness, a concept continuing to emerge (McMurran & Ward, 2010). For example, treatment readiness may itself be a complex construct that is worth investigating further. Additionally, it presents an opportunity to use the TTM as a way to understand how treatment readiness impacts process measures of change such as initiation and engagement. Finally, initiation and engagement will highlight the importance of the

beginning of a treatment episode rather than waiting until an individual actually completes a substance use treatment program.

### **Organization and Explanation of Research**

In chapter 2 of this dissertation, I review the relevant literature as it pertains to the predictors of substance use treatment initiation and engagement. In chapter 3, I provide a general discussion of the theoretical framework used to guide this dissertation (i.e., Transtheoretical Model (TTM)) and its application to substance use treatment. In chapter 4, I discuss the research methods for this project. Specifically, I describe the data collection process and analysis techniques used, including stepwise binary logistic regression. In chapter 5, I present the results of the current dissertation study in light of the research questions and hypotheses. Finally, in chapter 6, I end with a discussion of study findings, limitations and conclusions.

In light of the findings that nearly half of the 2.5 million individuals who receive treatment complete treatment, it is important to understand why the millions more do not receive or complete treatment. A host of additional reasons may explain completion rates, , including, for example, a lack of transportation to get to services. However, this dissertation will examine the impact of treatment readiness on why some individuals do not participate in treatment services such as initiating and engaging.

## **CHAPTER TWO: REVIEW OF RELEVANT LITERATURE**

One of the main foci of the current study is to explore the factors that are associated with substance use treatment initiation and engagement. Initiation and engagement are process measures of change (National Quality Measures Clearinghouse, 2014). As such, they measure activities associated with the desire to change. As they relate to substance use treatment, they are important because: 1) they are actionable and 2) they help identify ways to improve substance use services offered to individuals (Horgan & Garnick, 2005; Krumholz, Normand, Spertus, Shahian, & Bradley, 2007; McLellan, Chalk, & Bartlett, 2007). These indicators are important because they can be identified earlier in the treatment process and therefore do not require waiting to intervene. Specific policies or practices can be identified to improve these early outcomes. This allows for a mid-course correction before waiting until the program is over or the client has relapsed (Garnick, Lee, Horgan, & Acevedo, 2009).

To address the research questions and hypotheses, discussed in greater detail in chapter four, this study examines the factors associated with substance use treatment initiation and engagement. Focusing on initiation and engagement rather than completion is important because identifying challenges to treatment at the early stages allows us to better tailor services early in the process. Previous research on the factors associated with initiation and engagement has largely focused on static factors such as demographics.

Because these characteristics are difficult or impossible to change, we cannot really improve initiation and engagement. I recommend that we focus on treatment readiness because it is mutable and can be addressed, which will hopefully increase initiation and engagement.

This chapter is presented in three parts. First, I discuss the prevalence of substance use for individuals, including criminal justice populations. Second, I review the prior literature examining the correlates of substance use treatment initiation and engagement. Finally, I offer a critique of this literature for its focus on static factors and highlight the need to consider the more dynamic process of treatment readiness.

### **Prevalence of Substance Use among Criminal Justice Populations**

At year-end 2012, approximately 1.5 million individuals aged 18 or older were on parole in the United States. A quarter of these parolees (25.6%) reported current use of illicit substances (SAMHSA, 2013). Additionally, nearly one in five (18.1%) reported using marijuana and another 7% reported using other substances for nonmedical purposes (SAMHSA, 2013). These reported rates of substance use among parolees are disproportionately higher than the rates for individuals aged 18 and older in the general population. For example, the reported rates for individuals in the general population are as follows: 9% reported illicit use, 7.2% marijuana use, and 2.6% for nonmedical purposes (SAMHSA, 2013).

Substance use estimates for individuals on probation are slightly higher than for those on parole. In 2012, approximately 5 million individuals aged 18 or older were on probation in the United States. About 30 percent of probationers (30.2%) were reported

illicit substance users. Additionally, about one quarter of these individuals were reported marijuana users (25.1%) and another 10.1% reported using other substances for nonmedical purposes (SAMHSA, 2013). These reported rates of substance use among probationers is much higher than individuals aged 18 and older who were non-justice involved. For example, 8.7% of non-justice involved individuals reported using illicit substances whereas another 6.9% reported using marijuana; and, finally, another 2.4% reported using other substances for nonmedical purposes (SAMHSA, 2013).

Criminal justice populations tend to experience more substance use than individuals who are not under some form of correctional supervision. This is a significant public health and safety concern since their continued use of illicit substances puts them at risk for recidivism, revocation and/or a return to incarceration. Thus, to better serve the needs of individuals involved in the criminal justice system, it is particularly important for scholars to ascertain the factors associated with successful substance use treatment. Treatment initiation and engagement are two important steps toward successful substance use treatment.

### **Treatment Initiation and Engagement<sup>1</sup>**

For many individuals the initiation and engagement of substance use treatment requires a set of decisions. Individuals using substances often face adverse effects in many areas of their lives, including health and social stability leading them to make decisions to initiate and engage in treatment (Institute of Medicine, 1990; McLellan & Weisner, 1996; Roman, 1988). Additionally, some individuals decide to initiate and

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<sup>1</sup> The literature on treatment initiation and engagement are examined together, but are separate terms.



engage in treatment as a result of pressure from both formal and informal entities (Weisner, Mertens, Tam, & Moore, 2001; Rempel & DeStefano, 2001). However, this can lead to ambivalence among individuals about what to expect once starting the treatment process. Between 30% and 50% of individuals assessed at intake will not return to begin the treatment process (Finney & Moos, 1995; Martin, Giannandrea, Rogers, & Johnson, 1996). Before discussing the factors that predict initiation and engagement of substance use treatment, it is important to describe what exactly substance use treatment initiation and engagement entail.

### **Defining Treatment Initiation and Engagement**

For the purposes of this dissertation, I will use the definitions of substance use treatment initiation and engagement articulated by the Washington Circle more than a decade ago (Garnick et al., 2002). The importance of the Washington Circle definitions is they outline processes at the start of a treatment event. The measures of initiation and engagement developed by the Washington Circle are useful not only in substance use treatment, but in other organizations as well, including the National Committee for Quality Assurance (NCQA) and Department of Veterans Affairs with an endorsement from the National Quality Forum (NQF) (Harris, Humphreys, & Finney, 2007; National Committee for Quality Assurance, 2012; National Quality Forum, 2009). As of 2004, the Washington Circle recommended agencies calculate these definitions for suitability of care as well as treatment funding (Garnick, Lee, Horgan, Acevedo, & Washington Circle Public Sector, 2009; Garnick et al., 2012). Therefore, substance use treatment initiation and engagement are defined as the following:

**Initiation** is defined as receiving another treatment service within 14 days after the beginning of a new outpatient or intensive outpatient treatment episode.

**Engagement** is defined as receiving two additional services within 30 days after the initiation service (Garnick et al., 2014, p. 296).

These definitions are important as the proceeding sections of this chapter examine the factors that predict substance use treatment initiation and engagement and the empirical support surrounding them. These include demographic characteristics (e.g., age, gender, race); diagnostic factors (e.g., substance use, legal activities); family/ clinical factors (e.g., physical health, mental health); and motivation to change (e.g., treatment readiness). The connection between these factors and substance use treatment initiation and engagement will be discussed in further detail below.

## **Demographic Factors as Predictors of Treatment Initiation and Engagement**

### **Age**

In general, the treatment career research indicates the importance of examining multiple treatment episodes as opposed to single treatment episodes (Hser & Anglin, 2011). An individual's age plays an important role in facilitating these multiple treatment episodes. For instance, scholars indicate the age an individual first uses impacts their treatment career in several ways. First, individuals who use at an early age typically have longer substance use careers. Second, they often have extended histories of using before beginning treatment. Finally, they often have longer treatment careers (Dennis, Scott, Funk, & Foss, 2005). This may be why older individuals are more likely to then initiate and engage in substance use treatment. For example, it may be that older individuals,

who have experienced a lengthy treatment career, eventually get to the point of being concerned about their substance use and additional health concerns and, therefore, may be more likely to initiate and engage in substance use treatment. Studies indicate that older individuals are more likely to initiate, engage in, and, additionally, complete substance use treatment compared to younger individuals (Grella, Wugalter, & Anglin, 1997; Weisner, Mertens, Tam, & Moore, 2001; Garnick et al., 2014).

In a study of substance use treatment initiation in managed care, Weisner et al., (2001) assessed individuals aged 18 and older admitted to a Chemical Dependency program of the health maintenance organization (HMO). Weisner et al., (2001) used structured interviews to determine treatment attendance of a sample of 1204 participants. Individuals who were 30 to 50 years of age and older were statistically significantly more likely to initiate treatment compared to individuals aged 17-29. For example, 38.1 % of individuals aged 30-39 were likely to initiate treatment. This was followed by 27.8% of individuals aged 40-49; 21.5% of individuals aged 17-29; and 12.6% of individuals aged 50 and older.

In a similar study of predictors of initiation and engagement in substance use treatment among individuals with co-occurring serious mental illness and substance use disorders, Brown, Bennett, Li, and Bellack (2011) found that on average, older individuals were more likely to both initiate and engage in substance use treatment. Although the sample is relatively small, after an initial screening process, the average age of individuals likely to initiate substance use treatment was 42.6 (n=120) compared to 41 (n=56) of individuals who were not likely to initiate substance use treatment.

Additionally, individuals who engaged in substance use treatment were slightly older than those individuals who did not engage in substance use treatment. For example, the average age of those individuals who engage in substance use treatment was 42.78 (n=110) compared to 42.49 of those who did not engage in substance use treatment. These relationships were not statistically significant.

In light of these findings regarding the relationship between age and initiation and engagement in substance use treatment, it appears older individuals are more likely to initiate and engage in substance use treatment. More targeted efforts need to be undertaken to get younger individuals to initiate and engage earlier in substance use treatment since they are a priority population. Younger individuals may be less amenable to treatment services and as such, should be a central focus.

## **Gender**

The empirical literature examining the relationship between gender and substance use treatment initiation and engagement is mixed. For example, some studies indicate clear gender differences between males and females in terms of substance use treatment initiation and engagement (Mammo & Weinbaum, 1993), whereas other studies indicate the differences between males and females come in the form of other mediating factors (Rempel & DeStefano, 2001; Green et al., 2002). For instance, research indicates that women may be less likely than men to initiate substance use treatment for a host of reasons, including childcare, lack of health insurance, and poverty (Hodgins, el Guebaly, & Addington, 1997).

In a study of gender differences in predictors of initiation, retention, and completion in an HMO-based substance use treatment program, Green et al., (2002) found men and women differed in terms of the factors predicting treatment initiation. They found that females who were diagnosed with an alcohol disorder were almost four times more likely to initiate substance use treatment compared to males; however, females diagnosed as having mental health related issues were less likely to initiate substance use treatment compared to males with mental health related issues. In contrast, males who reported being employed and married were more likely to initiate substance use treatment compared to similarly situated females. Finally, males who had less than a high school diploma were less likely to initiate substance use treatment compared to females of the same educational background.

Acevedo et al. (2012) examined the impact of gender on initiation and engagement in substance use treatment on a sample of individuals using data from the Oklahoma Department of Mental Health and Substance Abuse Services. These data were linked to the National Survey of Substance Abuse Treatment Services. The authors found that females were less likely than males to both initiate and engage in substance use treatment. Specifically, with a sample of 4,927, females were less likely to initiate substance use treatment compared to males (Odds Ratio=0.99); however, there was no association between these two groups. Additionally, with a sample of 3,326, females were less likely to engage in substance use treatment compared to males (Odds Ratio=0.85); however, this was statistically significant relationship ( $p<0.05$ ). The confounding nature of predictors such as gender warrant further discussion.

Men and women initiate and engage in substance use treatment based on a different set of factors. Females are more likely to initiate substance use treatment when experiencing alcohol related disorders while males are more likely to initiate when experiencing mental health related issues. Future studies that use gender as a predictor of initiation and engagement should make sure to examine different strategies for increasing treatment utilization for men and women.

### **Race/Ethnicity**

Like gender, research on the link between race/ethnicity and substance use treatment initiation and engagement has produced mixed results. For example, some studies indicate that race/ethnicity is a significant predictor of treatment initiation and engagement (Peters & Murrin, 1998) while others find no association (Condelli & Hubbard, 1994). This is discussed in further detail below.

In a study of factors that influence dropping out from outpatient alcoholism treatment facilities, Mammo and Weinbaum (1993) discovered race differences not only for dropping out of treatment, but for initiating and engaging as well. For example, Mammo and Weinbaum (1993) note the difficulty of blacks and Hispanics to complete treatment but to initiate and engage as well. They found that whites were more likely to complete as well as initiate and engage compared to these other racial/ethnic groups. Data for this study come from the New Jersey State Department of Health, Division of Alcoholism, Drug Abuse and Addiction Services with nearly 13,000 individuals (n=12,697), aged 12 to 80 years, admitted to participate in outpatient substance use treatment in 1987.

Acevedo et al. (2012) also explored racial/ethnic differences in substance use treatment initiation and engagement. Racial/ethnic differences were found to exist between white, black, and Native American individuals. Specifically, with a sample of nearly 5,000 individuals (n=4,927), blacks and Native Americans were less likely to initiate substance use treatment relative to whites. The odds of initiating substance use treatment were 45% less for blacks (OR = 0.55, p. < .01) and there were no significant differences for initiation between Native Americans and whites. In terms of substance use treatment engagement, no significant associations were found between whites, blacks and Native Americans.

Since the findings on race/ethnicity are mixed, several points warrant discussion. First, the studies assessed often discuss differences between races but do not discuss what leads to blacks or Hispanics having lower rates of initiating and engaging. An examination of the environments these individuals come from may help to shed light on why their rates of initiating and engaging are lower. Second, if it is discovered these individuals come from environments that impede their ability to initiate and engage, strategies could be used to increase their rates. This could come in the form of family interventions.

### **Socioeconomic Status**

Studies have linked indicators of socioeconomic status to both substance use treatment initiation and engagement, including education (Hiller, Knight, Broome, & Simpson, 1998); employment (Hiller et al., 1998; Hser, Anglin, & Liu, 1990); homelessness and marriage (Acevedo et al., 2012). Weisner and colleagues' (2001) study

of a Chemical Dependency program within a health maintenance organization (HMO) found education and employment to be associated with substance use treatment initiation. People with only a high school diploma were the most likely to initiate (60.6%). This was followed by 25.4% of individuals who initiated substance use treatment with some college or more and 14% with less than a high school education. Additionally, 48.3% of individuals initiated who were employed either full-time or self-employed. This was followed by 9.5% who initiated who were part-time; 48.7% who were unemployed and 3.5% who classified themselves as a homemaker/student. There was no association between employment and substance use treatment initiation.

In terms of marriage, some studies find married people are more likely to initiate. For example, compared to individuals who are married, individuals who are not married were less likely to initiate (Odds Ratio=0.93) and engage in (Odds Ratio=0.93) substance use treatment. Other studies find no difference in rates of initiation between married and single people. Weisner et al. (2001) found individuals who were married were only slightly less likely to initiate treatment than those who were not married (45.7% versus 47.7%).

Lastly, in terms of homelessness, Acevedo et al. (2012) discovered that compared to not being homeless, homeless individuals were more likely to initiate substance use treatment (Odds Ratio=1.02), but were less likely to then engage in substance use treatment than their counterparts (Odds Ratio=0.58). This was a statistically significant relationship. However, in a study of initiation and engagement in chronic disease management care for substance dependence, Kim and colleagues (2011) conducted a



prospective study of individuals dependent on substances enrolled in a chronic disease management program. Of the 282 individuals enrolled in the study, those who reported being homeless were less likely to both initiate (Odds Ratio=0.80) and engage (Odds Ratio=0.79) in substance use treatment; however, there was no association between these relationships.

In summary, the literature surrounding socioeconomic status is mixed. For example, neither education nor employment impact initiation and engagement in substance use treatment. However, an individual's marital status and whether or not they are homeless does. Perhaps an individual's marital status is important to act as a sort of social support for individuals who are thinking about initiating or engaging in substance use treatment. For those individuals who are homeless, perhaps they seek to make a change in their life and therefore initiate substance use treatment services. Beyond demographic characteristics of treatment initiation and engagement, diagnostic factors contribute to initiation and engagement which will be discussed in the next section.

## **Diagnostic Factors Related to Treatment Initiation and Engagement**

### **Substance Use History**

Breaking an addiction may depend on the substance of choice of an individual. (Peters & Murrin, 1998; Peters, Haas, & Murrin, 1999). Initiation and engagement of substance use treatment differs based on substance of choice (e.g., marijuana, cocaine, etc.) and using alcohol and drugs in general.

Weisner et al. (2001) note how initiation in substance use treatment differs between types of substance user. For example, individuals using alcohol only (42.5%)

were more likely to initiate substance use treatment. This was followed by drug only user (26.6%); a combination of alcohol and drug users (18.9%) and no use (12%). When examining initiation among a sample of alcohol-dependent and drug only or drug-alcohol-dependent, Weisner et al. (2001) discovered several substance use factors were important. For example, the odds of initiating substance use treatment were nearly 200% higher for alcohol-dependent individuals who rated treatment as extremely important relative to those who did not ( $OR = 2.97, p < .001$ ). This was slightly lower for the drug only or drug-alcohol-dependent group. For these individuals, the odds of initiating substance use treatment was 104% higher when rating treatment as extremely important relative to those who did not ( $OR = 2.04, p < .001$ ). The drug only or drug-alcohol-dependent group were also more likely to initiate substance use treatment based on their drug severity score. The odds of initiating substance use treatment was 68% higher for these individuals when their drug severity score was higher relative to those with low scores ( $OR = 1.68, p < .05$ ).

Whereas Weisner et al. (2001) found alcohol users were more likely to initiate substance use treatment, Kim et al. (2011) found the opposite. For example, individuals using drugs only were more likely to initiate ( $OR = 1.47$ ) and more likely to engage ( $OR = 2.43$ ) in substance use treatment relative to those individuals using alcohol only. Additionally, individuals using a combination of alcohol and drugs were more likely to initiate substance use treatment ( $OR = 1.23$ ) and more likely to engage in substance use treatment ( $OR = 1.75$ ) relative to those individuals using alcohol only. Although there

was no significant association between these groups, it is important to highlight the difference in type of user.

### **Prior Treatment Episodes**

An existing body of literature discusses the efficacy of prior treatment episodes for substance use. Some of these studies indicate that the likelihood of completing a new treatment episode in the future diminishes for individuals who initiate treatment and then dropout (Beckman & Bardsley, 1986; Leigh, Ogborne, & Cleland, 1984). Conversely, for some individuals who report being in substance use treatment and continue on, their chances of completing treatment increase (Maglione, Chao, & Anglin, 2000).

Brown et al. (2011) assessed previous substance use treatment and how this predicted engaging in substance use treatment. For instance, Brown et al. (2011) found that individuals who reported more days of drug treatment in the last month were more likely to engage in substance use treatment compared to those who reported fewer days of drug treatment in the past month. On average, individuals who were more likely to engage spent 16 days in drug treatment in the past month compared to 11 days for those individuals who did not engage in substance use treatment. This relationship was statistically significant ( $p < 0.01$ ).

Dennis, Scott and Funk (2003) discuss how individuals undergo at least 3-4 treatment episodes before reaching a period of sustained abstinence. In an early reintegration experiment, Dennis and colleagues (2003) assessed the impact of a Recovery Management Checkup (RMC) intervention on a sample ( $n = 448$ ) of individuals with chronic substance use disorders. Individuals were either randomly

assigned to the RMC which included assessment and motivational interviewing or treatment as usual group. Individuals randomly assigned to the RMC were significantly more likely to both return to treatment and return to treatment sooner than individuals in the treatment as usual group.

### **Referral Source**

How an individual is referred to substance use treatment impacts treatment initiation and engagement, including legal coercion from the criminal justice system (Rempel & DeStefano, 2001). There are additional sources of referral for individuals to initiate and engage in substance use treatment beyond legal coercion, including themselves or significant other, employer, or health service providers (Garnick et al., 2014).

In a study of referral for substance use treatment and depression, Chan et al. (2014) identified three groups of individuals with substance use and depressive disorders who were referred to treatment. These three groups include: 1) accessing treatment; 2) declining treatment; and 3) no referral for treatment. The authors found that those individuals who were referred to treatment services and further initiated and engaged as a result of the referral were significantly more likely ( $p < 0.001$ ) to improve in their substance use and depression compared to those who were referred to treatment and declined and those who were not referred at all.

Acevedo et al. (2012) examined the type of referral source of individuals and its impact on both initiation and engagement of substance use treatment. They examined four types of referral sources, including 1) self/significant other; 2) criminal justice; 3)

employer/school/social service; and 4) health service. Statistically significant relationships were discovered between the types of referrals and initiating and engaging in substance use treatment. For example, Acevedo et al. (2012) found that, compared to self/significant other, individuals who were referred to substance use treatment by the criminal justice system were more likely to initiate (Odds Ratio=1.08) and engage in substance use treatment (Odds Ratio=1.32,  $p<0.01$ ). Additionally, individuals who were referred to substance use treatment by an employer/school/social service individual were more likely to initiate (Odds Ratio=1.24,  $p<0.05$ ) and engage (Odds Ratio=1.22) in substance use treatment compared to referrals from self/significant other. Lastly, individuals who were referred to substance use treatment by a health service provider were less likely to initiate substance use treatment (Odds Ratio=0.82) compared to referrals from self/significant other, but were more likely to engage in substance use treatment (Odds Ratio=1.18) compared to referrals from self/significant other.

### **Legal Activities**

There is some empirical support to suggest that individuals who participate in substance use treatment are more likely to experience a decrease in arrests and the risk of felony convictions (Luchansky, He, Longhi, Krupski, & Stark, 2006), a decline in self-reported involvement in illegal activities (Hubbard, Craddock, & Andersen, 2003), and a lower rate of arrest for a variety of types of crime, including drug and property crimes (Evans, Li, & Hser, 2008).

For the limited studies that have examined the efficacy of initiation and engagement in substance use treatment and legal activities, positive support is found. A

study conducted in Oklahoma, by Garnick and colleagues (2007) found that individuals were more likely to initiate and engage in substance use treatment when experiencing fewer arrests and incarcerations. Additionally, Campbell (2009) discovered similar findings with a sample of individuals in Washington State where individuals had fewer arrests when initiating and engaging in substance use treatment. Lastly, Harris, Humphreys, Bowe, Tiet, and Finney (2010) note a decrease in substance use and legal indicators for individuals initiating and engaging in substance use treatment in a study of the Veterans Administration.

In a more recent study of initiation and engagement, Garnick et al. (2014), using a sample of data from 2008 across four states, including Connecticut, Oklahoma, New York, and Washington, discovered individuals who had more positive outcomes in terms of legal matters were more likely to initiate and engage in substance use treatment sooner. For example, using survival analysis techniques, Garnick et al. (2014) found individuals who had fewer arrests for any crime as well as arrests for substance use related crimes and property/violent crime were more likely to initiate and engage in substance use treatment. These findings are statistically significant for individuals in New York and Oklahoma.

Kim et al. (2011) found that individuals who reported current legal problems were likely to both initiate and engage in substance use treatment. For example, individuals were 1.59 times more likely to initiate substance use treatment when reporting current legal problems. Additionally, they were 1.37 times more likely to then engage in substance use treatment when reporting current legal problems. These relationships were

not statistically significant. . Beyond these predictors of substance use treatment initiation and engagement, there are additional predictors assessed in the literature base.

## **Family and Clinical Factors of Treatment Initiation and Engagement**

### **Family/Emotional Stability**

The literature suggests that for those individuals who do not have some semblance of family/emotional support (i.e., someone in their life they can rely on), their likelihood of having a positive treatment outcome diminishes (Kingree, 1995). Brown et al. (2011) discovered that when individuals had some sort of family/emotional stability, over half were likely to engage in substance use treatment (52.7 %). Of this 52.7%, 35% reported engaging in substance use treatment when living independently compared to individuals who were not living independently.

### **Mental Health and Physical Health**

Individuals who report serious mental health illness (e.g., schizophrenia, depression, PTSD) often have higher rates of substance use issues (Mueser, Bennett, & Kushner, 1995). A point of consideration then becomes how these individuals fair in terms of substance use treatment initiation and engagement since this does become a matter of comorbidity (e.g., have two chronic illnesses). Kim et al. (2011) not only discovered individuals who were using drugs and alcohol were more likely to initiate and engage in substance use treatment; those reporting having a major depressive episode were more likely to initiate and engage in substance use treatment as well. For example, the odds of initiating substance use treatment were 160% higher for individuals with a major depressive episode relative to individuals with post-traumatic stress disorder (OR =

2.6,  $p < .05$ ). The odds of engaging in substance use treatment were 153% higher for individuals with a major depressive disorder relative to individuals with post-traumatic stress disorder ( $OR = 2.53$ ,  $p < .05$ ). In terms of physical health, Weisner et al. (2001) found that individuals who reported physical health related issues were more likely to initiate substance use treatment (25.5%) followed by individuals with mental health issues (24.8%). This could mean these individuals are attempting to make some sort of change in their lives even with mental and physical health issues.

### **Critique of the Current Literature**

For many of the factors discussed in this chapter, mixed findings were a predominant theme throughout which suggests these predictors are not robust indicators across samples. These include many demographic, static, factors such as age, gender and race. It may be that too much emphasis is placed on these types of factors as predictors of initiation and engagement in substance use treatment. It is difficult and often impossible for individuals to alter these types of characteristics. More emphasis should be placed on factors that are changeable which may serve as better predictors of initiation and engagement.

This chapter examined some changeable factors including substance use, mental health and physical health. Many of the studies cited for these diagnostic and family/clinical factors tended to produce statistically significant relationships with initiation and engagement. It may be that responding to these needs when assessing individuals increases their ability to initiate and engage in substance use treatment. One dynamic factor not yet discussed is motivation, especially treatment readiness, and its



contribution to initiation and engagement in substance use treatment. This is important since treatment readiness will impact individuals' willingness to initiate and engage in substance use treatment. The next section will discuss the empirical support for this concept in terms of what we know and what we do not know.

### **Treatment Readiness and Treatment Initiation and Engagement**

A most accepted definition of treatment readiness is “the presence of characteristics (states or dispositions) within either the client or the therapeutic situation, which are likely to promote engagement in therapy and which, thereby, are likely to enhance therapeutic change” (Ward, Day, Howells, & Birgden, 2004, p. 650).

Additionally, treatment readiness consists of motivation for treatment, especially when the decisions of substance users are considered (Rapp et al., 2007). These decisions can include, but are not limited to, the individuals' commitments, reasons, and considerations of treatment readiness. Often, the literature discusses treatment readiness in terms of an individual's ability to recognize problems and their desire for help (Rapp et al., 2007; De Leon & Jainchill, 1986; Simpson & Joe, 1993). Although these ideas are important to consider, the measurement of treatment readiness, to date, remains somewhat unclear (Mossière & Serin, 2014; McMurran & Ward, 2010). For example, instruments used to assess treatment readiness are often based on internal factors, goals, confidence and commitment of individuals (Mossière & Serin, 2014). Each instrument contains psychometric properties as well as theoretical models. Many of these instruments examine the impact of treatment readiness on more distal outcomes including recidivism and the completion of substance use treatment. There is also a body of research that

explores treatment readiness' impact on substance use treatment initiation and engagement, yet it is somewhat mixed.

Scholars continue to note the importance of motivating individuals to not only participate but be successful in treatment. In a study of motivational interviewing to improve treatment engagement and outcome in individuals seeking treatment for substance use, Carroll et al. (2006) find that using strategies such as motivational interviewing can be effective in getting individuals to remain in treatment and, eventually, complete treatment. It may be that increasing an individual's motivation will also increase their readiness to be in treatment. Several instruments are used to accomplish the measurement of an individual's level of treatment readiness.

In a study of construct and predictive validity of criminal thinking scales, Taxman, Rhodes and Dumenci (2011) assessed the Client Evaluation of Self and Treatment, Intake (CESI) on a sample of 250 drug using probationers. The CESI is used to gauge an individual's attitude toward treatment and contains a component on treatment readiness. Taxman et al. (2011) found criminal thinking among the sample of drug using probationers to be correlated to treatment readiness. For example, those with criminal thinking were more difficult to engage in treatment processes.

Brown et al. (2011) assessed treatment readiness using the University of Rhode Island Change Assessment Scale (URICA) which contains 32-items assessing individuals' stages of change (i.e., precontemplation, contemplation, action, and maintenance) regarding substance use treatment engagement (McConaughy, DiClemente, Prochaska, & Velicer, 1989). Brown et al. (2011) created a continuous

measure of treatment readiness to assess individuals' likelihood to initiate and engage in substance use treatment. Slightly more individuals did engage in substance use treatment (10.5) compared to those who did not engage in substance use treatment (10.39) of those who scored high on treatment readiness. There was no association between these groups. Brown et al. (2011) discuss this could be due to the fact that treatment readiness was assessed at one time point, intake, and not at additional follow-ups.

Kim et al. (2011) assessed substance use treatment initiation and engagement using a measure of treatment readiness. They found that individuals who scored higher on alcohol addiction severity experienced a decrease in treatment readiness and were less likely to both initiate and engage in substance use treatment. For example, individuals reporting a higher score (10) were less likely to initiate substance use treatment (Odds Ratio=0.90). Additionally, these individuals were also less likely to engage in substance use treatment (Odds Ratio=0.78). There was no association between initiation and engagement and substance use treatment and treatment readiness were not significant.

In light of these findings, an important question about treatment readiness remains in terms of its measurement. The studies assessed to this point appear to discuss treatment readiness in terms of an internal characteristic that individuals present with. Treatment readiness may in fact be a combination of both internal and external factors. For example, individuals may differ in terms of their level of treatment readiness. Some individuals may be more treatment ready than others; therefore, it is important to consider this. As mentioned previously, some measures of treatment readiness focus on internal characteristics of an individual thus neglecting the external factors that may impact their

treatment readiness. The current study uses a measure of treatment motivation and treatment resistance that incorporate both internal and external characteristics (this is discussed in more detail in Chapter 4). This approach may help to understand how treatment readiness then impacts process measures of change including initiation and engagement. As Olver, Stockdale, and Wormith (2011) note, treatment readiness, in its current state, is a predictor of treatment attrition rather than success. Using meta-analytic techniques, Olver et al. (2011) discovered that treatment readiness was not only a strong predictor of attrition but recidivism as well. Therefore, it may be of particular interest not only to assess individuals at intake, in terms of their treatment readiness, but to examine it in the context of other relevant factors that may help in the understanding of treatment readiness and its impact on process measures like initiation and engagement. The next chapter of this dissertation will explore the transtheoretical model of (TTM) change and its relation to treatment readiness.

An individual's treatment career may have an impact on their treatment readiness in several ways. First, as individuals get older treatment readiness may become more important for them to demonstrate their wanting to stop using. Second, having multiple treatment episodes may assist individuals in building up their treatment readiness. Finally, understanding how treatment readiness impacts initiation and engagement will help to design interventions to understand it better.

## **CHAPTER THREE: THEORETICAL FRAMEWORK**

The current research uses the transtheoretical model (TTM) of change as its guiding theoretical framework. Over the past 20 years, TTM has emerged as one of the leading frameworks for discussing individuals' behavior change processes through several empirical studies applying the TTM to substance use (Migneault, Adams, & Read, 2005). Therefore, this chapter will be presented in several stages. First, I provide an overview of the TTM theoretical framework, including the stages of change. Next, I discuss the empirical status of the TTM, both generally and in its application to substance use, including treatment readiness. Third, I provide a theoretical critique of the TTM and provide a summary of the TTM and its application to the current study. The rationale for using the TTM in this study is that it focuses implicitly on the two dependent variables of initiation and engagement which are similar to various components of the contemplation, preparation and action stages of change.

### **Transtheoretical Model of Change**

The Transtheoretical Model (TTM) of change is a multidisciplinary approach toward understanding behavior change amongst individuals. The framework encompasses both clinical and psychological factors that influence how individuals make changes (Prochaska & DiClemente, 1982). Casey, Day, and Howells (2005) note, "over the past two decades, the Transtheoretical Model (TTM) of change has become perhaps

the most widely used model of behavior change in the treatment of addictive and/or problem behaviors” (p. 157). The importance of the TTM lies in the fact that it can be used as a tool to assist treatment providers in identifying which individuals are ready to begin treatment, assessing their respective needs throughout the treatment process, and identifying those who are more likely to be successful in treatment (DiClemente, Schlundt, & Gemmell, 2004; Prochaska, DiClemente, & Norcross, 1992). The importance of the model lies in its application to practice. It should also be noted that treatment success may also depend on the quality of the program and appropriate program implementation.

### **Stages of Change**

The TTM consists of five stages as referenced by Prochaska and DiClemente (1984), including 1) precontemplation; 2) contemplation; 3) preparation; 4) action; and 5) maintenance. There is an unwillingness for individuals in the precontemplation stage to come to terms that they have a problem, thus reducing their likelihood of accepting change into their lives (e.g., not motivated). This stage is defined as not anticipating change within the next 6 months (Migneault et al., 2005). As individuals progress to the contemplation stage they begin to recognize they have a problem and are beginning to accept that change needs to occur (e.g., motivated). It should be noted, however, that this change is not immediate but occurs within one to six months (Migneault et al., 2005). In the preparation stage, individuals prepare to make changes in their lives by taking the proper steps within the next month (Migneault et al., 2005). In the action stage, change is occurring for individuals in terms of their behavior usually within the past 6 months

(Migneault et al., 2005). Finally, in the maintenance stage, individuals who have successfully altered their behavior work to maintain this behavior change for 6 months or more (Migneault et al., 2005).

Prochaska and DiClemente (1984) further discuss how individuals, going through the precontemplation and contemplation stages, may become defensive. This defensiveness may limit the likelihood of change processes to occur. If, and when, individuals move past these initial stages and into the preparation stage, change is beginning to occur in the individuals' life. DiClemente (2005) suggests this will only occur if the costs do not outweigh the benefits of moving into the preparation stage. Once an individual reaches the action stage, the individual should, at this point, be experiencing change in their lives. For example, this can come in the form of an increase in self-efficacy and other behavioral changes (DiClemente, 2005). Finally, the maintenance stage challenges individuals, as the name implies, to maintain this change that has occurred in their life. Several areas of inquiry have been undertaken by researchers in recent years to support the validity of the TTM.

This model provides a unique opportunity to understand how process measures of change (i.e., initiation and engagement) can help to better understand the stages of change in TTM. For example, those who initiate might be considered contemplators of change while those who are engaging in the treatment process may be considered being part of the preparation and action stages. Essentially, those individuals who initiate services may be thinking about the change process. They may start treatments or appear for a treatment episode or two but may not return. Those who continue to come back for additional

services are taking action and appear to be more invested in trying to address their addiction disorder. The TTM is a conceptual model that can help better understand treatment readiness since the stages of change are drawn upon this theoretical concept of readiness.

### **Empirical Status**

The use of the TTM finds empirical support in the literature. For example, the TTM has been applied to correctional programming (Casey, Day, & Howells, 2005); sex offenders (Kear-Colwell & Pollock, 1997; Tierney & McCabe, 2005); individuals who batter their intimate partners (Eckhardt, Holtzworth-Munroe, Norlander, Sibley, & Cahill, 2008) and violence victims (Brown, 1997). I briefly touch upon these areas of application of TTM before entering into a discussion of TTM and substance use.

In a qualitative study of domestic violence, Silvergleid and Mankowski (2006) note the importance of researchers trying to strike a balance between motivating individuals engaged in domestic violence to seek treatment and coercing them to seek treatment. They discovered, for instance, that some individuals ask therapists to challenge them while others needed support from therapists to become more motivated in treatment endeavors to move from various stages of the TTM.

Working with a sample of sex offenders, Olver, Wong, Nicholaichuk, & Gordon, (2007) assessed the TTM juxtaposed with a risk/need assessment tool developed by the researchers. Olver et al. (2007) note the dynamic nature of the TTM becomes important during the treatment phase for sex offenders. For example, Olver et al. (2007) discuss when progressing from stage to stage (e.g., precontemplation, contemplation, etc.),



positive change can be indicated. In turn, this can result in a reduction of possible risk amongst the individuals. Over a 10 year period, Olver et al. (2007) highlight the importance of the TTM as sex offenders were likely to demonstrate improvement in treatment and a reduction of future sex related offenses. Olver and colleagues (2007) apply the TTM to the Violence Risk Scale—Sexual Offender Version (VRS—SO) by quantifying 17 dynamic items (e.g., cognitive distortions) into the stages of change. Progression through the stages indicates how sex offenders develop coping skills and strategies for each of the 17 dynamic items. If a child molester, for instance, receives training on arousal modification and their behavior is observed to be different they have moved from the contemplation to the action stage. By using an assessment tool such as Olver and colleagues (2007) do, the researchers were better able to understand how sex offenders advance through various stages of the TTM.

### **Explaining the Transtheoretical Model and Substance Use**

To date, most research on the use of the TTM model and its application to substance use has been mixed (Schwarzer, 2008; Wei, Heckman, Gay & Weeks, 2011). For example, some scholars indicate that when a model involves stages, it does not take into consideration how individuals can move backwards (Bandura, 2000), but must proceed through the stages in a continuous fashion (Kraft, Sutton, & Reynolds, 1999; Sutton, 2000; Weinstein, Rothman, & Sutton, 1998). Scholars indicate that it is often difficult to detect predictive validity of the stages of change, including a study conducted by Gossop, Stewart, and Marsden (2008). Gossop et al. (2008) discuss the preparation stage and its connection to treatment outcomes for various substances, including

benzodiazepines, heroin, methadone, and stimulants. Gossop et al. (2008) discovered that the preparation stage was supportive of treatment outcomes for benzodiazepines, but not for the other substances noted. This may mean that the type of substance one uses will affect their behavior and thus, their progression through the TTM stages of change. As Gossop et al. (2008) suggest, large samples are needed to draw statistical inferences and exploring smaller samples may diminish the predictive validity of the different stages.

Additionally, diagnostic factors and personal characteristics have been found to be variously associated with TTM in the literature. These studies often discuss how individuals are sometimes mandated to participate in treatment programming (e.g., substance use) and as a result might find it difficult to partake in the stages of change to change their behavior. Farabee, Nelson, and Spence (1993) examined the readiness for change of a sample of substance using individuals who were either mandated to treatment by the criminal justice system or who willfully volunteered. The authors find that individuals mandated to treatment demonstrated lower readiness to the change process as compared to those individuals who went to treatment of their own volition.

In terms of personal characteristics, Narayan, Steele-Johnson, Delgado, & Cole (2007) discuss how age may play an important role in the behavior change process associated with the TTM. For example, using a sample of individuals charged with DUI offenses, Narayan et al. (2007) discovered older individuals were less likely to change their behavior and learn new techniques to change their behavior than younger people. This perspective is the opposite of what has been traditionally discussed in the literature surrounding substance use treatment initiation and engagement (Grella et al., 1997;

Weisner et al., 2001; Garnick et al., 2014). For Narayan et al. (2007), older individuals typically showed less motivation which affected their treatment outcomes. Narayan et al. (2007) conclude this results from the individuals' identities being so entrenched in drinking behaviors that it does not permit them to change their behavior toward more prosocial behavior (e.g., consuming less). This raises an important question about what factors make someone more or less likely to be in any given stage at any given time.

In contrast to what influences an individual's progression through the stages of the TTM's application to substance use, some other disciplines discuss the research evidence on it also (Dino, Kamal, Horn, Kalsekar, & Fernandes, 2004; Henderson, Saules, & Galen, 2004; Schwarzer, 2008; Velicer, Redding, Anatchkova, Fava, & Prochaska, 2007; Velicer et al., 2006). For example, in a meta-analysis of psychotherapy patients involved in a variety of types of treatment, including substance use, Rosen (2000) found behavioral treatment produced an effect size of .70 as it relates to each stage of change and cognitive-affective treatment produced an effect size of .80 as it relates to each stage of change suggesting a strong association between these factors. Rosen (2000) discusses that studies, including those on substance use, found that the behavioral treatment was most effective during the action stage while cognitive-affective treatment was most effective during the contemplation and preparation stages.

Similarly, Krebs, Prochaska, & Rossi, (2010) examined 87 studies and found an effect size of .18 for substance use treatment programming when treatments are tailored to an individual person's needs. This is interesting since this approach was found to be more effective instead of using a "one-size" fits all approach to treat individuals with

substance use issues. In a more recent meta-analysis, Norcross, Krebs, and Prochaska (2011) examined 39 studies involving over 8,000 individuals engaged in psychotherapy, including substance use. They found a large effect size of ( $d = .50$ ) in terms of the progress individual's made during treatment. Most notably, much of this was in the contemplation stage where individuals were beginning to think about making changes in their lives.

### **Explaining the Transtheoretical Model and Treatment Readiness**

An important component of the TTM is treatment readiness; however, scholars indicate the research evidence on treatment readiness is somewhat mixed as applied to the conceptual nature of the TTM (Mossière & Serin, 2014). For example, some scholars indicate that movement between the stages of TTM is not consistent (Drieschner, Lammers, & van der Staak, 2004). This has led other scholars to note that change within the TTM does not occur in genuine stages (McMurran, 2009). Several validated instruments exist to assess individual treatment readiness within the TTM's stages of change, including the University of Rhode Island Change Assessment Scale (URICA) (McConaughy, Prochaska, & Velicer, 1983); the Stages of Change and Readiness and Treatment Eagerness Scale (SOCRATES) (Miller & Tonigan, 1996); the Readiness to Change Questionnaire (RCQ) (Rollnick, Heather, Gold, & Hall, 1992); and the Readiness to Change Offending Questionnaire (RCOQ) (McMurran et al., 1998). In light of these instruments, it is important to understand that treatment readiness may consist of heterogeneous factors that may make some individuals more treatment ready than others.

In a study of treatment readiness and its application to TTM, Harrell, Trenez, Scherer, Martins, and Lattimer (2013) used latent class analysis (LCA) to assign individuals into latent classes of treatment readiness based on their responses to the 16-item Treatment Readiness Scale (TRS). Further, Harrell et al. (2013) used LCA to assess treatment readiness of 539 marijuana, cocaine and opioid substance users from Baltimore, Maryland. After assessment of the TRS, Harrell et al. (2013) identified a four-class model of cocaine and opioid users, including precontemplative, contemplative, preparation/action, and post-action class. Harrell et al. (2013) find that those individuals in the precontemplative class were more likely to still be using marijuana compared to those individuals in the contemplative class. The post-action class was less likely to be positive for opioids when tested and the preparation/action class was more likely to be in treatment. From a theoretical standpoint, the identification of the treatment readiness latent classes helps to provide empirical support for the TTM. For example, as discovered by Harrell et al. (2013), those individuals in the precontemplative class who are still using marijuana may find themselves ambivalent about change whereas those in the preparation/action class have taken the necessary steps to adhere to the change process (e.g., in treatment).

### **Theoretical Critiques**

The TTM is not without limitations. Scholars have noted three primary areas of theoretical critiques of the TTM, including the stages of change, measurement, and the simplicity of the model (McConaughy, Prochaska, & Velicer, 1983; Martin, 2012). Most notably, scholars contend it may be difficult to identify change in individuals and

their progression through various stages of the model (Bandura, 1998; Sutton, 2001). This has led scholars such as DiClemente and Prochaska (1998) to conclude, “individuals earlier in the process differ from individuals in the later stages on measures of change process activity, decisional considerations, and self-efficacy” (p. 9). That is, individuals who are more treatment ready earlier in the treatment process may be more likely to both initiate and engage in substance use treatment.

A second area of concern for the TTM lies in the measurement of the stages of change. Much of this concern is centered on how an individual’s readiness for change is assessed. Typically, assessment tools are not the same; therefore, differences in assessing an individual’s readiness to change will occur (Littell & Girvin, 2002). Further, some scholars have noted the poor psychometric properties surrounding some assessment tools leading to the conclusion of a lack of a single measure to indicate readiness for change (Carey, Purnine, Maisto, & Carey, 1999). This is an interesting statement since other scholars such as Bandura (1997) suggest “human behavior is too multifaceted and multidimensional to be categorized into a few discrete stages” (p. 412). As mentioned previously, these assessment tools may capture the concept of treatment readiness as an observable construct rather than from an unobservable perspective as noted by Harrell et al. (2013).

A final concern surround the TTM is the idea of individuals being mandated to participate in treatment services. As a result this can impact the true nature of change that an individual will go through (Casey et al., 2005; Day, Tucker, & Howells, 2004). If, for example, individuals are forced into treatment by external forces (e.g., the criminal

justice system), going through the process may have an impact on how they will adjust to internal change processes. Treatment is important as research indicates control mechanisms such as incarceration are not enough to produce positive behavior change in individuals (El-Bassel, Schilling, Ivanoff, Chen, Hanson, & Bidassie, 1998). As noted in Chapter 2, some research does indicate individuals both initiate and engage in substance use treatment as a result of referrals from the criminal justice system (Acevedo et al., 2012). For the field of criminal justice, treatment readiness is an important concept for those individuals who might be mandated to participate in treatment services. For example, if their levels of treatment readiness are high, they may be more willing to go through the change process. For the current study, some of the sample may not have interactions with the criminal justice system; it will still be important to understand their level of treatment readiness to make sure they are successful in treatment services.

### **Summary**

The TTM model, as a model of change, offers much insight into the discussion of how individuals change their behavior. This is important for treatment personnel who are tasked with assisting individuals through the change process. As previously discussed, the stages of change assist individuals in recognizing their change thus moving forward into the additional stages. For those who do not move through the stages, more work can be done with them. Despite the empirical support for the TTM, there is still much to do. I argue treatment readiness is a more multifaceted construct consisting of other personal characteristics, diagnostic factors and family/clinical factors that need to be considered.

The TTM is a conceptual framework to test hypotheses about why some individuals initiate and engage in substance use treatment.

The TTM is important to this study for several reasons. First, it uses the stages of change concepts to build a bridge between the process measures of initiation and engagement. Second, those who initiate might be considered contemplators of change while those who are engaging in the treatment process may be considered as being a part of the preparation and action stages. Finally, the TTM becomes an important conceptual framework to understand how treatment readiness relates to its various stages of change, including precontemplation, contemplation, preparation, action and maintenance.



## **CHAPTER FOUR: METHODS**

This chapter describes the research design and methodology of the current study. The first part of this chapter provides a statement of the primary study research questions and hypotheses. This is followed by a description of the 2012 SAMHSA/CSAT data and the proposed variables of interest. After a description of the data, the study measures are discussed and additional data considerations are explored. Finally, the analytic strategy is presented in a series of steps including univariate, bivariate and multivariate analyses.

### **Research Questions and Hypotheses**

Several research questions guide this study. The answers to the questions contribute to the existing body of knowledge surrounding the predictors of substance use treatment initiation and engagement. I briefly summarize the research questions in this section and outline them more completely in this chapter. Therefore, the first study research question is: What individual-level factors predict substance use treatment initiation in this sample? I hypothesize that several demographic characteristics (e.g., race gender, age), diagnostic factors (e.g., substance use, criminal justice involvement), family/clinical (e.g., mental health and physical health) and motivational factors (e.g., treatment readiness) will predict substance use treatment initiation. A second research question is: What individual-level factors predict substance use treatment engagement in this sample? I hypothesize the same demographic characteristics, diagnostic factors,

family/clinical and motivational factors noted above will predict substance use treatment engagement. A third research question is: Does treatment readiness, as measured by the treatment motivation and treatment resistance index, predict substance use treatment initiation? I hypothesize treatment readiness will significantly predict substance use treatment initiation. A fourth research question is: Does treatment readiness, as measured by the treatment motivation and treatment resistance index, predict substance use treatment engagement? I hypothesize treatment readiness will significantly predict substance use treatment engagement. A fifth research question is: Does treatment readiness predict initiating substance use treatment controlling for demographic characteristics (e.g., race gender, age), diagnostic factors (e.g., substance use, criminal justice involvement) and family/clinical factors (e.g., mental health and physical health)? I hypothesize that treatment readiness will increase the likelihood of initiating substance use treatment, controlling for the other factors. Finally, a sixth research question is: Does treatment readiness predict engaging in substance use treatment controlling for demographic characteristics (e.g., race, gender age), diagnostic factors (substance use, criminal justice involvement) and family/clinical factors (e.g., mental health and physical health)? I hypothesize that treatment readiness will increase the likelihood of engaging in substance use treatment, controlling for other factors. Table 1 shows each of these.

**Table 1. Research Questions and Hypotheses**

<b>Research Questions</b>	<b>Hypotheses</b>
Q1: What individual-level factors predict substance use treatment initiation in this sample?	H1: A series of demographic characteristics, diagnostic factors, family/clinical and motivational factors will predict substance use treatment initiation.
Q2: What individual-level factors predict substance use treatment engagement in this sample?	H2: The same demographic characteristics, diagnostic factors, and family/clinical and motivational factors noted above will predict substance use treatment engagement.
Q3: Does treatment readiness predict substance use treatment initiation?	H3: Treatment readiness will significantly predict substance use treatment initiation.
Q4: Does treatment readiness predict substance use treatment engagement?	H4: Treatment readiness will significantly predict substance use treatment engagement.
Q5: Does treatment readiness predict initiating substance use treatment controlling for personal characteristics, diagnostic factors and family/clinical factors?	H5: Treatment readiness will increase the odds of initiating substance use treatment, controlling for the other factors.
Q6: Does treatment readiness predict engaging in substance use treatment controlling for personal characteristics, diagnostic factors and family/clinical factors?	H6: Treatment readiness will increase the odds of engaging in substance use treatment, controlling for the other factors.

In addressing these hypotheses, the current study seeks to gain a better understanding of the importance of treatment readiness as it relates to process change measures (i.e., initiation and engagement). This study can have several important research implications. For example, if treatment readiness predicts initiating and engaging in substance use treatment, the stages of change of the TTM framework will

help to provide a better understanding of individuals' involvement in the various stages. If, however, treatment readiness is not found to predict initiating and engaging in substance use treatment, or one and not the other, further research will be needed to address how to increase individuals' levels of treatment readiness or identify other factors that might be relevant to the stages of change and how they influence outcomes such as initiation and engagement.

## **Data<sup>2</sup>**

To empirically test the current study hypotheses, data from the Substance Abuse and Mental Health Services Administration/Center for Substance Abuse Treatment (SAMHSA/CSAT) 2012 data set was used (GAIN Coordinating Center, 2013). The sample for the SAMHSA/CSAT 2012 data set included data on 32,476 clients from 224 local evaluations, recruited between 2002-2012 who were due for at least one follow-up and available in the last quarterly data set of 2012. Additionally, data were collected on several levels of care, including outpatient, intensive outpatient, short-term & moderate/long-term residential, corrections-based treatment and post-treatment continuing care. The primary survey used to collect data on clients is the Global Appraisal of Individual Needs (GAIN) (GAIN Coordinating Center, 2013). The GAIN has sections covering background, substance use, physical health, risk behaviors and disease prevention, mental and emotional health, environment and living situation, legal, and vocational. Within these sections are questions that address problems, services, client attitudes and beliefs, and the client's desire for services. The GAIN is also used to collect

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<sup>2</sup> The current research obtained Institutional Review Board approval for the secondary data analysis from George Mason University and Chestnut Health Systems, Inc.

information on recent problems, breadth of symptoms, recent prevalence lifetime service utilization, and recent utilization and its frequency. The items are combined into over 100 scales and subscales and more than 500 variables that can be used for DSM-IV-based diagnoses, American Society of Addiction Medicine (ASAM)-based level-of-care placement, The Joint Commission (TJC)-based treatment planning, and Drug Outcome Monitoring Study (DOMS)-based outcome monitoring. The GAIN also includes items that support most state and federal reporting requirements, which compare to community samples from the National Survey of Drug Use and Health. The GAIN instrument takes between 1.5 and 2.5 hours to administer, depending on interviewer experience and client severity (GAIN Coordinating Center, 2013).

The current study focuses on clients who are at least 18 years of age and older. While the data set is largely comprised of juvenile cases, the current study uses only adult cases<sup>3</sup>. For example, 57.3% of the clients in the SAMHSA/CSAT 2012 data set are 18-25 years of age whereas 42.7% are 26+ years of age (n = 5443). Additionally, 64.8% are males and 35.2% are females. In terms of race, a majority of clients are white (44.2%) followed by Hispanic (24%), African American (19.2%) and those who identify as Other (12.5%). As it pertains to substance use, data in the SAMHSA/CSAT 2012 data set indicate a majority of clients reported having used marijuana (52.9%) in the past 90 days. This is followed by alcohol (25.9%), amphetamines (7.5%), opioids (6%), cocaine (5.5%), and other drugs (2.1%).

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<sup>3</sup> The current study is inspired by a research project working with adult probationers attempting to navigate their way through probation by initiating and engaging in treatment services.

A couple of features of the SAMHSA/CSAT 2012 data set make it appealing for the current study. First, the SAMHSA/CSAT 2012 data set follows clients over time from Intake, 3 months, 6 months and 12 months. The follow-up rates for the SAMHSA/CSAT 2012 data set include 85% with one or more at 3, 6, and 12 months post intake and 65% with two or more. Secondly, the SAMHSA/CSAT 2012 data set reports treatment outcome data in the form of initiation and engagement. This will provide a unique opportunity to assess the relationship between treatment readiness and treatment initiation and engagement using a series of stepwise binary logistic regression models.

## **Measures**

### **Dependent Variables**

Two outcome measures are considered in the current study.. *Initiation* is an indicator variable of initiation collected during the initial GAIN interview and was administered not more than 14 days before or seven days after substance abuse treatment admission. *Engagements* an indicator of engagement for 30+ days and 2+ sessions. These factors have dichotomous values and are coded 0 = No and 1 = Yes.

### **Independent Variables**

Several independent variables are used to distinguish between what predicts initiating and engaging in substance use treatment. The selection of these risk and protective factors are guided by the review of relevant literature discussed in Chapters 2 and 3. Further, these variables span across several areas, including individuals' personal characteristics, diagnostic factors, family/clinical factors and motivation (GAIN Coordinating Center, 2011). Data were collected on these risk and protective factors

between 2002—2012. These covariates are used to distinguish their impact on substance use treatment initiation and engagement.

### **Demographic Characteristics**

Gender, age and race are included as personal characteristics in the bivariate and multivariate analyses. *Gender* is coded 0 for males and 1 for females. *Age* is comprised of 4 groups, including 18-25; 26-35; 36-49; and 50+ (coded 1 for the 18-25 year olds, 2 for the 26-35 year olds, 3 for the 36-49 year olds and 4 for the 50+ year olds). *Race* has four categories, including White/Caucasian (coded 1); Black/African-American (coded 2), Hispanic (coded 3), and Other (coded 4). These covariates are used to predict substance use treatment initiation and engagement. Socioeconomic status indicators included education, homelessness, marital status, and employment. *Education* is a dichotomous indicator asking respondents if they graduated from high school (0 = No, 1 = Yes). *Homelessness* is a dichotomous indicator asking respondents if they have ever considered themselves to be homeless (0 = No, 1 = Yes). *Marital status* is a categorical indicator asking respondents if they are married or living as married, separated, divorced, widowed, or never married (1 = Married or living as married, 2 = Separated, divorced or widowed, 3 = never married). Finally, the *employment activity scale* asks respondents about their employment activity over the past 90 days (*Range* = 0-100). For this scale higher scores indicate more recent employment, days working, and fewer days of missing scheduled work. The internal consistency of the scale was assessed and drawn from previous studies ( $\alpha = .95$ ) (Dennis et al., 2000).

## **Diagnostic Factors**

To assess substance use history of respondents, the *substance frequency scale* (Lennox, Dennis, Ives, & White, 2006) was used. Higher scores on this scale represent increasing frequencies of substance use in terms of days, days staying high most of the day (i.e., high risk of problems) and days causing problems during the past 90 days (*Range* = 0-82). The internal consistency of the scale was assessed ( $\alpha = .83$ ). To assess prior treatment episodes, the *treatment received scale* (Godley et al., 2007) was used. Higher values indicate greater variety of services received through treatment in the past 90 days (*Range* = 0-20). The internal consistency of the scale was assessed ( $\alpha = .95$ ). To assess criminal justice involvement, the *criminal justice system scale* was used (Morral et al., 2006). Higher scores indicate increasing involvement in the criminal justice system in the past 90 days through detention or monitoring (*Range* = 0-100). Finally, to assess legal activities, the *illegal activities scale* (White et al., 2004) was used. Higher scores indicate more recent illegal activity, more days of illegal activity and increasingly more dependence on illegal activities for financial support during the past 90 days (*Range* = 0-100). The internal consistency of the scale was assessed ( $\alpha = .81$ ).

## **Family and Clinical Factors**

To assess recovery environment, the *environmental strengths scale* was used. This scale is a count of positive aspects of a client's environment including no fighting or illegal activity and exposure to others in treatment or in recovery at home, school/work or among peers. Higher scores indicate more positive aspects in the client's environment



outside of treatment (*Range* = 0-12). To assess mental health, the *internal mental distress scale* (Dennis, Chan, & Funk, 2006) was used. Higher scores indicate a greater level of internal mental distress (i.e., somatic, depression, anxiety, homicide/suicide, traumatic stress) (*Range* = 0-43). The internal consistency of the scale was assessed ( $\alpha = .96$ ). Finally, the *health problem scale* (Dennis et al., 2000) was used to assess the physical health of respondents. Higher scores indicate more recent problems, problems on more days and problems increasingly interfering with the individual's responsibilities. The internal consistency of the scale was assessed (*Range* = 0-100) ( $\alpha = .77$ ).

### **Motivational Factor**

Treatment readiness is a current assessment of individuals' readiness to be in substance use treatment. The variable is a summative index from the Treatment Motivation Index (TMI) and the Treatment Resistance Index (TRI). The TMI consists of 5 binary -items asking respondents if they currently feel that: 1) there is a lot of pressure for you to be in alcohol or drug treatment (0 = No, 1 = Yes); 2) you can get the help you need in alcohol or drug treatment program (0 = No, 1 = Yes); 3) you need to be in treatment for at least a month (0 = No, 1 = Yes); 4) you will probably need to return to treatment one or more times during your lifetime (0 = No, 1 = Yes); and 5) you need support from friends and relatives to deal with your alcohol or drug use (0 = No, 1 = Yes). The TMI is a count of items indicating individuals' perceptions of sources to be in treatment and his/her own need for treatment, support for treatment and hope for help through treatment. The TRI consists of 4 items asking respondents if they currently feel that: 1) being in a treatment program is too demanding (0 = No, 1 = Yes); 2) you have too

many other responsibilities not to be in a treatment program (0 = No, 1 = Yes); 3) it will be hard for you to resist alcohol or other drugs where you currently live, work or go to school (0 = No, 1 = Yes); and 4) your old friends may try to get you to drink or use drugs again (0 = No, 1 = Yes). The TRI is a count of items endorsed regarding difficulties in being treated or resisting use. These 9 binary items are measured at Intake with higher scores indicating more readiness for treatment (*Range* = 0-9). There is a slightly elevated amount of missing data for the TMI and TRI since both items must have responses in order to calculate the indices. This is discussed further in the next section.

**Table 2. Variables for the Current Study**

Dependent Variables	Independent Variables
Initiation	Gender
Engagement	Age
	Race
	Education
	Homelessness
	Marital status
	Employment activity scale
	Substance frequency scale
	Treatment received scale
	Criminal justice system scale
	Illegal activities scale
	Environmental strengths scale
	Internal mental distress scale
	Health problems scale
	Treatment readiness

### **Additional Data Considerations**

Among all of the current study variables, the only ones with sufficient missing data are the treatment readiness variable (missing = 324 responses); treatment received scale (missing = 202 responses); and the criminal justice system scale (missing = 268 responses). Upon further examination of these variables, several points of discussion are warranted. First, each of these variables is comprised of binary response options required to be asked of individuals at intake. Missing responses are likely due to either individuals not knowing how to respond, legitimately skipping an item, refusing to answer, bad data (i.e., not entered or entered incorrectly) and, finally, just not being asked. Since the treatment readiness variable is made up of 9-binary response items, I elected to let the binary logistic regression models account for the missing data using listwise deletion. This is appropriate for several reasons. First, Allison (2005) suggests multiple imputations of categorical variables can lead to bias results. For example, dummy coding a categorical variable and then treating it as a continuous measure (i.e., between 0 and 1) rounded off to 0 or 1 based on the imputed value being between .5 is not accurate. Secondly, Allison (2005) notes using other approaches such as listwise deletion may not bias results as compared to using the previously noted approach. Binary logistic regression will use listwise deletion of missing cases and should not impact the statistical power since there are over 5,000 cases.

Prior to data analysis, I examine each of the independent measures to check for multicollinearity. When independent measures are highly correlated with one another it is difficult to determine which variables are impacting the dependent measures. When

multicollinearity becomes an issue it can weaken the overall model (Norusis, 2008).

When two variables have no correlation, a value of zero will be produced whereas two perfectly correlated variables will produce a value of 1. When independent measures are highly correlated, a value of .70 or higher become problematic (Bachman & Paternoster, 2004). Table 3 shows the test for multicollinearity among the independent scales.

Upon examination of the independent scales, multicollinearity does not appear to be an issue. For example, many of the scales are significantly correlated with one another at either the  $p < .05$ ,  $p < .01$ , or  $p < .001$  level. The two highest correlated scales are internal mental distress and health problems scale ( $r = .266$ ,  $p < .001$ ) and substance frequency and illegal activities ( $r = .415$ ,  $p < .001$ ). Although these are highly significant, the strength of their relationship is moderate at best. To further assess for multicollinearity, VIF and tolerance statistics were computed for each of the scale items. Each scale reported a VIF less than 10 and a tolerance greater than .10 which is considered appropriate and reveals no multicollinearity (Bruin, 2006).

**Table 3. Multicollinearity Diagnostics for Independent Scales**

	EAS	SFS	TRS	CJSS	IAS	ESS	IMDS	HPS	TxReady
Employment Activity Scale (EAS)	1.00	.103***	-.007	-.109***	.042**	-.046***	-.028*	-.040**	-.065***
Substance Frequency Scale (SFS)		1.00	-.021	-.200***	.415***	-.221***	.231***	.062***	.051***
Treatment Received Scale (TRS)			1.00	.056***	.037**	.091***	.094***	.016	.117***
Criminal Justice System Scale (CJSS)				1.00	-.038***	.101***	-.010	-.009	.070***
Illegal Activities Scale (IAS)					1.00	-.171***	.196***	.038**	.040**
Environmental Strengths Scale (ESS)						1.00	-.100**	-.024	.092***
Internal Mental Distress Scale (IMDS)							1.00	.266***	.206***
Health Problems Scale (HPS)								1.00	.070***
Treatment Readiness (TxReady)									1.00

\*p&lt;.05; \*\*p&lt;.01; \*\*\*p&lt;.001

## **Analytic Strategy**

The current study analyses were conducted in multiple stages. First, univariate statistics, including descriptive statistics, were used to describe the nature of each of the study variables. For example, I examined the frequency distribution, means and standard deviations of each of the dependent and independent measures.

Secondly, bivariate analyses, including point-biserial correlations and crosstabulations, explore what personal, diagnostic, family/clinical and motivational factors are related to substance use treatment initiation and engagement. A point-biserial correlation is the preferred method of analysis here due to the dichotomous nature of the dependent measures (Linacre & Rasch, 2008). This approach, along with crosstabulations, was used to assist the researcher in answering research questions one through four. Additionally, phi coefficients were computed to determine which variables produced the greatest effect size on the dependent measures of interest.

Finally, to address research questions five and six, multivariate techniques, including stepwise binary logistic regressions (BLR) were used. I entered the covariates into each model to assess the impact they have on substance use treatment initiation and engagement. Model 1 contains the demographic characteristics, Model 2 the diagnostic factors, Model 3 the family/clinical factors and Model 4 the primary covariate of interest, treatment readiness. The model summaries and Nagelkerke  $R^2$ 's are computed for each model to assess for variance as well as Hosmer and Lemeshow tests for best model fit.

## **Conclusion**

This chapter outlines the several research questions and hypotheses to examine what factors predict substance use treatment initiation and engagement. These hypotheses will be tested through a series of descriptive, bivariate and multivariate analyses. This will allow the researcher to understand the relationship between treatment readiness, demographic, diagnostic and family/clinical factors on initiation and engagement in substance use treatment.

## **CHAPTER FIVE: RESULTS**

### **Introduction**

The analysis begins with descriptive statistics for each of the study variables, including all dependent and independent variables. For example, frequency distributions, means, and standard deviations were examined for each variable when appropriate. Following the descriptive statistics, bivariate associations are examined for each of the study hypotheses including: 1) the demographic characteristics, diagnostic factors, family/clinical factors and motivational factors discussed will predict substance use treatment initiation; 2) the demographic characteristics, diagnostic factors, family/clinical factors and motivational factors discussed will predict substance use treatment engagement; 3) treatment readiness will significantly predict substance use treatment initiation; and 4) treatment readiness will significantly predict substance use treatment engagement. These include crosstabulations and point-biserial correlations. Finally, multivariate models are used to address hypotheses 5) treatment readiness will increase the odds of initiating substance use treatment, controlling for the other factors and 6) treatment readiness will increase the odds of engaging in substance use treatment, controlling for the other factors. These analyses include a series of stepwise binary logistic regressions for each of the dependent measures and independent measures. I close this chapter with a discussion of the current study findings.



## Descriptive Findings of Key Demographic Characteristics

Table 4 highlights descriptive statistics for each of the demographic characteristics for the study sample. A majority of the sample (44%) was Caucasian and between the ages of 18-25 (57%). Additionally, more than half of the sample were males (64%); were high school graduates (58%); were never homeless (66%); and have never been married (69%). During the past 90 days, the sample self-reported having, on average, 22.49 days of employment activity including days working and less days of missing scheduled work ( $SD = 34.95$ ).

**Table 4. Descriptive Statistics for Demographic Characteristics of Study Sample**

Demographic Characteristics	Frequency (N = 5443)	Percent or Mean
Race		
White	2407	44.2
Black	1046	19.2
Hispanic	1308	24
Other	682	12.5
Age		
18-25	3120	57.3
26-35	986	18.1
36-49	989	18.2
50+	348	6.4
Gender		
Male	3528	64.8
Female	1914	35.2
Missing	1	.0
Education		
Graduate high school	3205	58.9
Did not graduate high school	2229	41
Missing	9	.2

Homeless		
Homeless	1801	33.1
Not homeless	3619	66.5
Missing	23	.4
Marital status		
Married/living as	702	12.9
Separated/Divorced/Widowed	963	17.7
Never married	3763	69.1
Missing	15	.3
Employment Activity Scale	5391	22.49
Missing	52	
Region <sup>4</sup>		
1	275	5.1
2	327	6
3	363	6.7
4	1445	26.5
5	432	7.9
6	393	7.2
7	214	3.9
8	598	11
9	783	14.4
10	613	11.3

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Table 5 reveals descriptives for the diagnostic characteristics of the study sample including substance frequency; treatment received; criminal justice involvement; and illegal activities. Since these are scale items, the frequencies, means and standard deviations of each were assessed. During the past 90 days, the sample self-reported having, on average, 22.49 days of employment activity including days working and less days of missing scheduled work ( $SD = 34.95$ ). Respondents also self-reported, on average, 9.38 days of substance use during the past 90 days. This includes staying high

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<sup>4</sup> Region 1 = CT, ME, MA, NH, RI, VT; Region 2 = NY, NJ, Puerto Rico, Virgin Islands; Region 3 = DE, MD, PA, VA, WV, DC; Region 4 = AL, FL, GA, KY, MS, NC, SC, TN; Region 5 = IL, IN, OH, MI, MN, WI; Region 6 = LA, NM, OK, AR, TX; Region 7 = IA, KS, MO, NE; Region 8 = CO, MT, ND, SD, UT, WY; Region 9 = AZ, CA, HI, NV, Guam and Pacific Islands; Region 10 = AK, ID, OR, WA

most of the day (i.e., high risk or problems) and days causing problems ( $SD = 14.65$ ). For the treatment received scale, the study sample self-reported, on average, 2.63 days of a greater variety of services received in the past 90 days ( $SD = 4.82$ ). The study sample reported an average of 60.31 days of involvement in the criminal justice system in the past 90 days ( $SD = 46.11$ ). This includes both detention and monitoring. Finally, the study sample self-reported 8.28 days of illegal activity, days of illegal activity, and dependence on illegal activities for financial support during the past 90 days ( $SD = 11.42$ ).

**Table 5. Descriptive Statistics for Diagnostic Characteristics of Study Sample**

Diagnostic Characteristics	Frequency	Mean	Standard Deviation
Substance frequency scale	5442	9.38	14.65
Missing	1		
Range (0-82)			
Treatment received scale	5241	2.63	4.82
Missing	202		
Range (0-20)			
Criminal justice system index	5175	60.31	46.11
Missing	268		
Range (0-90)			
Illegal activity scale	5372	8.28	11.42
Missing	71		
Range (0-90)			

Table 6 displays descriptive statistics for each of the family/clinical characteristics of the study sample including social support; mental distress; and health problems. The sample as a whole self-reported having, on average, 5.67 sources of social support, including professionals, family, friends, schoolmates or work colleagues ( $SD = 2.45$ ). Additionally, respondents self-reported, on average, 10.23 sources of internal mental distress, including somatic, depression, anxiety, homicide/suicide and traumatic stress ( $SD = 10.20$ ). Finally, the study sample self-reported 14.70 days of health problems, problems on more days and problems increasingly interfering with their responsibilities ( $SD = 20.01$ ).

**Table 6. Descriptive Statistics for Family/Clinical Characteristics of Study Sample**

<b>Family/Clinical Characteristics</b>	<b>Frequency</b>	<b>Mean</b>	<b>Standard Deviation</b>
Environmental strengths index	5432	5.67	1.81
Missing	11		
Range (0-12)			
Internal mental distress scale	5438	10.23	10.20
Missing	5		
Range (0-43)			
Health problem scale	5385	14.70	20.01
Missing	58		
Range (0-100)			

Table 7 highlights descriptive statistics for the motivational/outcomes of interest of the study sample. The sample as a whole self-reported having, on average, a score of

5.75 on the treatment readiness scale ( $SD = 1.49$ ). Higher scores indicate an individuals' readiness to be in substance use treatment. The primary outcomes of interest for the current study, initiation and engagement, are also displayed in Table 7. For example, (90.4%) of respondents self-reported initiating substance use treatment compared to (9.6%) that did not whereas (59.5%) engaged in substance use treatment and (39.8%) did not. Although most of the clients initiated care, few were engaged or participated in substance use treatment as discussed below.

**Table 7. Descriptive Statistics for Motivational/Outcomes of Study Sample**

Motivational/Outcomes	Frequency	Percent	Mean	Standard Deviation
Treatment Readiness	5119	-	5.75	1.49
Missing	324	-	-	-
Range (0-9)				
Initiation				
Yes	4920	90.4	-	-
No	523	9.6	-	-
Engagement				
Yes	3239	59.5	-	-
No	2167	39.8	-	-
Missing	37	.7		

## **Bivariate Findings**

### **Initiation**

Initiation is defined as receiving another treatment service within 14 days after the beginning of a new outpatient or intensive outpatient treatment episode. Hypothesis one predicts the same demographic characteristics, diagnostic factors, family/clinical and motivational factors will predict substance use treatment initiation. Table 8 reveals the findings for demographic characteristics that predict substance use treatment initiation. Hispanics (93.4%) were most likely to initiate substance use treatment followed by Whites (90.2%); Other races (88.4%); and Blacks (88.2%). There is a statistically significant relationship between race/ethnicity and substance use treatment initiation  $X^2(3, N = 5443) = 22.56, p = .000$ .

Treatment initiation increases steadily with age. For example, individuals 50 years and older (98.9%) were more likely to initiate substance use treatment compared to 36-49 year olds (97.2%); 26-35 year olds (96.7%); and 18-25 year olds (85.3%). There is a statistically significant relationship between age and substance use treatment initiation  $X^2(3, N = 5443) = 217.86, p = .000$ .

Being female increases the likelihood of initiating substance use treatment (92.1%) compared to males (89.5%). There is a statistically significant relationship between gender and substance use treatment initiation  $X^2(1, N = 5442) = 9.47, p = .002$ . Additionally, those individuals who reported graduating high school (92.7%) were more likely to initiate substance use treatment compared to those individuals who did not graduate high school (87.2%). There is a statistically significant relationship between

education and substance use treatment initiation  $X^2 (1, N = 5434) = 46.46, p = .000$ . In terms of homelessness, those individuals who reported ever being homeless (91.7%) were slightly more likely to initiate substance use treatment compared to those individuals who report not ever being homeless (89.8%). There is a statistically significant relationship between homelessness and substance use treatment initiation  $X^2 (1, N = 5420) = 4.98, p = .026$ .

An individual's marital status matters in terms of initiating substance use treatment. Those individuals who reported being separated, divorced or widowed (96.9%) were most likely to initiate substance use treatment followed by married or living as married (93.2%) and the never married (88.2%). There is a statistically significant relationship between marital status and substance use treatment initiation  $X^2 (2, N = 5428) = 73.69, p = .000$ .

Due to the large sample size of the current study, all of the independent measures were statistically significantly with initiating substance use treatment at the bivariate level of analysis. In order to discern a more meaningful effect, effect sizes were calculated using the phi coefficient (Cramer, 1946). The phi coefficient is the effect size of choice since both the outcome variable (initiation) and each independent measure are binary or categorical. Age produced the greatest effect size for initiation ( $\phi = .200$ ); however, this is a weak positive association.

**Table 8. Demographic Characteristics and Comparison of Differences between those who Initiate and Did not Initiate Substance Use Treatment**

<b>Demographic characteristics</b>	<b>Initiate (n = 4920)</b>	<b>Did not Initiate (n = 523)</b>	<b>Significance/effect size</b>
<b>Race</b>			$p = .000; \phi = .064$
White	90.2	9.8	
Black	88.2	11.8	
Hispanic	93.4	6.6	
Other	88.4	11.6	
<b>Age</b>			$p = .000; \phi = .200$
18-25	85.3	14.7	
26-35	96.7	3.3	
36-49	97.2	2.8	
50+	98.9	1.1	
<b>Gender</b>			$p = .002; \phi = .042$
Male	89.5	10.5	
Female	92.1	7.9	
<b>Education</b>			$p = .000; \phi = .092$
Graduate HS	92.7	7.3	
Did not graduate HS	87.2	12.8	
<b>Homeless</b>			$p = .026; \phi = .030$
Homeless	91.7	8.3	
Not homeless	89.8	10.2	
<b>Marital status</b>			$p = .000; \phi = .117$
Married	93.2	6.8	
Separated/Divorced/Widowed	96.9	3.1	
Never married	88.2	11.8	



To further assess hypothesis one, point-biserial correlations were examined to determine if the employment activity demographic characteristic, diagnostic and family/clinical factors predicted substance use treatment initiation. Additionally, hypothesis three is included in this analysis which predicts treatment readiness will significantly predict substance use treatment initiation. Table 9 highlights the point-biserial correlations relationships between initiation and each of the scale items. There is a negative, weak, statistically significant relationship between initiation and employment activity  $r(5391) = -.04, p < .01$ . This indicates that individuals with more reported days of employment activity are less likely to initiate substance use treatment. Along with employment activity, there is a negative, weak, statistically significant relationship between initiation and substance use frequency  $r(5442) = -.03, p < .05$ . For example, individuals who reported more substance use days were less likely to initiate substance use treatment. The criminal justice system index was significantly correlated with initiating substance treatment in the positive direction; however, the relationship was weak  $r(5175) = .03, p < .05$ . This means that as individuals report more days of involvement in the criminal justice system, they are more likely to initiate substance use treatment. This weak relationship denotes that as individuals reported more illegal activity they are less likely to initiate substance use treatment. The environmental strengths scale was significantly correlated with initiating substance use treatment in the positive direction; however, this relationship was weak as well  $r(5432) = .08, p < .001$ . Finally, to address hypothesis three, treatment readiness significantly predicted initiating substance use treatment  $r(5119) = .10, p < .001$ . Although this relationship was weak as

well, it was the strongest predictor of initiating substance use treatment compared to the other scale items. For example, the higher an individual's treatment readiness, the more likely they were to initiate substance use treatment.

**Table 9. Point-biserial Correlations for Initiation and Substance Frequency, Employment, CJS, Illegal Activities and Environmental Strengths Scales**

	Initiation	EAS	SFS	TRS	CJSS	IAS	ESS	IMDS	HPS	TxReady
Initiation	1.00	-.041**	-.031*	.003	.030*	-.023	.087***	.016	.020	.103***
Employment Activity Scale (EAS)		1.00	.103***	-.007	-.109***	.042**	-.046***	-.028*	-.040**	-.065***
Substance Frequency Scale (SFS)			1.00	-.021	-.200***	.415***	-.221***	.231***	.062***	.051***
Treatment Received Scale (TRS)				1.00	.056***	.037**	.091***	.094***	.016	.117***
Criminal Justice System Scale (CJSS)					1.00	-.038**	.101***	-.010	-.009	.070***
Illegal Activities Scale (IAS)						1.00	-.171***	.196***	.038**	.040**
Environmental Strengths Scale (ESS)							1.00	-.100***	-.024	.092***
Internal Mental Distress Scale (IMDS)								1.00	.266***	.206***
Health Problems Scale (HPS)									1.00	.070***
Treatment Readiness (TxReady)										1.00

\*p<.05; \*\*p<.01; \*\*\*p<.001

## Engagement

Engagement is defined as receiving two additional services within 30 days after the initiation service. Hypothesis two predicts the same demographic characteristics, diagnostic factors, family/clinical and motivational factors will predict substance use treatment initiation. Table 9 reveals the findings for demographic characteristics that predict substance use treatment initiation. As can be seen, in terms of race, Other races (64.2%) were more likely to engage in substance use treatment followed by Whites (61.1%); Hispanics (59.4%); and Blacks (55.1%). There is a statistically significant relationship between race and substance use treatment engagement  $X^2 (3, N = 5406) = 16.34, p = .001$ .

Treatment engagement decreases steadily with age. For example, individuals 18-25 years of age (62.1%) were most likely to engage in substance use treatment compared to 26-35 year olds (60.1%); 50 years and older individuals (56.4%); and 36-49 year olds (54.2%). There is a statistically significant relationship between age and substance use treatment engagement  $X^2 (3, N = 5406) = 21.15, p = .000$ . Females (63.8%) were more likely to engage in substance use treatment compared to males (57.8%). There is a statistically significant relationship between gender and substance use treatment engagement  $X^2 (1, N = 5405) = 18.08, p = .000$ .

Additionally, individuals who reported graduating high school (61.3%) were more likely to engage in substance use treatment compared to those individuals who did not graduate high school (58.0%). There is a statistically significant relationship between education and substance use treatment engagement  $X^2 (1, N = 5397) = 5.87, p = .015$ . In

terms of homelessness, those individuals who reported not ever being homeless (60.1%) were slightly more likely to engage in substance use treatment compared to those individuals who reported ever being homeless (58.0%). There is not a statistically significant relationship between homelessness and substance use treatment engagement  $X^2(1, N = 5383) = .109, p = .741$ .

An individual's marital status matters in terms of engaging in substance use treatment. Those individuals who reported never being married before (62.0%) were more likely to engage in substance use treatment followed by married or living as married (56.0%) and separated, divorced or widowed (55.1%). There is a statistically significant relationship between marital status and substance use treatment initiation  $X^2(2, N = 5391) = 20.34, p = .000$ .

Similar to the bivariate results for initiation, many of the same measures significantly predicted engaging in substance use treatment at the bivariate level of analysis, excluding homelessness. In order to discern a more meaningful effect, effect sizes were calculated using the phi coefficient (Cramer, 1946). The phi coefficient is the effect size of choice since both the outcome variable (engagement) and each independent measure are binary or categorical. Once again, age produced the greatest effect size for engagement ( $\phi = .063$ ); however, there is little to no association.

**Table 10. Demographic Characteristics and Comparison of Differences between those who Engage and Did not Engage in Substance Use Treatment**

Demographic characteristics	Engage (n = 3239)	Did not Engage (n = 2167)	Significance/effect size
Race			$p = .001; \phi = .055$
White	61.1	38.9	
Black	55.1	44.9	
Hispanic	59.4	40.6	
Other	64.2	35.8	
Age			$p = .000; \phi = .063$
18-25	62.1	37.9	
26-35	60.1	39.9	
36-49	54.2	45.8	
50+	56.4	43.6	
Gender			$p = .000; \phi = .058$
Male	57.8	42.2	
Female	63.8	36.2	
Education			$p = .015; \phi = .033$
Graduate HS	61.3	38.7	
Did not graduate HS	58.0	42.0	
Homeless			$p = .741; \phi = -.055$
Homeless	59.6	40.4	
Not homeless	60.1	39.9	
Marital status			$p = .000; \phi = .061$
Married/living as	56.0	44.0	
Separated/Divorced/Widowed	55.1	44.9	
Never married	62.0	38.0	

To further assess hypothesis one, point-biserial correlations were examined to determine if the diagnostic and family/clinical factors predicted substance use treatment engagement. Additionally, hypothesis three is included in this analysis which predicts treatment readiness will significantly predict substance use treatment engagement. Table 11 reveals the relationships between engagement and each of the scale items. There is a positive, weak, statistically significant relationship between engagement and employment activity  $r(5354) = .02, p < .05$ . This indicates that individuals with more reported days of employment activity are more likely to engage in substance use treatment. Along with employment activity, there is a positive, weak, statistically significant relationship between engagement and substance use frequency  $r(5405) = .06, p < .001$ . For example, individuals who reported more substance use were more likely to engage in substance use treatment. The criminal justice system index significantly predicted engaging in substance treatment in the negative direction, however, the relationship was weak  $r(5139) = -.02, p < .001$ . This means that as individual's report more days of involvement in the criminal justice system they are less likely to engage in substance use treatment. The illegal activity scale significantly predicted engaging in substance use treatment in the positive direction  $r(5336) = .05, p < .001$ . This weak relationship denotes that as individuals reported more illegal activity, they are more likely to engage in substance use treatment. The internal mental distress scale and health problems scale both significantly predict engaging in substance use treatment in the positive direction. For instance,

individuals who reported more mental distress  $r(5401) = .03, p < .05$  and health problems  $r(5348) = .04, p < .01$  were more likely to engage in substance use treatment. Finally, to address hypothesis three, treatment readiness did not significantly predicted engaging in substance use treatment  $r(5097) = .01$ . Although this relationship was weak and non-significant it still goes in a positive direction. That is, the higher the treatment readiness, the more likely the person is to engage in treatment.



**Table 11. Point-biserial Correlations for Engagement and Substance Frequency, Employment, CJS, Illegal Activities and Environmental Strengths Scales**

	Engagement	EAS	SFS	TRS	CJSS	IAS	ESS	IMDS	HPS	TxReady
Engagement	1.00	.028*	.061***	-.007	-.046***	.055***	-.022	.032**	.040**	.014
Employment Activity Scale (EAS)		1.00	.103***	-.007	-.109***	.042**	-.046***	-.028*	-.040**	-.065***
Substance Frequency Scale (SFS)			1.00	-.021	-.200***	.415***	-.221***	.231***	.062***	.051***
Treatment Received Scale (TRS)				1.00	.056***	.037**	.091***	.094***	.016	.117***
Criminal Justice System Scale (CJSS)					1.00	-.038**	.101***	-.010	-.009	.070***
Illegal Activities Scale (IAS)						1.00	-.171***	.196***	.038**	.040**
Environmental Strengths Scale (ESS)							1.00	-.100***	-.024	.092***
Internal Mental Distress Scale (IMDS)								1.00	.266***	.206***
Health Problems Scale (HPS)									1.00	.070***
Treatment Readiness (TxReady)										1.00

\*p<.05; \*\*p<.01; \*\*\*p<.001

## **Multivariate Findings**

### **Initiation<sup>5</sup>**

A series of stepwise binary logistic regression models tested hypothesis 5. These models are meant to examine the impact each set of factors has on initiating substance use treatment. For example, hypothesis 5 predicted treatment readiness will increase the odds of initiating substance use treatment, controlling for the other demographic, diagnostic and family/clinical factors. The binary logistic regression results are presented as a series of stepwise models where demographic characteristics are introduced in Model 1, diagnostic factors added in Model 2, family/clinical factors in Model 3 and, finally, treatment readiness in Model 4. A simple bivariate regression was calculated to demonstrate the uniqueness of the relationship. The results were similar to the point-biserial correlations in tables 9 and 11, respectively. Table 12 shows the results of each of these models. These factors were introduced one model at a time to help determine which are more relevant in terms of helping to explain initiation in substance use treatment.

Model 1. Demographic characteristics consisted of race, age, gender, education, homelessness and marital status. As shown in Table 12, demographic characteristics that significantly predict initiating substance use treatment include race, age, gender and education. For example, being Hispanic significantly predicted initiating substance use treatment compared to Other races. In fact, the odds of initiating substance use treatment were 110.5% higher for Hispanics relative to Other races (OR = 2.105,  $p = .000$ ).

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<sup>5</sup> Further analyses explored race/ethnicity as a series of dummy variables. For example, (0 = nonwhite, 1 = white); (0 = nonblack, 1 = black); (0 = nonhispanic, 1 = Hispanic); and (0 = nonother; 1 = other). For each of these models, no significant differences in race/ethnicity were detected for initiation.

In addition to using Other races as the reference group, additional analyses were conducted with Caucasian as the reference group (not shown). The findings in the model with Caucasian as the reference group support the initial conclusion that Hispanic ethnicity is associated with increased odds of initiation relative to Whites and other. For example, in the final model, Model 4, the odds of initiating substance use treatment were 123% higher for Hispanics relative to Whites ( $OR = 2.232, p = .000$ ). Although the odds ratio increases slightly, the odds of initiating substance use treatment remained higher for Hispanics in both models. Altering the reference category has no impact on the findings and therefore other race is used as the reference category.

In terms of age, the odds of initiating substance use treatment were 95% less for 18-25 year olds ( $OR = .046, p = .000$ ) and 74% less for 26-35 year olds ( $OR = .264, p = .031$ ) relative to the 50 and older group. The odds of initiating substance use treatment were 23% less for males relative to females ( $B = -.260, OR = .771, p = .030$ ). Education reveals that the odds of initiating substance use treatment were 32% less for individuals who do not graduate high school relative to those who do graduate high school ( $OR = .683, p = .000$ ). The model chi-squared value was statistically significant which indicates that the model overall is a statistically significant predictor of initiating substance use treatment ( $X^2 = 282.932, df = 11, p = .000$ ). To test for fit of Model 1, the Hosmer and Lemeshow Test was used which revealed low chi-squared values that are non-statistically significant ( $X^2 = 7.755, p = .458$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. If the Hosmer and Lemeshow Test were statistically significant it would

indicate instability in the model which results in a poorly fitting model. The Nagelkerke  $R^2$  for the model is .128 which means taken together, the demographic characteristics alone explain 12.8% of the variation in initiating substance use treatment.

Model 2. Diagnostic factors are comprised of substance use frequency, treatment received, criminal justice system involvement and illegal activity. These were introduced along with the demographic characteristics from Model 1. The same demographic characteristics from Model 1 remained significant in Model 2. None of the diagnostic factors reached significance. The model chi-squared value were statistically significant which indicates that the model, overall, is a statistically significant predictor of initiating substance use treatment ( $X^2 = 288.595$ ,  $df = 16$ ,  $p = .000$ ). The Hosmer and Lemeshow Test for Model 2 revealed a low chi-squared value that are non-statistically significant ( $X^2 = 13.323$ ,  $p = .101$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. The Nagelkerke  $R^2$  for the model is .130 which means taken together the demographic characteristics and diagnostic factors explain 13% of the variation in initiating substance use treatment. Therefore, adding these variables slightly improved the model.

Model 3. The model includes both demographic characteristics and diagnostic factors and introduces family/clinical factors. The same demographic characteristics from Model 1, excluding employment activity, and diagnostic factors from Model 2 remained significant. The only family/clinical factor to reach significance was the environmental strengths index. For example, a one unit increase on the environmental strengths scale increases the odds of initiating substance use treatment by 7.5%. ( $OR = 1.075$ ,  $p = .014$ ).

The model chi-squared value were statistically significant which indicates that the model overall is a statistically significant predictor of initiating substance use treatment ( $X^2 = 295.198$ ,  $df = 19$ ,  $p = .000$ ). The Hosmer and Lemeshow Test, for Model 3, revealed a low chi-squared value that are non-statistically significant ( $X^2 = 11.056$ ,  $p = .199$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. The Nagelkerke  $R^2$  for the model is .133 which means taken together, the demographic characteristics, diagnostic factors and family/clinical factors explain 13.3% of the variation in initiating substance use treatment. The model remains statistically significant and improves slightly from Model 1 (12.8%) and Model 2 (13%). Very little is added to the predictive validity of the models by adding more variables.

Model 4. This is the full model which includes demographic characteristics, diagnostic factors, family/clinical factors and the primary independent measure of interest, treatment readiness. Many of the same demographic characteristics (excluding gender now) from Model 1 remained significant and the diagnostic factors from Model 2 did not. Additionally, the family/clinical factor held up in the full model. Treatment readiness significantly predicts initiating substance use treatment. For example, a one unit increase on the treatment readiness scale increases the odds of treatment initiation by 10.5%. ( $OR = 1.105$ ,  $p = .005$ ). The model chi-squared value was statistically significant which indicates that the model overall is a statistically significant predictor of initiating substance use treatment ( $X^2 = 302.857$ ,  $df = 20$ ,  $p = .000$ ). The Hosmer and Lemeshow Test for Model 4 revealed a low chi-squared value that is non-statistically significant ( $X^2$

= 11.295,  $p = .186$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. The Nagelkerke  $R^2$  for the model is .137 which means taken together, the demographic characteristics, diagnostic factors, family/clinical factors and treatment readiness explain 13.7% of the variation in initiating substance use treatment. The model remains statistically significant and improves slightly from Model 1 (12.8%), Model 2 (13%) and Model 3 (13.3%).

### **Summary of Multivariate Findings for Initiation**

Four stepwise binary logistic regression models for predicting initiation were examined. In the first model, demographic characteristics such as race, age, gender, education and employment activity significantly predicted initiating substance use treatment. Many of these demographic characteristics held up in Models 2-4. The Nagelkerke  $R^2$  for Model 1 is 12.8% with just the demographic characteristics. When adding the substance frequency, treatment received, criminal justice involvement and illegal activities diagnostic factors in Model 2, none were significant; however, adding the diagnostic factors increased the Nagelkerke  $R^2$  value to 13%. When adding the family/clinical factors to the demographic characteristics and diagnostic factors, environmental support significantly contributed to predicting initiation of substance use treatment. It also increased the Nagelkerke  $R^2$  to 13.3%, a slight change. Finally, the treatment readiness variable in Model 4 significantly predicted initiating substance use treatment and increased the Nagelkerke  $R^2$  to 13.7%, another slight change. Although this is not a dramatic increase in the explained variance, the final model, Model 4, appears to

be the better fit. For example, the variables that contribute the most to initiating substance use treatment are being Hispanic, being older, being a high school graduate, having environmental support and being treatment ready.

**Table 12. Binary Logistic Regression Predicting Substance Use Treatment Initiation**

	Model 1				Model 2				Model 3				Model 4			
Independent Variables	B	S.E.	OR	p	B	S.E.	OR	p	B	S.E.	OR	p	B	S.E.	OR	p
Constant																
<b>Demographic Characteristics</b>																
Race (reference Other)																
White	-.046	.156	.955	.768	-.028	.157	.972	.858	-.029	.157	.971	.851	-.062	.158	.939	.693
Black	-.174	.175	.840	.319	-.178	.175	.837	.309	-.164	.177	.848	.352	-.144	.177	.866	.418
Hispanic	.745	.181	2.105	<b>.000</b>	.768	.182	2.156	<b>.000</b>	.763	.183	2.146	<b>.000</b>	.741	.183	2.097	<b>.000</b>
Age (reference 50+)																
18-25	-3.073	.064	.046	<b>.000</b>	-3.048	.605	.047	<b>.000</b>	-3.040	.606	.048	<b>.000</b>	-2.977	.606	.051	<b>.000</b>
26-35	-1.334	.619	.264	<b>.031</b>	-1.311	.619	.270	<b>.034</b>	-1.324	.620	.266	<b>.033</b>	-1.309	.620	.270	<b>.035</b>
36-49	-1.117	.617	.327	.071	-1.100	.618	.333	.075	-1.109	.618	.330	.073	-1.099	.618	.333	.075
Gender (reference female)																
Male	-.260	.120	.771	<b>.030</b>	-.246	.124	.782	<b>.046</b>	-.220	.128	.802	.084	-.187	.128	.830	.145
Education (reference grad HS)	-.381	.107	.683	<b>.000</b>	-.400	.108	.670	<b>.000</b>	-.387	.108	.679	<b>.000</b>	-.370	.109	.691	<b>.001</b>
Homeless (reference homeless)	.085	.118	1.089	.470	.100	.119	1.105	.400	.117	.124	1.125	.344	.131	.124	1.140	.293
Marital Status (reference never married)																
Married/Living as	-.248	.184	.781	.179	-.224	.185	.799	.225	-.244	.185	.784	.188	-.259	.186	.772	.162
Separated/Widowed/Divorced	-.270	.257	.763	.294	-.264	.258	.768	.306	-.291	.259	.747	.261	-.304	.259	.738	.241
Employment Activity Scale	-.003	.001	1.000	.063	-.003	.001	.997	.081	-.002	.001	.998	.116	-.002	.001	.999	.120
<b>Diagnostic Factors</b>																
Substance Frequency Scale					.000	.004	1.000	.947	.001	.004	1.001	.780	.000	.004	1.000	.973
Treatment Received Scale					.015	.011	1.016	.162	.012	.011	1.012	.266	.009	.011	1.009	.419
Criminal Justice System Index					.000	.001	1.000	.726	-.001	.001	.999	.633	-.001	.001	.999	.582
Illegal Activities Scale					.000	.005	1.000	.937	.001	.005	1.001	.820	.001	.005	1.001	.852
<b>Family and Clinical Factors</b>																
Environmental Strengths Scale									.072	.029	1.075	<b>.014</b>	.067	.030	1.069	<b>.023</b>



Internal Mental Distress Scale	.006	.006	1.006	.367	.004	.006	1.004	.505
Health Problems Scale	-.001	.003	.999	.700	-.001	.003	.999	.744
<b>Motivational Factor</b>								
Treatment Readiness					.100	.036	1.105	<b>.005</b>

<b>Model Summary</b>	<b>Model Summary</b>	<b>Model Summary</b>	<b>Model Summary</b>
$X^2 = 282.932$ , df = 11, $p = .000$	$X^2 = 288.595$ , df = 16, $p = .000$	$X^2 = 295.198$ , df = 19, $p = .000$	$X^2 = 302.857$ , df = 20, $p = .000$
<b>Hosmer and Lemeshow Test</b>	<b>Hosmer and Lemeshow Test</b>	<b>Hosmer and Lemeshow Test</b>	<b>Hosmer and Lemeshow Test</b>
$X^2 = 7.755$ , $p = .458$	$X^2 = 13.323$ , $p = .101$	$X^2 = 11.056$ , $p = .199$	$X^2 = 11.295$ , $p = .186$
-2LL = 2620.184	-2LL = 2614.521	-2LL = 2607.919	-2LL = 2600.259
Nagelkerke $R^2 = .128$	Nagelkerke $R^2 = .130$	Nagelkerke $R^2 = .133$	Nagelkerke $R^2 = .137$

B = Beta; S.E. = Standard error; OR = Odds ratio; p = p value; -2LL = Log likelihood

## Engagement<sup>6</sup>

A series of stepwise binary logistic regression models tested hypothesis 6 regarding treatment engagement. These models examine the impact each set of factors have on engaging in substance use treatment. For example, hypothesis 6 predicted treatment readiness will increase the likelihood of engaging in substance use treatment, controlling for the other demographic, diagnostic and family/clinical factors. The binary logistic regression results are presented in terms of a series of stepwise models where demographic characteristics are introduced in Model 1, diagnostic factors added in Model 2, family/clinical factors in Model 3 and, finally, treatment readiness in Model 4. Table 13 shows the results of each of these models.

Model 1. The demographic characteristics that significantly predict engaging in substance use treatment include race, age, gender, education and marital status. For example, the odds of engaging in substance use treatment were 18% less for Whites (OR = .819,  $p = .049$ ) and 32% less for Blacks (OR = .683,  $p = .001$ ) relative to Other races.

As previously discussed, besides using Other races as the reference group, additional analyses were conducted using Caucasian as the reference group (not shown). The findings in the model with Caucasian as the reference group support the initial conclusion that other ethnicity is associated with increased odds of engagement relative to Whites. For example, in the final model, Model 4, the odds of engaging in substance use treatment were 26% higher for Other races relative to Whites (OR = 1.260,  $p = .024$ ).

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<sup>6</sup> Further analyses explored race/ethnicity as a series of dummy variables. For example, (0 = nonwhite, 1 = white); (0 = nonblack, 1 = black); (0 = nonhispanic, 1 = Hispanic); and (0 = nonother; 1 = other). For each of these models, no significant differences in race/ethnicity were detected for engagement.

The odds of engaging in substance use treatment remained highest for Other races, relative to Whites in each model.

The odds of engaging in substance use treatment were 26% less for males relative to females ( $OR = .740, p = .000$ ). The odds of engaging in substance use treatment were 14% less for those who did not graduate high school relative to those who did graduate high school ( $OR = .862, p = .023$ ). Finally, the odds of engaging in substance use treatment were 22% less for those individuals being married or living as married ( $OR = .784, p = .015$ ) and 27% less for those individuals being separated, widowed or divorced ( $OR = .733, p = .006$ ) relative to those individuals who report never being married. The model chi-squared value was statistically significant which indicates that the model overall is a statistically significant predictor of initiating substance use treatment ( $X^2 = 72.221, df = 11, p = .000$ ). The Hosmer and Lemeshow Test for Model 1 revealed a low chi-squared value that is non-statistically significant ( $X^2 = 2.304, p = .970$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. The Nagelkerke  $R^2$  for the model is .021 which means taken together, the demographic characteristics alone explain 2.1% of the variation in engaging in substance use treatment.

Model 2. The diagnostic factors were introduced along with the demographic characteristics from Model 1. The same demographic characteristics from Model 1 remained significant in Model 2. One diagnostic factor significantly predicted engaging in substance use treatment and that is substance frequency. For example, a one unit increase in the substance use frequency scale increases the odds of engaging in substance

use treatment by .8% (OR = 1.008,  $p = .001$ ). The model chi-squared value was statistically significant which indicates that the model overall is a statistically significant predictor of initiating substance use treatment ( $X^2 = 98.389$ ,  $df = 16$ ,  $p = .000$ ). The Hosmer and Lemeshow Test for Model 2 revealed a low chi-squared value that is non-statistically significant ( $X^2 = 12.119$ ,  $p = .146$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. The Nagelkerke  $R^2$  for the model is .029 which means taken together, the demographic characteristics and diagnostic factors explain 2.9% of the variation in engaging in substance use treatment which is slightly higher than demographic characteristics alone (2.1%).

Model 3. The family/clinical factors were introduced along with demographic characteristics and diagnostic factors. The same demographic characteristics from Model 1 and diagnostic factors from Model 2 remained significant. The family/clinical factor that statistically predicted engaging in substance use treatment is the health problems scale. For example, a one unit increase in the health problems scale increases the odds of engaging in substance use treatment .5% (OR = 1.005,  $p = .002$ ). The model chi-squared value was statistically significant which indicates that the model overall is a statistically significant predictor of initiating substance use treatment ( $X^2 = 108.403$ ,  $df = 19$ ,  $p = .000$ ). The Hosmer and Lemeshow Test for Model 3 revealed a low chi-squared value that is non-statistically significant ( $X^2 = 11.994$ ,  $p = .151$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. The Nagelkerke  $R^2$  for the model is .032 which means

take together the demographic characteristics, diagnostic factors and family/clinical factors explain 3.2% of the variation in engaging in substance use treatment which is slightly higher than Model 1 (2.1%) and Model 2 (2.9%).

Model 4. This is the full model which includes demographic characteristics, diagnostic factors, family/clinical factors and the primary independent measure of interest, treatment readiness. Many of the same demographic characteristics from Model 1 remained significant as well as the diagnostic factors from Model 2 and family/clinical factors from Model 3. The treatment readiness variable did not significantly predict engaging in substance use treatment. For example, a one unit increase in the treatment readiness scale increases the odds of engaging in substance use treatment by 4% ( $OR = 1.039, p = .089$ ). The model chi-squared value was statistically significant which indicates that the model overall is a statistically significant predictor of initiating substance use treatment ( $X^2 = 111.286, df = 20, p = .000$ ). The Hosmer and Lemeshow Test for Model 4 revealed a low chi-squared value that is non-statistically significant ( $X^2 = 9.845, p = .276$ ). This suggests that the predicted and observed probabilities for the model match up nicely, implying that this is a plausible model for these data. The Nagelkerke  $R^2$  for the model is .033 which means taken together, the demographic characteristics, diagnostic factors, family/clinical factors and treatment readiness explain 3.3% of the variation in engaging in substance use treatment. This final model explains the most variability in substance use treatment engagement compared to Model 1 (2.1); Model 2 (2.9%) and Model 3 (3.2%).

### **Summary of Multivariate Findings for Engagement**

Four stepwise binary logistic regression models predicting engagement were examined. In the first model, demographic characteristics, such as race, age, gender, education and marital status, significantly predicted engaging in substance use treatment. Many of these demographic characteristics held up in Models 2-4. The Nagelkerke  $R^2$  for Model 1 is small (2.1%) with just the demographic characteristics. When adding the diagnostic factors in Model 2, substance use and illegal activity significantly predict engaging in substance use treatment. Adding the diagnostic factors slightly increased the Nagelkerke  $R^2$  value to 2.9%. When adding the family/clinical factors to the demographic characteristics and diagnostic factors, health problems contributed to engaging in substance use treatment and even more slightly increased the Nagelkerke  $R^2$  to 3.2%. Finally, the treatment readiness variable in Model 4 significantly predicted engaging in substance use treatment and increased the Nagelkerke  $R^2$  to 3.3%. Although this is not a dramatic increase, the final model, Model 4, appears to be the better fit. For example, the variables that contribute the most are substance frequency, illegal activities, health problems and treatment readiness. Although the variation from model to model is low, several diagnostic and family/clinical factors appear to be more relevant for engagement than what was discovered for initiation. The small predictive power of the model will be discussed in the next chapter.

**Table 13. Binary Logistic Regression Predicting Substance Use Treatment Engagement**

	Model 1				Model 2				Model 3				Model 4			
Independent Variables	B	S.E.	OR	<i>p</i>	B	S.E.	OR	<i>p</i>	B	S.E.	OR	<i>p</i>	B	S.E.	OR	<i>p</i>
Constant																
<b>Demographic Characteristics</b>																
Race (reference Other)																
White	-.200	.101	.819	<b>.049</b>	-.220	.102	.803	<b>.031</b>	-.220	.102	.802	<b>.031</b>	-.231	.102	.794	<b>.024</b>
Black	-.381	.114	.683	<b>.001</b>	-.384	.115	.681	<b>.001</b>	-.356	.116	.700	<b>.002</b>	-.348	.116	.706	<b>.003</b>
Hispanic	-.176	.110	.838	.108	-.193	.110	.825	.081	-.182	.111	.834	.100	-.190	.111	.827	.086
Age (reference 50+)																
18-25	.013	.144	1.014	.925	.035	.145	.966	.809	.020	.147	1.021	.889	.042	.147	1.043	.774
26-35	-.055	.144	.946	.703	-.050	.145	.951	.729	-.004	.146	.996	.981	-.002	.146	.998	.988
36-49	-.253	.140	.777	.070	-.244	.140	.784	.082	-.209	.141	.812	.139	-.208	.141	.812	.141
Gender (reference female)																
Male	-.301	.068	.740	<b>.000</b>	-.274	.069	.761	<b>.000</b>	-.252	.071	.777	<b>.000</b>	-.244	.072	.783	<b>.001</b>
Education (reference grad HS)	-.149	.066	.862	<b>.023</b>	-.161	.066	.851	<b>.015</b>	-.168	.066	.845	<b>.011</b>	-.162	.066	.850	<b>.015</b>
Homeless (reference homeless)	-.058	.068	.944	.397	-.035	.069	.966	.614	-.021	.072	.979	.769	-.014	.072	.986	.842
Marital Status (reference never married)																
Married/Living as	-.244	.098	.784	<b>.013</b>	-.240	.099	.787	<b>.015</b>	-.253	.099	.776	<b>.010</b>	-.258	.099	.772	<b>.009</b>
Separated/Widowed/Divorced	-.311	.101	.733	<b>.002</b>	-.283	.102	.754	<b>.006</b>	-.291	.103	.747	<b>.005</b>	-.297	.103	.743	<b>.004</b>
Employment Activity Scale	.000	.001	1.000	.885	.000	.001	1.000	.785	.000	.001	1.000	.698	.000	.001	1.000	.655
<b>Diagnostic Factors</b>																
Substance Frequency Scale					.008	.002	1.008	<b>.001</b>	.008	.003	1.008	<b>.002</b>	.008	.003	1.008	<b>.003</b>
Treatment Received Scale					-.005	.006	.995	.437	-.005	.006	.995	.411	-.006	.007	.994	.326
Criminal Justice System Scale					-.001	.001	.999	.361	-.001	.001	.999	.350	-.001	.001	.999	.317
Illegal Activities Scale					.006	.003	1.006	.075	.006	.003	1.006	.079	.006	.003	1.006	.081
<b>Family and Clinical Factors</b>																
Environmental Strengths Scale									.007	.018	1.007	.708	.005	.018	1.005	.784

Internal Mental Distress Scale					.000	.004	1.000	.969	-.001	.004	.999	.837
Health Problems Scale					.005	.002	1.005	<b>.002</b>	.005	.002	1.005	<b>.002</b>
<b>Motivational Factor</b>												
Treatment Readiness									.038	.022	1.039	.089
	<b>Model Summary</b>	<b>Model Summary</b>	<b>Model Summary</b>	<b>Model Summary</b>								
	$X^2 = 72.221, df = 11, p = .000$	$X^2 = 98.389, df = 16, p = .000$	$X^2 = 108.403, df = 19, p = .000$	$X^2 = 111.286, df = 20, p = .000$								
	<b>Hosmer and Lemeshow Test</b>	<b>Hosmer and Lemeshow Test</b>	<b>Hosmer and Lemeshow Test</b>	<b>Hosmer and Lemeshow Test</b>								
	$X^2 = 2.304, p = .970$	$X^2 = 12.119, p = .146$	$X^2 = 11.994, p = .151$	$X^2 = 9.845, p = .276$								
	-2LL = 6006.274	-2LL = 5980.106	-2LL = 5970.092	-2LL = 5967.209								
	Nagelkerke $R^2 = .021$	Nagelkerke $R^2 = .029$	Nagelkerke $R^2 = .032$	Nagelkerke $R^2 = .033$								

B = Beta; S.E. = Standard error; OR = Odds ratio; p = p value; -2LL = Log likelihood



## **CHAPTER SIX: DISCUSSION, LIMITATIONS & CONCLUSION**

Millions of individuals suffer from substance use issues annually (NSDUH, 2013). The completion of treatment is an important aspect for those individuals who struggle with substance use disorders. Before completing treatment, however, individuals must initiate and engage in the treatment process. For treatment to be effective it is important that the person participate in the program. Participation consists of a number of different dimensions, including going to sessions and completing them. In addition to the concern that only 10 percent of individuals engage in substance use treatment, treatment readiness becomes one important factor in the mix of other dimensions. Understanding how treatment readiness impacts initiation and engagement in substance use treatment can provide a better understanding of decreasing individuals' substance using behavior.

The present study suggests that treatment readiness impacted initiation in substance use treatment but not engagement (in the individual models). In the multivariate models, demographic factors, diagnostic factors, family/clinical factors and treatment readiness explained 13.7% of initiation and 3.3% of engagement. Treatment readiness mixed with other demographic (race, age, education) and family/clinical (environmental support) factors had the greatest impact on initiating substance use treatment with 13.7% of the dependent variable explained. Treatment readiness was not a significant predictor for engagement in substance use treatment but other demographic

(race, gender, education, and marital status), diagnostic (substance use and illegal acts) and a family/clinical factor (physical health) had the greatest impact on engagement in substance use treatment with 3.3% of the dependent variable explained. The present research contributes to the literature on the TTM (Prochaska & DiClemente, 1984) by using the TTM to explain the stages of change conceptual link to initiation and engagement in substance use treatment. It also uses an additional measure of treatment readiness (i.e., treatment resistance index and treatment motivation index) to assess whether it predicts initiation and engagement in substance use treatment. This is important as to further explore the measurement of treatment readiness and the role it plays in determining if individuals initiate and engage in substance use treatment. The current work is significant for policy related to the design and implementation of interventions to increase individuals' treatment readiness as well as the measurement of treatment readiness. By measuring additional aspects that may impact an individual's treatment readiness, interventions can be used to increase these areas thus increasing their treatment readiness.

Despite significant findings, other factors also impact initiation and engagement as indicated by only 13.7% and 3.3% of the dependent variables explained in the final stepwise binary logistic regression models. Areas for future research should include an emphasis on different populations of individuals, clinical staff, location, types of programs and legislation that mandates participation in interventions. Moreover, qualitative research designs will help increase knowledge about treatment readiness and how individuals experience and understand initiating and engaging in substance use

treatment. The limitations of the study include missing data, a further examination of the covariates (e.g., type of substance user) and completion data.

### **Summary Findings for Initiation**

Initiation in this study refers to “receiving a treatment service within 14 days after the beginning of a new outpatient or intensive outpatient treatment episode” (Garnick et al., 2014, p. 296). For example, if being treatment ready means an individual wants to make a change in their life, then process measures, such as initiation and engagement, are necessary to understand the degree to which individuals are involved in treatment.

Several models address the research hypotheses. At the bivariate level of analysis, each personal characteristic significantly predicted substance use treatment initiation, including race, age, gender, education, homelessness and marital status. More specifically, Hispanics, individuals 50 years and older, females, individuals who reported graduating high school, individuals who reported being homeless and individuals who reported being separated, divorced or widowed were more likely to initiate substance use treatment. These findings parallel previous research including individuals 50 years and older (Weisner et al., 2001; Brown et al., 2011), individuals who reported graduating high school (Weisner et al., 2001) and individuals who report being homeless initiating substance use treatment (Acevedo et al., 2012). Contrary to previous research, Hispanics and females were more likely to initiate substance use treatment (Green et al., 2002; Acevedo et al., 2012). The region that an individual lives in may affect initiating substance use treatment because treatment is more readily available in some areas than others. For example, the finding that Hispanics initiate at higher rates than other groups

may be due to the fact that the second highest percentage of respondents came from one Region that includes Arizona, California, Hawaii and Nevada. Recent research indicates that these states are among some of the fastest growing in terms of Hispanic populations (Passel, Cohn, & Lopez, 2011). Some prior research indicates Hispanics tend to have close-knit networks which means they may have more of a well-established support system to assist them in initiating substance abuse treatment as compared to other races (i.e., White, Black, Other) (Straus & Smith, 1990). Rivera and colleagues (2008) assessed the social cohesion of a sample of 2,540 Hispanics and found that those families that were more socially cohesive were less likely to experience psychological stress. Initiating a substance use treatment program, perhaps for the first time, can be psychological stressful for some but having a strong social support network can ease the process. Several explanations may explain why females were more likely to initiate substance use treatment compared to men such as females feel subjective distress (McGovern, Angres, Shaw, & Rawal, 2003); need services (Grella & Joshi, 1999); or face the possibility of losing their children (Fiorentine, Anglin, Gil-Rivas, & Taylor, 1997).

Many of the independent diagnostic and family/clinical, scaled, items predicted initiating substance use treatment. These include employment activity, substance use frequency, criminal justice system involvement, illegal activities and environmental strengths. There are some similarities with these findings and the existing literature base, including criminal justice system involvement (Kim et al., 2011) and environmental strengths (Brown et al., 2011). For instance, individuals who are a part of the criminal justice system may be likely to initiate substance use treatment to begin the change

process; however, when it comes time to actually engage in the process, they do not. Criminal justice involved individuals who receive treatment are more likely to reduce their substance use and criminal behavior (Joe, Simpson, Dansereau, Rowan-Szal, 2014). Having some environmental support is important for those individuals who are beginning the change process since it facilitates substance use treatment. For example, environmental support, including support from family and friends, is a strong predictor of promoting both abstinence and substance use recovery (Stevens, Jason, Ram, & Light, 2014). The same may be said for those individuals who initiate substance use treatment. Having various types of support may be likely to promote individuals' ability to initiate substance use treatment.

Treatment readiness significantly predicted substance use treatment initiation at the bivariate level of analysis. Although the strength of the relationship is weak ( $r = .103$ ) it is the strongest predictor of substance use treatment initiation. This finding is somewhat similar with the literature that often suggests treatment readiness is a mixed predictor of substance use treatment initiation (Brown et al., 2011; Kim et al., 2011).

Several stepwise binary logistic regression models were conducted to examine which factors affected substance use treatment initiation. These include personal characteristics in Model 1, diagnostic factors in Model 2, family/clinical factors in Model 3 and treatment readiness in Model 4. The final multivariate model, Model 4, demonstrated how treatment readiness is a significant predictor of substance use treatment initiation; however, it was not the strongest predictor. In fact, being Hispanic increased the odds of initiating substance use treatment by nearly 110% relative to other

racess. Treatment readiness, however, was the second strongest, significant, predictor in terms of odds by increasing the likelihood of initiation by 10.5%. The odds of substance use treatment initiation were 95% less for 18-25 year olds, 73% less for 26-35 year olds and 67% less for 36-49 year olds relative to the 50 and older group; 31% less for those who did not graduate high school relative to those who did graduate high school; and having some semblance of environmental support. For example, individuals who reported more environmental support were more likely to initiate substance use treatment. Specifically, their odds of initiating increased by 6.9%. The Nagelkerke  $R^2$  for the model is .137 which means taken together, the personal characteristics, diagnostic factors, family/clinical factors and treatment readiness explain 13.7% of the variation in initiating substance use treatment.

### **Summary Findings for Engagement**

When examining the factors that predict engagement, which is defined as “receiving two additional services within 30 days after the initiation service” (Garnick et al., 2014, p. 296), several personal characteristic variables were statistically significant including: race, age, gender, education and marital status. More specifically, other races, individuals 18-25 years of age, females, individuals who reported graduating high school and individuals who reported never being married were more likely to engage in substance use treatment than their respective counterparts.

Several diagnostic and family/clinical factors predicted engaging in substance use treatment. These include employment activity, substance frequency, criminal justice system involvement, illegal activity, internal mental distress and health problems scale.

There are some consistencies in the literature, including employment activity (Weisner et al., 2001); substance use frequency (Weisner et al., 2001; Kim et al., 2011); illegal activity (Kim et al., 2011); mental health and health problems (Kim et al., 2011; Weisner et al., 2001). It could be that the individuals who present with these factors are beginning to recognize change needs to occur, therefore, they engage in substance use treatment.

Several stepwise binary logistic regression models included personal characteristics in Model 1, diagnostic factors in Model 2, family/clinical factors in Model 3 and treatment readiness in Model 4. The final model, Model 4, demonstrated that treatment readiness did not significantly predict substance use treatment engagement. Additional items that predicted substance use treatment engagement were 21% less for Whites; 30% less for Blacks and 17% less for Hispanics relative to Other races. The odds of engaging in substance use treatment was 22% less for males relative to females and 15% less for those who did not graduate high school relative to those who did graduate high school. The odds of engaging in substance use treatment was 23% less for those who identified as being married or living as married and 26% less for those who are separated, widowed or divorced 26% relative to those individuals who report never being married.

One diagnostic factor significantly predicted engaging in substance use treatment, that being substance frequency. For example, a one unit increase in substance use increased individuals' odds of engaging in substance use treatment by .8%. Finally, a family/clinical factor statistically predicted engaging in substance use treatment. For example, a one unit increase in health related issues increased individuals' odds of engaging by .5%. The Nagelkerke  $R^2$  for the model is .033 which means taken together,

the personal characteristics, diagnostic factors, family/clinical factors and treatment readiness explain 3.3% of the variation in engaging in substance use treatment.

### **Explaining the Low Nagelkerke $R^2$ Value**

There are several reasons why the Nagelkerke  $R^2$  value for the initiation and engagement stepwise binary logistic regression models was low in this study. First, the two dependent variables, initiation and engagement, are binary outcomes coded as either 0 = did not initiate/engage or 1 = did initiate/engage. These data are considered to be individual outcomes or single events for each person meaning that they either initiated or not and engaged or not. Second, since these data are single events for each individual, the  $R^2$  values will be different than if these data were treated as the number of times an individual initiated and engaged in treatment. For example, Mittlböck and Heinzl (2001) suggest that when treating your data as count data, such as in various Poisson regression models, the  $R^2$  value will often be higher than treating it as single event data. Finally, Mittlböck and Heinzl (2001) explain this is not too uncommon for studies that have many observations; the variables are highly significant and are of interest. For example, this study has many observation points ( $n = 5443$ ); many of the variables in both the bivariate and multivariate analyses are highly significant and they are derived from the literature as predictors of initiation and engagement. Mittlböck and Heinzl (2001) conclude that the logistic regression approach and  $R^2$  value, “may, in fact, explain only a small percentage of the variability in the individual response” (p. 102) when examining outcomes as single events. In addition to the suggestions put forth by Mittlböck and Heinzl (2001), additional factors from these current study data may help to explain the low Nagelkerke



R<sup>2</sup> value. These include: not having treatment program data which prohibits an understanding of how good the treatment program is, if the program attends to the needs of the individual, not knowing prior treatment experiences of the individual and the missing of key variables in the regression models that would help explain more of the variance.

### **Theoretical Implications**

The present study suggests that treatment readiness significantly predicts initiating in substance use treatment but not engaging in substance use treatment. This is important since individuals are beginning to recognize that change needs to occur; however, several other factors impact initiation and engagement including the host of factors mentioned previously. In the final stepwise binary logistic regression models, personal characteristics, diagnostic factors, family/clinical factors and treatment readiness each contributed in different ways to the initiation and engagement in substance use treatment. For example, the final stepwise binary logistic regression model for initiation found that each factor contributed to 13.7% of its variation. Oppositely, these same factors only contributed to 3.3% of the variation of engagement in the final stepwise binary logistic regression model. Many explanations are warranted as to why the variation diminished between initiation and engagement in light of the Transtheoretical Model (TTM) of change. Treatment readiness predicts initiation but other individual-level factors, including environmental support, do also. For engagement, treatment readiness is not a predictor but other individual-level factors are, including substance use and physical health. It may be that the measure of treatment readiness used in this study

is a better measure of initiation and not engagement. When it comes to construct validity, the questions that make up the treatment readiness variable may not be as relevant or representative thus leading to no relationship with engagement. One of the indicators in the Treatment Motivation Index (TMI) asks respondents if they need help/support from friends and relatives to deal with alcohol or drug use. This may be why treatment readiness was a significant predictor of initiation as well as environmental support. Of particular interest is physical health predicted engaging in substance use treatment but treatment readiness did not. The measure of treatment readiness does not include any indicators of an individual's physical health. Perhaps if this were assessed by creating an interaction between the two, treatment readiness may have been more of a predictor. The present research contributes to the literature on the TTM (Prochaska & DiClemente, 1984; Prochaska et al., 1992) by explaining how process measures of change (i.e., initiation and engagement) are related to treatment readiness.

For those individuals who initiated substance use treatment, several factors are important including a variety of personal characteristics. More importantly, however, family/clinical factors in the form of environmental support and treatment readiness predicted initiating substance use treatment. In fact, 6.9% of individuals with some sort of environmental support initiated substance use treatment and another 10.5% who reported being treatment ready initiated substance use treatment.

The TTM theory of change hypothesizes that individuals go through various stages before entering treatment. Individuals may cycle back through the stages if they relapse. Individuals who initiate treatment in the current study sample fall into the

contemplation stage. Remember, initiation refers to receiving a treatment service within 14 days after the beginning of a new outpatient or intensive outpatient treatment episode (Garnick et al., 2014, p. 296). Conceptually speaking, these individuals fall into the contemplation stage for several reasons. First, precontemplation involves individuals who are often unwilling to come to terms that they have a problem, thus reducing their likelihood of accepting change into their lives (e.g., not motivated). In this case, these individuals are beginning to recognize some form of change needs to occur in their lives thus moving them beyond mere precontemplation. Secondly, by having environmental support in their lives, these individuals further contemplate change knowing they have a support network in place that can assist them with the change process. For example, the literature suggests social support interventions, including family interventions, help promote behavior change in individuals with substance use related issues (Alverson, Alverson, & Drake, 2000). Finally, by reporting being treatment ready, these individuals are making an internal decision that some sort of change needs to occur in their lives. Therefore, it is not treatment readiness alone, but a combination of factors working together to move these individuals from precontemplation to contemplation.

For those individuals who engage in substance use treatment, several factors are important as well. Unlike initiation, more diagnostic and family/clinical factors contributed to the prediction of predicted engagement in substance use treatment, although the contributions were small. These include substance use frequency, illegal activity, physical health and treatment readiness. It should be noted these factors, especially substance use frequency (OR = 1.008) and physical health (OR = 1.005),

contributed in small ways to engaging in substance use treatment. Treatment readiness was not significant, however; in terms of the TTM, these individuals constitute the preparation and action stages.

As previously discussed, for those who initiate treatment, it may be that they realize some sort of change needs to occur in their lives. As a result, they move from precontemplation to contemplation by initiating substance use treatment; however, they do not advance any further. For those who engage, they are interested in continuing to pursue change in their lives.

Engagement is more than simply initiating substance use treatment services. These individuals continue to come back for additional services over time. I argue these individuals coincide with the preparation and action stages of the TTM. What is interesting is the fact that these individuals have more substance use issues and physical health problems but yet remain engaged. It is worth mentioning that environmental support was not significant in the stepwise binary logistic models for engagement. I hypothesize once individuals move into the preparation and action stages, there may not be as much of a reliance on environmental support from others to assist them since these individuals are now beginning to change on their own without much environmental support.

### **Policy Implications**

In light of the findings of this study, more work is needed to further develop the concept of treatment readiness, especially as it pertains to engaging in substance use treatment. In a recent study, Becan, Knight, Crawley, Joe and Flynn (2015) assessed the

effectiveness of a Treatment Readiness and Induction Program (TRIP) for increasing adolescent motivation for change. TRIP uses techniques such as peer facilitation, mapping and enhanced counseling and experiential games and activities. The objective is to get individuals to challenge their ways of thinking about substance use and change their behavior. They discovered that people who were exposed to TRIP had increased levels of problem recognition (i.e., precontemplation) thus increasing the readiness for treatment services. This led to better treatment outcomes for the sample in the study. This study is important in that it uses an intervention, such as TRIP, to increase an individual's readiness before becoming involved in treatment services. This, in turn, has the potential to enhance individuals' initiation and engagement in treatment.

Becan et al. (2015) shed light on the importance of interventions designed to address treatment readiness at the outset before individuals initiate and engage in treatment services. For example, their use of TRIP was to front load programming in the beginning of treatment to get individuals to the point of changing their motivation before entering treatment services. Becan et al. (2015) note that TRIP is, "effective for promoting general decision making and use of strategies to guide thinking" (p. 47). What must be considered, however, is the fact this is a single study. But this study suggests the importance of interventions to address readiness which is an area that needs further research and clinical assessment. For instance, federal and state agencies with a vested interest in making sure individuals are treatment ready can provide funding to organizations to use interventions such as TRIP to enhance treatment outcomes. And, an investment in well-designed research studies (e.g., randomized controlled trials) will be

important as to generate a totality of evidence to promote practices such as TRIP as evidence based.

The role of TRIP is to develop treatment readiness at the outset before individuals enter into substance use treatment. An additional type of behavioral therapy used at the beginning of substance use treatment is Motivational Enhancement Therapy (MET). Since individuals are often ambivalent about change, MET uses a cost/risk approach of continued substance use. By helping individuals develop a plan to change, commitment for change and the confidence to change, treatment readiness can be increased (Davey-Rothwell, Frydl, & Latkin, 2009).

By funding interventions such as TRIP and MET, individuals can become more treatment ready to initiate and engage in treatment services, thus increasing their potential access to programs. It will be important, however, for organizations to be ready as well to respond to these individuals who are now more treatment ready. For example, some organizations who provide assessments and treatment of individuals may not adhere to using practices that are grounded in scientific inquiry (McGovern, Fox, Xie, & Drake, 2006; Lundgren, Amodeo, Chassler, Krull, & Sullivan, 2013). This can impact clients who are attempting to make some sort of necessary change in their lives, especially if they have gone through an intervention to get them more treatment ready. It then becomes imperative for organizations to be ready themselves to respond to individuals who have enhanced their own readiness. Organizational adoption of evidence-based practices will be imperative as to garner a more accurate assessment of individuals

treatment readiness (Lerch, James-Andrews, Eley, & Taxman, 2009; Lerch, Viglione, Eley, & James-Andrews, 2011).

Once organizations are assessed for readiness, and evidence-based practices are assumed to be both adopted and implemented, a focus maintaining the readiness of individuals can be furthered as a result of front loading from previous interventions. One such conceptual framework, which contains several evidence-based practices that can be used is the Risk-Need-Responsivity (RNR) framework (Andrews & Bonta, 2010). RNR is mentioned for several reasons. First, although this dissertation did not examine risk-level for re-offense of individuals it will be important for proper assessments to be undertaken to gauge the likelihood of future criminal activity. Second, once risk-level is ascertained of individuals, their needs can then be addressed. For example, this dissertation demonstrated that substance use and physical health problems predicted engagement in substance use treatment. It may be that addressing the needs these clients have, in conjunction with an increase in treatment readiness from interventions, will maintain their ability to be successful in programming. Using appropriate treatment services in each of the proscribed areas may benefit each individual. It is true these additional factors were positively associated with engaging in substance use treatment; however, they may be stronger predictors if their needs are responded to appropriately. Finally, it should be taken under consideration that not all clients are the same; levels of treatment readiness are going to be different. Services should target each individual's learning style thus maintaining their level of treatment readiness as best as possible. For example, when individuals are going through treatment readiness interventions, they are

going to be different in how they respond to the intervention. The same can be said for when they begin to work with an organization tasked with helping them alleviate their substance use.

A final policy implication lies in the establishment of legislation to enhance treatment readiness. For example, if interventions such as TRIP and MET continue to find success in increasing individuals' motivation to change before initiating and engaging in treatment programs, it may be worthwhile to mandate them to partake in these type of interventions. Several states work to help individuals be successful in treatment programming. California requires the Department of Mental Health to develop a treatment protocol to assess individuals' treatment progress and to ensure the public safety (California Department of State Hospitals, 2012). Legislation in this form could lead to the development of additional interventions aimed at increasing motivation to change in individuals. This can then lead to the development of a plan for each individual to ensure their level of treatment readiness is increased before beginning an actual treatment program.

### **Areas for Future Research**

From this study we learned treatment readiness significantly predicted initiating substance use treatment but did not predict engaging in substance use treatment. This is important because it signifies individuals who initiate substance use treatment are attempting to make change in their lives; however, when it comes to engaging in substance use treatment, more work needs to be done to better understand the role of treatment readiness. Additionally, the TTM was used to conceptually link initiation and



engagement to the different stages of change which adds to the existing literature by establishing a connection with process measures of change such as initiation and engagement. For example, initiators can be considered contemplators whereas engagers constitute the preparation and action stages. But there are a number of key unanswered questions that the GAIN data cannot answer regarding treatment readiness, initiation and engagement. Several areas of future research warrant discussion, especially since treatment readiness does not appear to only consist of factors within the individual. Instead, it appears to encompass other individual factors such as environmental support, substance use, illegal activities and physical health. Areas of future inquiry may want to consider addressing additional barriers to initiating and engaging in substance use treatment including different populations, different clinical staff, location, the type of program and treatment models.

Treatment readiness must be understood from the perspective that not all individuals are the same. For example, depending on the type of individual, treatment readiness is going to differ. Future research would be remiss to not assess readiness based on the type of individual. For example, Day, Howells, Casey, Ward, Chambers and Birgden (2009) assessed treatment readiness in a sample of violent offenders. They discovered that violent offenders who scored higher in terms of treatment readiness were more likely to engage in the therapeutic change process. Future research can be extended to other populations as well, including sex offenders, those who commit intimate partner violence and domestic violence to name a few since treatment readiness is likely to vary within each population.

An additional area of future research relates to the type of clinical staff tasked with assessing individuals. For example, in this study, treatment readiness was not found to predict engaging in substance use treatment. Clinical staff can gauge other areas of an individual's life that may impede their treatment readiness (e.g., their physical health). As mentioned previously, being able to assess treatment readiness for individuals before entering treatment is imperative. The same holds true for organizations who are responsible for using the best available practices to make sure individuals' treatment readiness is maintained. For example, if clinical staff are not using appropriate treatment practices, it can diminish the treatment readiness accrued by individuals from interventions. Therefore, the likelihood that clinical staff are using effective practices will be important to better sustain individuals' treatment readiness. McGovern et al. (2004) conducted a survey of clinical practices and readiness to adopt evidence-based practices in addiction treatment. They discovered that clinical staff were likely to adopt some practices (e.g., cognitive-behavioral therapy, motivational interviewing, etc.) but were unwilling to adopt others. The question becomes how to best assess clinicians for readiness which will then be used to assess individuals going through the process.

The location an individual is receiving treatment in is important to consider for future research. For example, regional variation in social climate may affect individuals' readiness. If the environment is stigmatizing or not accepting of their behavior, their level of treatment readiness may diminish. Hipp, Petersilia and Turner (2011) find that parolees' physical closeness to social services is impacted by the stigmatization in the locations. Parolees with more needs for social services tend to not live near social

services they need. Although Hipp et al. (2011) raise an important issue, future research should investigate, perhaps qualitatively, what goes on in these types of areas that may decrease an individual's treatment readiness.

The type of program in which an individual participates is a further area of future research. For example, as it relates to treatment readiness, individuals are going to differ on how they respond to treatment services. Tailoring programming to fit their unique characteristics is of the utmost importance. Once assessed, in terms of their needs, individuals may be given cognitive-behavioral therapy or motivational interviewing to enhance their level of treatment readiness. This can occur in either a group setting or individual treatment. This approach may then make them more successful during the treatment process. This is similar to the discussion in the policy implications section which maintains that using an evidence-based practice such as the RNR model may benefit this area of research (Andrews & Bonta, 2010).

Allowing an individual to be a part of the treatment process is another area of future research. For example, helping them to identify their needs and involving them in the process of how they want change to occur can increase their level of readiness. Allowing them to have a stake in their treatment planning may increase their level of treatment readiness. It is important to address their substance use, illegal activity and physical health problems; therefore, getting their input on how they want to change these behaviors can lead them to increase their readiness to change. This may permit them to have some sort of responsibility for their actions rather than being told what to do.

There are many possibilities about other factors that affect initiating and engaging in substance use treatment which may also contribute to the low overall variation of initiation and engagement in the stepwise binary logistic regression models besides those discussed in the previous sections. For example, these data are from the Substance Abuse and Mental Health Services Administration/Center for Substance Abuse Treatment (SAMHSA/CSAT) 2012 data set which contains a great deal of variables that were not examined for the current dissertation including type of substance use treatment and other factors that may be relevant, such as HIV/AIDS risky behavior and needle use. Additionally, it would be worth investigating the physical health variable in more detail. For example, what types of physical health impact engagement in substance use treatment and how these can be formulated to better articulate the measurement of treatment readiness?

A final line of inquiry would be to invest in qualitative research to gain a better understanding of how individuals going through the change process understand initiating and engaging in substance use treatment services. Based on the results of this dissertation (only 13.7% of the variation explained in initiating substance use treatment and 3.3% of the variation explained in engaging in substance use treatment), it is clear that more research is needed to explore additional areas that impact initiation and engagement in substance use treatment. For example, in-depth interviewing with individuals who initiate and engage in substance use treatment will reveal how they experience the change process while using substances, being involved in illegal activities and experiencing health related issues. The results from qualitative research may be used to better inform

future quantitative surveys used to gather information from individuals going through the change process.

### **Limitations**

This dissertation has several limitations. First, some of the variables for the current study were susceptible to missing data. For example, the primary independent measure of interest for the current study, treatment readiness, had 324 (6%) missing cases. As noted previously in the methods chapter, the treatment readiness variable is made up of a 9-item binary response items. As a result, imputation is more difficult with these types of items. As noted earlier, Allison (2005) suggests multiple imputations of categorical variables can lead to biased results. For example, dummy coding a categorical variable and then treating it as a continuous measure (i.e., between 0 and 1) rounded off to 0 or 1 based on the imputed value being between .5 is not accurate. Secondly, Allison (2005) notes using other approaches such as listwise deletion may not bias results as compared to using the previously noted approach. Binary logistic regression will use listwise deletion of missing cases and should not impact the statistical power since there are over 5,000 cases.

A second limitation to the current study is not distinguishing between types of factors portrayed in the independent, scaled, items. For example, many of the diagnostic factors and family/clinical factors were assessed as the average number of days that some reported using substances, was employed, or involved in the criminal justice system. This dissertation did not go so far as to parse out types of these factors. It may be prudent to look at type of substance user (e.g., alcohol, marijuana, hard drugs); type of employment

(e.g., full-time, part-time); and type of involvement in the criminal justice system (e.g., probation, parole) to ascertain how these predict initiating and engaging in substance use treatment.

A final limitation is not including whether treatment readiness further predicts completing substance use treatment. For example, this dissertation examines process measures of change including initiation and engagement. Completion of substance use treatment can be considered more of a distal measure of change. It will be worth investigating whether the same factors that predict substance use treatment initiation and engagement also predict completion. Additionally, examining completion data can then link conceptually to the TTM. For example, individuals who initiate, engage and then later complete substance use treatment can be considered as falling into the maintenance stage. This means that by completing substance use treatment, they are working to maintain the change in their lives.

## **Conclusion**

This dissertation study showed the benefit and promise of treatment readiness' impact on initiating and engaging in substance use treatment. The purpose of the study was to determine if treatment readiness predicted initiating and engaging in substance use treatment. Treatment readiness did, in fact, significantly predict initiating substance use treatment but did not predict engaging in substance use treatment. But, other diagnostic and family/clinical factors predicted initiating and engaging in substance use treatment. Despite statistical significance for each of these factors, little variation was found in the final initiation model (13.7%) and final engagement model (3.3%). This means that there

is still considerable individual-level variation in the outcomes that are not accounted for by the included covariates. In the stepwise models, treatment readiness did significantly predict initiation but produced a small odds ratio and did not predict engagement. What is interesting are the other diagnostic and family/clinical factors that predict initiation and engagement as well. More research is needed to further understand treatment readiness and what other potential factors may contribute to individuals' initiating and engaging in substance use treatment. The use of qualitative research can be essential to garner a greater understanding of what other factors may be important to individuals who initiate and engage in substance use treatment. Specifically, gaining an understanding of how the change process works for individuals may provide better insight into their level of treatment readiness.

This study explores several things about treatment readiness. First, treatment readiness significantly predicted initiating substance use treatment. This may reflect the fact that these individuals have some form of social support to ease them into the initiation process as reflected in the TMI. Second, treatment readiness did not significantly predict engagement in substance use treatment; however, another individual-level factor, physical health, did. The measure of treatment readiness in this study did not ask questions regarding an individual's physical health. Perhaps examining an interaction between treatment readiness and physical health may gain a better understanding of how an individual's physical health interacts with their level of treatment readiness. As researchers we need to explore further individual-level factors to gain a better understanding of the construct of treatment readiness.

The Transtheoretical Model (TTM) of change is the framework for the study and highlighted how the different stages of change can be incorporated into process measures of change such as initiation and engagement. Important is the fact that those who initiate treatment can be considered the contemplators. Individuals who continue to want to change engage in treatment and become a part of the preparation and action stages. For these individuals, treatment readiness does not matter as much; however, a host of other factors did. These should be considered when assessing an individuals' readiness for treatment in future studies.



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