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# Changes in Self-Concept and Substance-Related Cognitions During Short-Term Residential Substance Use Treatment

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**CHANGES IN SELF-CONCEPT AND SUBSTANCE-RELATED COGNITIONS  
DURING SHORT-TERM RESIDENTIAL SUBSTANCE USE TREATMENT**

**by**

**Olivia G. Larson**

A Dissertation Presented to the College of Psychology  
of Nova Southeastern University  
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This Dissertation was submitted by Olivia G. Larson under the direction of the Chairperson of the Dissertation committee listed below. It was submitted to the College of Psychology and approved in partial fulfillment of the requirements for the degree of Doctor of Psychology in Clinical Psychology at Nova Southeastern University.

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## Statement of Original Work

I declare the following:

I have read the Code of Student Conduct and Academic Responsibility as described in the *Student Handbook* of Nova Southeastern University. This dissertation represents my original work, except where I have acknowledged the ideas, words, or material of other authors.

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Olivia G. Larson

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Name

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Date

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## **ABSTRACT**

The United States is in the midst of an opioid crisis, with more than 130 people dying each day from an opioid overdose (Centers for Disease Control and Prevention [CDC], 2018a). Given the recent spike in overdose deaths associated with highly potent synthetic opioids (i.e., fentanyl), there are few signs of the crisis abating (CDC, 2018a). Compared to other age groups, the prevalence of both heroin and prescription opioid use is particularly elevated among young adults (Sharma, Bruner, Barnett, & Fishman, 2016). While there is a large body of evidence demonstrating the effectiveness of substance use treatment in general, only 40-60% of individuals remain abstinent in the year following treatment (McLellan, Lewis, O'Brien, & Klebber, 2000). Less attention has been given to the process of treatment, making it challenging to determine what works and what needs improvement. This information is necessary in developing a comprehensive understanding of the treatment process, which in turn, will inform treatment decisions and improve client outcomes. The current study adds to existing literature by assessing during-treatment change on four proximal outcomes measuring substance-related cognitions (i.e., abstinence self-efficacy and commitment to sobriety) and self-concept (i.e., internalized shame and self-compassion). It was hypothesized that participants

would demonstrate significant changes in the favorable direction on all four proximal outcomes. A sample comprised of primarily young adults with opioid use disorders attending short-term residential substance use treatment were enrolled in a naturalistic longitudinal study and assessed at intake, mid-treatment, and discharge. Individual growth curve models were used to examine change over time at both the aggregate and individual levels on the four proximal outcomes. Several potential moderating influences (e.g., demographic information, substance use history, mental health symptoms) were explored to better understand initial status and responses to treatment. Results revealed significant changes in the expected direction on all four proximal outcomes. In addition, several variables emerged as significant predictors of initial status and rates of change. These results provide further evidence that residential substance use treatment is not only a viable option in reducing substance use, but also impacts other important outcomes relevant to clients' functioning and overall well-being.

*Keywords:* opioid use disorder; residential treatment; young adults; substance-related cognitions; self-concept

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## Chapter I: Statement of the Problem

While humans have used drugs for thousands of years, the problems associated with addiction have been slowly acknowledged over time (e.g., establishing laws banning use, requiring antidrug education in schools). Distinct trends in the popularity of specific substances have been recognized periodically. For example, while marijuana use was heightened in the 1960s and 1970s, cocaine use became popular in the 1980s. Various patterns are still evolving, such as the increase in e-cigarette use among teenagers in the United States (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016). In general, illicit drug use in the United States has been increasing. In 2016, approximately 28.6 million people aged 12 or older had engaged in illicit substance use within the past month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2017). This number comprises 10.6% of the total population (SAMHSA, 2017). A growing concern within the United States, and globally, is the use of prescription painkillers, heroin, and synthetic opioids. America's "opioid epidemic" has been ongoing for over twenty years and is characterized by three distinct waves: (a) increased prescribing of opioids in the 1990s; (b) a rise in heroin use beginning in 2010; and (c) spike in deaths associated with overdose involving synthetic opioids, particularly fentanyl, ongoing since 2013 (Centers for Disease Control and Prevention [CDC], 2018a). An estimated 11.8 million people in the United States misused opioids in 2016, with 11.5 million misusing prescription opioids and 948,000 addicted to heroin (SAMHSA, 2017). Despite recent decreases in opioid prescribing patterns in the United States, highly potent synthetic opioids are distributed in illicit drug markets at alarmingly high rates (Centers for Disease Control [CDC], 2016). As such, the devastating consequences associated with opioid abuse have

been on the rise. Between 1999 to 2016, opioid-related deaths increased by 455% (Tinker, 2019). In 2017 alone, over 47,000 Americans died as the result of an opioid overdose (Centers for Disease Control and Prevention [CDC], 2018b). Of those deaths, 28,000 were associated with synthetic opioids, a 45% increase from the previous year (CDC, 2016). Compared to other age groups, individuals in their late teens to early twenties are at the highest risk for illicit drug use (National Institute on Drug Abuse [NIDA], 2015; Schulenberg et al., 2018). In 2017, the annual prevalence of any illicit drug use was the most elevated among 21- and 22-year-old adults, with 44% endorsing past year illicit substance use (Schulenberg et al., 2018). Specific to opioids, young adults have the highest prevalence of both heroin and prescription opioid use, as well as the largest increases in heroin use across the lifespan (Sharma, Bruner, Barnett, & Fishman, 2016). In 2014, approximately 1,700 individuals between the age of 18 and 24 died from a prescription drug overdose (primarily opioid) – a 4-fold increase since 1999 (National Institute on Drug Abuse [NIDA], 2016a). For every death, there were 119 emergency room visits and 22 treatment admissions among this age group (NIDA, 2016a). The primary purpose of the current study is to examine proximal outcomes of short-term residential substance use treatment for samples comprised of primarily young adults with opioid use disorders.

### **Treatment for Substance Use Disorders**

There are more than 14,400 substance use treatment facilities in the United States (Substance Abuse and Mental Health Services Administration [SAMHSA], 2016). The treatment of substance use disorders is complex and can vary by setting (e.g., outpatient vs. inpatient), duration (30-days vs. 90-days), intensity (meeting once a week vs. five

days a week), and modality (e.g., Cognitive-Behavioral Therapy vs. Twelve-Step Facilitation).

**Detoxification.** Often the first stage of treatment is known as detoxification (detox), which is the process of eliminating substances from the body. Because the side effects of withdrawal are not only physically uncomfortable, but potentially life-threatening, this stage of treatment is conducted under the care of medical professionals who may prescribe medication to facilitate the process (i.e., medically managed withdrawal). For example, some clients experience delirium tremens when detoxing from heavy alcohol use which can include the rapid onset of seizures, confusion, irregular heartrate, tremors, nausea, and other symptoms. The goal of detox is to stabilize clients and is typically followed by a referral to additional treatment.

**Residential treatment.** Often referred to as “rehab,” residential treatment usually occurs in a non-hospital setting and treats clients 24-hours a day for a period of weeks to months. Long-term treatment typically refers to any time commitment longer than 90 days. The therapeutic community (TC) is a common model focused on “re-socializing” individuals through use of a community – including staff and residents (National Institute on Drug Abuse [NIDA], 2012). Any treatment lasting fewer than 90 days would be considered short-term. Short-term residential programs are brief, yet intensive, and often utilize a 12-step approach (NIDA, 2012). Treatment duration is sometimes determined by a client’s problem severity. Research has found that clients with higher substance use severity had better substance use outcomes when enrolled in a longer residential treatment program (90 days or more), whereas those with lower problem severity improved in less intense outpatient settings (Simpson, Joe, Fletcher, Hubbard, & Anglin,

1999). In general, residential treatment programs usually involve traditional substance use treatment coupled with psychological and medical care. After clients complete a residential program, they are usually encouraged to attend outpatient treatment.

**Outpatient treatment.** Unlike residential treatment, clients live at home while receiving outpatient treatment. It is often less expensive than residential treatment and can be more accessible for those with employment or social obligations. Intensive outpatient (IOP) or day treatment is comparable to residential settings in regard to services and effectiveness, depending on the client's needs and characteristics (NIDA, 2012). These programs commonly involve at least nine hours of treatment per week and are viewed as a step-down level of care for those who have completed residential treatment (Fletcher, 2013). Clients may continue to step-down into a less time-demanding program, such as individual treatment or 12-step meetings.

**Individual treatment.** One-on-one treatment with a licensed mental health professional (e.g., mental health counselor, social worker, psychologist, or psychiatrist) focuses on reducing or stopping substance use. In conjunction with this goal, individual treatment may also address different areas of the client's functioning (e.g., mental health, social relationships, employment problems). The licensed professional might help the client identify and understand the underlying nature of their substance use and develop strategies for maintaining long-term recovery (Fletcher, 2013). The duration of treatment varies by the needs of the individual being treated. Some remain in treatment for years at a time, while others may require only brief interventions. Additionally, the mental health professional might encourage twelve-step participation to supplement individual treatment.

**Twelve-step programs.** At the foundation of twelve-step programs are the 12 steps – sequentially organized guiding principles for overcoming addiction and maintaining sobriety. While these principles can be incorporated into almost any treatment setting (e.g., residential, IOP, individual treatment), 12-step mutual-help organizations (MHOs) – such as Alcoholics Anonymous (AA) or Narcotics Anonymous (NA) – refer to non-professional, peer-operated organizations committed to helping those with addiction-related problems within the community (Humphreys et al., 2004). MHOs are evidence-based, cost-effective, and easily accessible treatment options for individuals with a substance use problem (Humphreys et al., 2004). Twelve-step organizations emphasize the acceptance of addiction as a disease that can be managed through abstinence, spiritual growth, and providing support to other members of the organization (Humphreys et al., 2004).

**Sober living facilities.** Often referred to as halfway houses, sober living facilities are transitional group homes for individuals in recovery. While not a requirement, entrance into a sober living facility is generally preceded by the completion of a treatment program. These facilities seek to further one’s progression into becoming an independent and productive member of society.

**Treatment modalities.** Aside from the various settings in which substance use treatment occurs, there are also different evidence-based treatment modalities that are used, such as Cognitive-Behavioral Therapy (CBT), Dialectical Behavioral Therapy (DBT), and 12-Step Facilitation Therapy. It is not uncommon for a treatment setting to use a combination of these modalities – resulting in more of an eclectic approach. For example, a treatment setting might focus on the connection between one’s thoughts and

behaviors – a principle concept behind CBT – yet utilize mindfulness meditations and encourage 12-step meeting attendance. In conjunction with evidence-based psychosocial treatment modalities, pharmacotherapies (e.g., methadone, naltrexone) are effective and more widely used (U.S. Department of Health and Human Services [HHS], 2018). In general, the use of FDA-approved medications for opioid use disorder has resulted in significant decreases in overdose deaths, transmission of infectious diseases, and criminal activity (National Institute on Drug Abuse [NIDA], 2016b). Further, these medications have also been associated with improvements in social functioning and increased retention in treatment (NIDA, 2016b).

In addition to these core parameters described above, treatment is also affected by more macro-level socio-cultural influences, such as societal values surrounding substance use and treatment (Simpson, 2004). The many variations and variables at play in substance use treatment make it challenging to determine what works.

### **Addiction as a Chronic Health Condition**

Continual monitoring of client outcomes has become increasingly important with the changing landscape of healthcare in the United States and the widely accepted definition of addiction as a chronic health condition. In general, treatment follow-up studies demonstrate that only 40% to 60% of clients remain abstinent 12-months post-discharge (McLellan, Lewis, O'Brien, & Kleber, 2000). Most individuals with a substance use disorder necessitate multiple treatment episodes over a period of years before maintaining stable recovery (Dennis & Scott, 2007). According to the American Society of Addiction Medicine (2011), “Addiction is a primary, chronic disease of brain reward, motivation, memory, and related circuitry” (para. 1). Similar to other chronic

diseases (e.g., hypertension, diabetes, or asthma), substance use disorders warrant continual monitoring both during and after treatment (McLellan et al., 2000). However, treating addiction from a chronic care perspective is challenging, and sometimes impossible, as managed care is becoming increasingly common in both the public and private sector (Center for Substance Abuse Treatment [CSAT], 2006). Insurance companies and managed care organizations (MCOs) only want to fund the most effective programs and restrict the number of visits covered.

### **Outcome Evaluation**

Many treatment outcome studies are based on large-scale national evaluations, such as the Treatment Outcome Prospective Study (TOPS; Hubbard et al., 1989) and the Drug Abuse Treatment Outcome Study (DATOS, Fletcher, Tims, & Brown, 1997). The data accumulated from hundreds of treatment programs and thousands of admissions has supported the general effectiveness of drug treatment (Simpson, 2004). However, these data were collected in the 1980's and 1990's – rendering them possibly less relevant today. While treatment effectiveness studies have become relatively popular in the literature base, few examine the underlying processes associated with the effects (Finney, Noyes, Coutts, & Moos, 1998). This is particularly true among samples of young adults whose primary substance is something other than alcohol.

In general, treatment effectiveness studies usually only monitor the client's substance use behavior – the most obvious indicator of treatment success. However, researchers have recently emphasized the importance of examining changes that occur for individuals during-treatment which may – or perhaps, may not— be associated with reduced substance use in the hopes of developing a comprehensive understanding of the

treatment process. Changes that occur as a result of an intervention are often defined in terms of their proximity with the occurrence of the intervention. In regard to treatment, proximal outcomes are those that can be measured at any time between treatment entry and the assessment of distal outcomes (Finney, 2004). These proximal outcomes often comprise an individual's thoughts, attitudes, personality characteristics, and behaviors that should be influenced by the intervention (Finney, 2004). As such, incremental changes in these proximal variables should lead to more positive distal outcomes, such as decreased substance use (Finney, 2004). Client performance monitoring has multiple benefits (e.g., improved attendance and retention rates, better treatment for clients, reduced program costs; CSAT, 2006). In addition, monitoring performance through the assessment of proximal outcome variables would enhance our understanding of the program's effectiveness and allow for the gathering of clinically relevant client-level information to inform the course of treatment (e.g., altering treatment plans) in real time (Joe, Broome, Rowan-Szal, & Simpson, 2002).

### **Summary**

Overall, illicit drug use is increasing and more than 130 people die each day from an opioid overdose (CDC, 2018a). At risk are young adults who have the highest prevalence of both heroin and prescription opioid use (Sharma et al., 2016). The number of drug-related medical emergencies and deaths associated with opioid use among young adults has increased at an alarming rate (NIDA, 2016a). While years of research has supported the general effectiveness of substance use treatment, less is known of the treatment process – making it difficult to determine what works and what needs improvement (Simpson, 2004). The current study reviews the literature examining in-

treatment changes on proximal outcomes for individuals receiving short-term residential substance use treatment. A specific focus is placed on young adults with opioid use disorders. In addition, the association between changes on proximal outcomes (e.g., self-efficacy) and changes on distal outcomes (e.g., substance use) is reviewed.

## Chapter II: Review of the Literature

Overall, the substance use treatment outcome literature is extensive and varies widely. A large portion of data supporting the effectiveness of substance use treatment is derived from large-scale national evaluations beginning in the early 1970s and continuing through the 1990s (Simpson, 2004). Over two decades later, these data are likely less relevant considering the changing trends in substance use and treatment. The number of studies focused on alcohol use, specifically, is vast in comparison to the number of studies focused on other substances more commonly used today (e.g., opioids). To help prune the literature, three selection criteria were used: (a) evaluates proximal outcomes of short-term residential treatment, (b) sample is comprised of mainly young adults, and (c) the primary substance abused is prescription opioids or heroin. Due to the limited number of studies meeting all three criteria, studies were included in the final review if they satisfied criterion “a” (evaluated short-term residential treatment), and either criteria “b” (sample of young adults) or “c” (primary substance is opioids or heroin).

A total of eight studies utilizing data from three different samples examine changes on proximal outcome variables during short-term residential substance use treatment. Several proximal outcomes have been evaluated in these studies, including self-efficacy, self-criticism, adaptive coping skills, psychological distress, substance use expectations, and 12-step engagement. These studies examine differences in proximal outcomes for both patient- and program-level characteristics. Additionally, the relationship of proximal outcomes to the ultimate outcome of reduced substance is discussed. Studies are organized by sample and within the three sections is a description of each study. The descriptions contain sample characteristics, treatment program characteristics (e.g., type,

duration, approach), selection and randomization procedures, proximal outcomes, and an assessment timeline. A general summary is incorporated at the end of each section. An integrated summary concludes the review.

### **Sample 1: Emerging Adults**

Between October 2006 and March 2008, emerging adults between the age of 18 to 24 entering a private residential treatment facility – Hazelden Center for Youth and Families (HCYF) – in Plymouth, Minnesota were recruited to participate in a general treatment outcome study, which ultimately produced the four studies reviewed in this section. The treatment was youth-specific and based on the 12-step Minnesota Model philosophy (McElrath, 1997). Evidence-based approaches such as motivational enhancement, cognitive-behavioral, and family-based therapies were utilized in conjunction with medication management. The average length of stay was approximately 25 days. A stratified sampling procedure was used during the recruitment period to obtain a representative sample within the target age range (18-24 years old). During this time, 384 individuals entered the treatment program and 21.1% either declined to participate or withdrew prior to the baseline assessment. Participants ( $N = 303$ ) were on average 20.4 years old, predominantly male (73.9%), Caucasian (94.7%), and all were single. Approximately 55.8% were either employed or enrolled as a student and 43.6% had a high school diploma. The most commonly used substances were alcohol (28.1%) or marijuana (28.1%), heroin or other opiates (22.4%), cocaine or crack (12.2%), and amphetamines (5.9%).

Four studies utilizing data from this sample evaluate the during-treatment changes that occur among emerging adults and the impact those changes have on outcomes post-

treatment. The first study examines changes on proximal outcomes during treatment and the impact of those changes on outcomes at 3-months post-discharge (Kelly, Urbanoski, Hoepfner, & Slaymaker, 2012). The second study evaluates during-treatment responses to residential treatment among emerging adults with opioid use disorders, specifically (Schuman-Olivier, Greene, Bergman, & Kelly, 2014). The third study looks at differences in outcomes between emerging adults with and without comorbid psychiatric diagnoses (Bergman, Greene, Slaymaker, Hoepfner, & Kelly, 2014). Finally, the fourth study examines the role of psychiatric comorbidities on one specific aspect of the treatment process – changes in abstinence self-efficacy (Greenfield, Venner, Kelly, Slaymaker, Bryan, 2012).

In the first study — examining changes during treatment on proximal variables considered significant in the process of treatment — researchers hypothesized that participants would demonstrate significant improvement on the following five proximal outcomes: (a) psychological distress, (b) motivation, (c) self-efficacy, (d) coping skills, and (e) commitment to AA/NA (Kelly et al., 2012). In addition, the extent to which these proximal outcomes predicted abstinence three months after the completion of treatment was examined. Participants ( $N = 303$ ) were assessed at four time points: (a) treatment entry, (b) mid-treatment, (c) treatment discharge, and (d) 3-months post-discharge. Follow-up rates were 91.1% at mid-treatment, 87.1% at treatment discharge, and 81.8% at 3-months post-discharge.

Primary results revealed significant changes during treatment in the expected direction on all five proximal outcome variables. The magnitude of effect ranged from small to large, with the most substantial change occurring in psychological distress ( $d =$

1.09). Moderate to large effects were observed amongst abstinence coping ( $d = 0.66$ ), AA/NA commitment ( $d = 0.66$ ), and abstinence self-efficacy ( $d = 0.55$ ). One small effect was observed for abstinence motivation ( $d = 0.17$ ). Next, discharge levels of these proximal outcomes were correlated with the dichotomized post-discharge abstinence outcome (yes/no) from all drugs (excluding nicotine) at the 3-month follow-up. Motivation, self-efficacy, coping skills, and commitment to AA/NA were all significantly associated with higher abstinence rates. When models were replicated while controlling for factors associated with missing the 3-month follow-up (i.e., age, race, education, opiate drug of choice) and other possible third variables [i.e., pre-treatment percentage of days abstinent (PDA) and time spent in a controlled environment], motivation, self-efficacy, and coping skills remained significant predictors. Finally, when predictors were entered in a simultaneous model, self-efficacy was the only variable that remained statistically significant.

Results support researchers' hypotheses that young adults demonstrate improvements on key therapeutic targets during treatment, which in turn predict substance use outcomes post-treatment. However, the degree to which these variables improve and predict outcomes varied considerably. Interestingly, the variable demonstrating the largest amount of change during treatment – psychological distress – was not a robust predictor of 3-month outcomes. Rather, variables considered specific to substance use (e.g., motivation, self-efficacy, and coping skills) were stronger predictors of abstinence at the 3-month follow-up – with abstinence self-efficacy emerging as the sole significant predictor in the full model.

A subsequent study using the same sample examined outcomes as a function of “drug of choice.” More specifically, participants ( $N = 292$ ) were classified into one of three groups – opioid dependence ( $n = 73$ , 25%), opioid misuse ( $n = 58$ , 20%), or no opiate use ( $n = 161$ , 55%) – based on their reported opioid use during the 90 days prior to treatment admission (Schuman-Olivier et al., 2014). Measures were administered at treatment entry, discharge, 3-, 6-, and 12-months post-discharge. Proximal outcomes of interest included the following: (a) commitment to sobriety, (b) self-efficacy, (c) coping skills, (d) intentions to attend 12-step, and (e) psychiatric symptoms. Follow-up rates were 81.2% at the 3-month follow-up, 72.6% at the 6-month follow-up, and 70.9% at the 12-month follow-up.

At baseline, the opioid dependence group presented with significantly higher levels of dependence severity compared to the opioid misuse group and no opiate use group. The opioid dependence group demonstrated significantly higher substance use consequences, as well as significantly more substance-related hospitalizations and psychiatric symptoms compared to the no opiate use group. The opioid dependence group was more likely to endorse heroin as the sole form of recent opioid use and the opioid misuse participants were more likely to endorse prescription opioids. No significant group differences were observed on demographics, psychiatric diagnoses, prior arrests, medications, and pre-treatment 12-step attendance.

Primary results indicated that during treatment, all groups experienced significant increases in levels of abstinence self-efficacy, commitment to sobriety, intentions to attend 12-step mutual help organizations, and coping skills. However, the opioid misuse group experienced significantly greater improvements on these four outcomes compared

to the other two groups. The largest difference occurred in coping skills, with the magnitude of effect being relatively large for the opioid misuse group ( $d = 0.72$ ) and smaller for both the opioid dependent ( $d = 0.27$ ) and no opiate use participants ( $d = 0.38$ ). Significant decreases in psychiatric symptomatology during treatment were observed among all three groups, yet the opioid dependence group experienced a greater decline ( $d = 1.59$ ) compared to the opioid misuse ( $d = 1.09$ ) and no opiate use participants ( $d = 0.84$ ). The opioid misuse participants had the lowest proportion of participants endorsing complete abstinence (e.g., abstinence from all substances, except nicotine, since the previous interview or follow-up assessment) at six months (31.0%) and 12 months (22.4%). However, groups were not significantly different (see Table 1). Additionally, the opioid dependence participants reported attending significantly more outpatient sessions compared to the no opiate use group post-discharge.

Table 1  
*Abstinence rates as a function of opioid use group (N = 292)*

	6 months	12 months	6 and 12 months
Opioid dependent ( $n = 73$ )	31 (42.50%)	21 (28.80%)	20 (27.40%)
Opioid misuse ( $n = 58$ )	18 (31.00%)	13 (22.40%)	10 (17.20%)
No opioid misuse ( $n = 161$ )	68 (42.20%)	52 (32.30%)	46 (28.60%)

*Note:* Missing data for percent days abstinent was documented as a relapse. Adapted from “Is residential treatment effective for opioid use disorders? A longitudinal comparison of treatment outcomes among opioid dependent, opioid misusing, and non-opioid using emerging adults with substance use disorder,” by Z. Schuman-Olivier, M.C. Greene, B.G. Bergman, and J.F. Kelly, 2014, *Drug and Alcohol Dependence*, 144, p. 184.

In general, all three groups demonstrated significant improvement on all five outcomes during treatment. However, the opioid misuse participants evidenced the most

change in self-efficacy, coping skills, commitment to sobriety, and intentions to attend 12-step. In contrast, psychiatric symptomatology was reduced to the greatest extent by the opioid dependence group. These differences during treatment may be a function of differential regression. For example, the opioid dependence group presented with the highest level of psychiatric symptomatology at baseline and therefore, the large effect might partially be explained by regression to the mean. At follow-up, outcomes were comparable among the three groups. Interestingly, although the opioid misuse group demonstrated the largest change during-treatment, they had the lowest proportion of participants endorsing abstinence at 6- and 12-months post-discharge. Although proximal and distal outcomes of short-term residential substance use treatment were evaluated in this study, the linkage between these two types of outcomes is unclear as authors did not attempt to investigate their relationships.

Using data from the same longitudinal study, differences in outcomes between participants ( $N = 300$ ) with a substance use disorder only (SUD;  $n = 159$ ) and participants with co-occurring substance use and psychiatric disorders (COD;  $n = 141$ ) were examined (Bergman et al., 2014). The most commonly diagnosed substance use disorders were alcohol (75.7%), cannabis (72.0%), cocaine (46.3%), and opioid (34.0%) use disorders. Approximately 47% ( $n = 141$ ) met criteria for at least one past-month psychiatric disorder and were therefore categorized into the COD group. Major depressive disorder (33.3%), generalized anxiety disorder (24.1%), and social phobia (22.7%) were the most prevalent psychiatric diagnoses. In addition to the constructs assessed in the prior study, researchers also examined commitment to AA/NA and intentions to avoid risky situations. Measures were administered at treatment entry,

discharge, 3-, 6-, and 12-months post-discharge. Follow-up rates were 85.7% at discharge, 81.0% at 3-months, 73.0% at 6-months, and 70.7% at 12-months.

At baseline, significantly higher levels of dependence severity and substance use consequences were observed among the COD group. Additionally, the COD group was significantly more likely to be diagnosed with an alcohol use disorder and polysubstance dependence, while the SUD-only group was significantly more likely to be diagnosed with a cannabis use disorder. Although COD patients were more likely to be female (39% vs. 13.8%), the two groups were similar in terms of their age, ethnicity, education, and other substance-related variables (e.g., PDA, other lifetime SUD, hospitalizations for SUD). Primary results indicated that during treatment changes on five targeted proximal outcomes did not differ significantly as a function of diagnostic group. Specifically, both groups demonstrated similar improvement on the following outcomes: commitment to sobriety (COD  $d = 0.40$ ; SUD-only  $d = 0.35$ ), AA/NA commitment (COD  $d = 0.65$ ; SUD-only  $d = 0.69$ ), avoiding risky situations (COD  $d = 0.32$ ; SUD-only  $d = 0.26$ ), self-efficacy (COD  $d = 0.60$ ; SUD-only  $d = 0.49$ ), and coping skills (COD  $d = 0.78$ ; SUD-only  $d = 0.62$ ). However, for psychiatric symptoms, COD patients exhibited greater symptom decrease ( $d = -1.46$ ) relative to those with substance use only ( $d = -0.85$ ). At the 3-month follow-up, the COD group had slightly higher PDA (93.7% vs. 92.3%) and lower PDA at the 6-month (85.7% vs. 88.6%) and 12-month (78.31% vs. 85.5%) follow-ups. However, diagnostic group was not a significant predictor of PDA or psychiatric symptoms at follow-up. Overall, it appears that emerging adults with co-occurring substance use and psychiatric disorders experience similar gains during and after treatment as compared to those with a substance use disorder only.

As evidenced in the above studies, abstinence self-efficacy is a significant proximal outcome of substance use treatment. In another investigation using these data, the impact of psychiatric comorbidities on mechanisms of treatment process was further examined (Greenfield et al., 2012). More specifically, researchers hypothesized that emerging adults with a current diagnosis of major depressive disorder and/or current depressive symptomatology would show less during-treatment improvement on abstinence self-efficacy. It was also predicted that major depression and/or symptomatology would moderate the relationship between self-efficacy at discharge and substance use outcomes at follow-up. Participants ( $N = 302$ ) completed assessments measuring depressive symptoms, substance use consequences, substance use frequency, AA attendance, and self-efficacy at treatment entry, mid-treatment (2 weeks), discharge, and 3-months post-discharge. Follow-up rates were 91% for the mid-treatment assessment, 86% for the discharge assessment, and 80.5% for the 3-month follow-up assessment. Participants were categorized into one of two groups: MDD (“depressed”;  $n = 48$ ; 15.8%) or No MDD ( $n = 254$ ; 84.2%). In total, 35% met criteria for an Axis I disorder, with the three most common being MDD (15.8%), Generalized Anxiety Disorder (11.3%), and Social Phobia (10.6%). All participants were diagnosed with a substance use disorder, with the most common substances being alcohol (51.0%), cannabis (42.1%), and opioids (23.9%). At baseline, the two diagnostic groups were similar in terms of their demographic information. However, the MDD group was significantly more likely to have another Axis I diagnosis, a current alcohol use disorder, more consequences from their substance use, and more depressive symptoms during the week prior to treatment entry.

Primary results revealed a significant increase in abstinence self-efficacy scores during treatment regardless of one's depression status, with moderate effect sizes for the self-efficacy total score ( $d = 0.65$ ) and the Negative Affect subscale ( $d = 0.55$ ). Furthermore, depressive symptoms were reduced during-treatment, with a large effect size ( $d = 1.04$ ). A significant correlation between discharge self-efficacy and changes between discharge and 3-month follow-up self-efficacy scores was observed, indicating that those with higher self-efficacy at discharge were more likely to exhibit an increase in self-efficacy over time. Additionally, self-efficacy at discharge significantly predicted abstinence at the 3-month follow-up. In determining the predictive ability of depression status on substance use outcomes at follow-up, results from logistic regression analyses revealed that neither intake MDD status, level of depression at discharge, nor the interaction between MDD status and discharge self-efficacy significantly predicted substance use outcomes.

These findings indicate that MDD status and depressive symptomatology do not moderate the relationship between abstinence self-efficacy and substance use outcomes. Overall, self-efficacy increased significantly during treatment for participants, regardless of MDD status, and predicted abstinence status at the 3-month follow-up. In comparison to the findings from Bergman et al. (2014), researchers focused specifically on depressive symptomatology rather than psychiatric comorbidity in general. However, findings from both studies suggest that young adults with comorbid psychiatric diagnosis experience similar gains in proximal variables – including a reduction in psychological distress and improvements in self-efficacy – critical for long-term recovery.

**Summary of emerging adults sample.** The above studies include an examination of proximal outcomes among emerging adults attending short-term residential substance use treatment. Opioid use severity and psychiatric comorbidity were examined as moderating influences in one's response to treatment. In general, the effects were consistent across levels of the moderating variables – with slight variations in magnitude – as evidenced by similar gains made during and after treatment among participants. A total of 14 analyses were conducted in which researchers could have observed differences based upon a moderating variable. Interestingly, participants demonstrated statistically significant change on every proximal outcome for each analysis, regardless of the moderator. Emerging adults appear to demonstrate positive change during treatment on key therapeutic targets, including abstinence self-efficacy, commitment to sobriety and AA/NA, coping skills, psychological distress and psychiatric symptomatology, motivation, intentions to attend 12-step meetings, and avoidance of risky situations. However, differences in effect sizes were observed, with the largest occurring in psychiatric distress when examining opioid use severity and psychiatric comorbidity as moderators. It appears that individuals with an opioid dependence diagnosis demonstrated the least amount of change during treatment yet experienced the greatest decline in psychiatric symptomatology. Effects were generally consistent when examining the role of psychiatric comorbidities – and MDD specifically – on changes made during-treatment. Finally, the only proximal outcome evidenced to uniquely predict substance use post-discharge, was self-efficacy.

Relatively little research has been conducted on younger adults – a population at particularly high risk for substance use disorders. Further, the sample size was large and

the longitudinal design incorporated several assessment points for data collection. Despite these strengths, the studies contained several limitations. The sample was drawn from one treatment facility in the Midwest and was comprised of participants who were primarily male and/or Caucasian. The extent to which the results can be generalized to women and non-Caucasian individuals remains unknown. Additionally, due to the naturalistic, longitudinal design, statistical regression may provide an alternative explanation for some of the observed changes on proximal outcomes considered to be more extreme at baseline (e.g., psychological distress).

### **Sample 2: Examining Treatment Modality in the VA**

At 15 Department of Veterans Affairs (VA) substance use treatment programs, a total of 4,193 patients entering treatment were approached to participate in a multisite evaluation of substance use treatment services. A total of 494 (12%) declined to participate, leaving 3,699 patients in the initial sample. Due to their small numbers, women were excluded from the study. After patients completed medical detoxification, they were admitted to a program and asked to participate in the study. Participants completed a variety of measures at multiple time points within the study. The 15 programs were either identified as employing a 12-step ( $n = 5$ ), cognitive-behavioral (C-B;  $n = 5$ ), or eclectic (combination of 12-step and C-B;  $n = 5$ ) approach. The 12-step programs encouraged 12-step meeting attendance, reading 12-step literature (e.g., the Big Book), accepting an alcoholic/addict identity, acknowledging a loss of power over substance use, and having abstinence as the overarching treatment goal (Ouimette, Finney, & Moos, 1997). The C-B programs utilized relapse prevention groups, cognitive and behavioral skills training, and abstinence skills training (Ouimette et al., 1997). These

programs encouraged more adaptive ways of coping, enhanced feelings of self-efficacy, and worked to modify expectations towards substance use (Ouimette et al., 1997). All three programs were multidisciplinary in nature, used individual and group therapy, and anticipated aftercare participation (e.g., outpatient treatment and/or community-based self-help groups) (Ouimette et al., 1997). Overall, 970 participants were treated in the 12-step programs (30%), 1,191 in C-B programs (37%), and 1,067 in eclectic programs (33%). The desired length of stay was 21 to 28 days.

Three studies discussed in detail below utilize data from this sample to examine during-treatment changes on proximal outcome variables. The first study evaluates these changes specific to each modality (e.g., 12-step, C-B, and eclectic; Finney et al., 1998). The second examines these changes among participants with co-occurring substance use disorder and posttraumatic stress disorder (PTSD; Ouimette, Ahrens, Moos, & Finney, 1998). The third study revisits the distinction between changes on proximal outcomes specific to different treatment modalities and how these outcomes predict one-year outcomes (Johnson, Finney, & Moos, 2006).

Treatment approaches, such as traditional 12-step or cognitive-behavioral therapy (C-B), are theorized to differentially impact during-treatment changes in proximal outcomes (Finney et al., 1998). For example, outcomes specific to 12-step approaches include acknowledgement of powerlessness over substance use and belief in higher power, while outcomes specific to C-B treatments include coping skills and substance use expectancies. In this study, researchers examined differences in proximal outcomes among the three treatment approaches and hypothesized that C-B outcomes would be

considered more general and characteristic of substance use treatment in general, including 12-step treatment (Finney et al., 1998).

Participants ( $N = 3,228$ ) were male and on average 43 years old. Majority were either black (48%) or white (46%), 17% were married, and 17% were separated. Most were unemployed (76%). Nearly half of the sample (51%) was diagnosed with a concurrent alcohol and drug abuse/dependence diagnosis, followed by only alcohol abuse/dependence (36%), and only drug abuse/dependence (13%). Forty-eight percent used cocaine or crack, 39% used marijuana, and 13% used heroin, street methadone, or other opiates within the past three months. Participants were assessed at treatment entry and discharge. Overall, 87% completed the discharge assessment prior to discharge or within 30 days of leaving the program. Changes in a number of traditional 12-step proximal outcomes (e.g., disease model beliefs, alcohol or addict identity, abstinence goal) and C-B proximal outcomes (e.g., self-efficacy, positive substance use expectancies, general coping) were assessed.

The first set of analyses evaluated the during-treatment changes on proximal variables within each group. Using a significance level of  $p < .001$ , all three groups demonstrated improvement on nearly all proximal outcomes. In general, each group felt an enhanced sense of self-efficacy, improved their ability to cope, and increased 12-step behaviors. Each group reported increased attendance at 12-step meetings, were more likely to have a sponsor at discharge, made friends in 12-step meetings, took more steps, and read more 12-step literature. Additionally, disease model beliefs were increased during treatment regardless of treatment approach. For the 12-step group, no significant change was evidenced for two outcomes: (a) adherence to an abstinence goal and (b) positive

outcome expectancies. For the C-B group, participants did not demonstrate change in their acceptance of an alcoholic/addict identity. Finally, the eclectic group did not demonstrate change on adherence to an abstinence goal, positive substance use expectancies, or positive outcome expectancies. These outcomes were evaluated in terms of the average length of stay for each program. Analyses revealed that while some proximal outcomes were impacted by length of stay, the magnitude of effects were modest. In examining the between-program differences on proximal outcomes, results revealed that the 12-step group showed more improvement on 12-step outcomes compared to the C-B group. However, participants in the C-B group did not consistently demonstrate greater change on the C-B outcomes (with less change on three variables) compared to the 12-step group.

In summary, participants demonstrated significant changes on theorized proximal outcome variables during residential treatment, with some variability between groups. In general, the participants in the 12-step programs evidenced more improvement on the proximal outcomes specific to 12-step treatment and the C-B programs fared similarly to the 12-step programs on the proximal outcomes specific to C-B treatment. These results are consistent with the researchers' hypothesis that C-B proximal outcomes may be considered more general outcomes of treatments utilizing either 12-step, C-B, or an eclectic approach. In contrast, it is possible that programs employing a 12-step approach are more comprehensive in their focus on both outcomes specific to 12-step, as well as other important outcomes – such as self-efficacy and coping skills. Overall, the significant improvements on proximal outcomes among all three groups demonstrate the effectiveness of these treatments in eliciting change during treatment.

In a separate study, changes on proximal outcome variables during residential substance use treatment were examined among participants with either: (a) a comorbid substance use and posttraumatic stress disorder (Sub-PTSD;  $n = 140$ ), (b) a comorbid substance use and another Axis I diagnosis (Sub-other;  $n = 228$ ), or (c) a substance use disorder only (Sub-only;  $n = 1,262$ ) (Ouimette et al., 1998). Researchers hypothesized that participants in the Sub-PTSD group would improve on all proximal outcomes but to a lesser extent as compared to the other two groups. Participants ( $N = 1,630$ ) were male patients from the 15 VA substance abuse treatment programs discussed above. Of the Sub-PTSD group, 50.3% were engaged in a C-B orientated program, 22.6% in a 12-step orientated program, and 27.0% in an eclectic program. Participants were primarily Caucasian and the average age for each group was between 43 and 45 years old. In the Sub-other group, the most common diagnoses consisted of affective disorder ( $n = 145$ ), psychotic disorder ( $n = 65$ ), adjustment disorder ( $n = 17$ ), and anxiety disorder ( $n = 12$ ).

Assessments were administered at treatment entry and discharge and included measures of coping (e.g., positive reappraisal), substance-specific coping (e.g., stimulus control), positive substance use expectancies, positive expectancies for quitting, self-efficacy, and psychological distress. In addition, treatment participation, 12-step involvement, and perceptions of the treatment environment were assessed. At baseline, Sub-PTSD participants demonstrated significantly lower levels of adaptive coping, with less endorsement of positive reappraisal and higher usage of cognitive avoidance as compared to the Sub-only group. In addition, these two groups differed on positive reinforcement expectancies and positive expectancies for quitting. Results revealed that

the Sub-PTSD group had the highest levels of psychological distress, followed by Sub-other and Sub-only.

Primary results revealed that the Sub-only group demonstrated significant improvement on all proximal outcomes, while the Sub-other group improved on all outcomes except substance use expectancies. The Sub-PTSD group improved on all outcomes except positive substance use expectancies and positive expectancies for quitting. However, the magnitude of change was similar for all three groups and moderate to large effect size estimates were present in general coping, substance-specific coping, self-efficacy, and psychological distress.

To further understand these data, researchers evaluated the extent to which outcomes were impacted by other important factors (e.g., discharge functioning, substance use disorder type). In general, the Sub-only group demonstrated the highest level of functioning at discharge, followed by the Sub-other and Sub-PTSD groups. The Sub-PTSD group demonstrated the lowest level of functioning at discharge (e.g., higher cognitive avoidance, expected fewer benefits for quitting, higher psychological distress). While the three groups had unequal proportions of substance use disorder diagnoses (e.g., the Sub-PTSD group was comprised of more participants with an alcohol use disorder, as compared to the Sub-only group), no significant changes were observed when entering the substance use disorder diagnosis type as a covariate in a set of analyses – indicating that poorer outcomes among the Sub-PTSD group were not impacted by participant's substance use disorder diagnosis type. Finally, results revealed that increased levels of participation in treatment interventions and 12-step groups was associated with better coping and less distress at discharge.

In summary, all three groups demonstrated significant improvements on most proximal variables at discharge. These variables included coping styles, substance-specific coping, cognitions related to substance use, and psychological distress. Although participants with comorbid PTSD or another Axis I diagnosis reported lower levels of functioning at discharge, changes made during treatment were similar among all three groups. These findings suggest that proximal outcomes are positively impacted for individuals with and without comorbid psychiatric disorders in short-term residential substance use treatment. Further, the substance use disorder diagnosis type did not significantly impact the level of improvement on these outcomes. Overall, the progress made during treatment among the three groups was comparable. Because participants with comorbid diagnoses had poorer functioning at baseline and experienced similar gains during treatment, they also had poorer functioning at discharge. Research examining ways to further increase these positive changes during treatment for individuals with comorbid diagnoses would be beneficial.

To further understand the during-treatment changes on proximal outcomes in the sample, researchers examined the correlation between specific proximal outcomes and their relation to substance use outcomes, as well as the impact of continuing care on these outcomes 12-months post-discharge (Johnson et al., 2006). Although 3,698 individuals consented to participate, only those who completed both the intake and follow-up assessment were included in the study. In addition, the five eclectic treatment programs were excluded. Participants ( $N = 1,873$ ) were on average 43 years old ( $SD = 9.7$ ) and primarily non-Hispanic European American (50%) or African American (45%). Approximately 45% were diagnosed with a concurrent alcohol and drug use diagnosis,

42% with an alcohol use diagnosis, and 13% with a drug use diagnosis. Three months before treatment entry, 46% endorsed cocaine or crack use, 39% marijuana use, and 11% heroin or other opiate use. During this timeframe, nearly 45% reported attending at least one 12-step meeting. Researchers analyzed the same proximal outcome variables, including those specific to 12-step and those specific C-B (also referred to as general outcomes in this study) approaches. In addition, information regarding the participant's engagement in continuing care was utilized. Data were obtained at three time points: (a) treatment intake, (b) treatment discharge, and (c) 12-months post-discharge. On average, the 12-month assessment occurred at 13.2 months.

Primary results revealed improvements on most proximal outcomes from treatment entry to discharge with a decline in outcomes from discharge to the 12-month follow-up assessment. However, outcomes were still somewhat greater at 12 months compared to treatment intake. In comparing the two groups at follow-up, participants in the 12-step programs endorsed higher levels of 12-step proximal outcomes. For example, these individuals were more likely to endorse an alcoholic/addict identity and disease model beliefs, have a sponsor and abstinence goal, and engage in 12-step behaviors (e.g., attend 12-step meetings, read 12-step literature, take more steps, and have more 12-step friends) compared the participants in the C-B programs. No other significant differences were evidenced between the two types of programs at follow-up. Results revealed that participants who attended 12-step groups after discharge were more likely to maintain the improvements made during treatment, while attending outpatient care did not significantly impact gains. When examining the proximal outcomes at discharge independently, few were significantly correlated with substance use outcomes and the

effects were small. However, every variable measured in the 12-month follow-up assessment – except endorsement of an alcoholic/addict identity – was significantly correlated with concurrent substance use outcomes in the expected direction.

Overall, results again revealed that participants in both types of programs – 12-step and C-B – tend to show similar improvements during treatment on proximal outcomes. However, individuals in the 12-step programs reported higher levels of 12-step proximal outcomes (e.g., more likely to have a sponsor, greater 12-step meeting attendance) at the 12-month follow-up. This is an important finding because those who attended 12-step meetings after discharge maintained improvements acquired during treatment. The relationship of proximal outcomes at discharge with the ultimate outcome of reduced substance use one year later is minimal. However, proximal variables measured in the 12-month follow-up assessment were associated with substance use outcomes. These results may demonstrate the little influence certain treatment processes have on long-term substance use outcomes. Perhaps the variables assessed in the above study were more closely related to shorter-term outcomes (e.g., one-month post-discharge) or are not representative of all therapeutic processes that occur and significantly impact long-term outcomes. It is plausible that the general changes made during treatment are more meaningful compared to individual predictors alone when examining long-term outcomes. Furthermore, the effects of the mediators (e.g., attending 12-step meetings), which were controlled for in the analyses, are perhaps more powerful and proximal to the 12-month outcomes as they allow for the maintenance of progress made during-treatment. Finally, these findings represent the ways continuing care – specifically 12-

step group involvement – can influence substance use during the year after receiving short-term residential treatment.

**Summary of treatment modality in the VA.** The above studies examined differences in proximal outcomes among three different treatment approaches – 12-step, cognitive-behavioral, and eclectic. Overall, participants achieved similar gains on both 12-step and C-B/general proximal outcomes during residential treatment, with some variability among treatment approaches. Specifically, outcomes theorized to be specific to the C-B approach were achieved at similar rates in all three treatment approaches – indicating C-B outcomes may be considered more general. Additionally, 12-step programs might employ a more comprehensive approach in which 12-step and C-B specific outcomes are both promoted during treatment. In general, these data are consistent with previous findings supporting the efficacy of treatment in general – regardless of modality. Although all participants demonstrated improvements on these proximal outcomes during treatment, individuals with a comorbid psychiatric diagnosis – PTSD in particular – had poorer functioning at discharge. Proximal outcomes at discharge had relatively little effect on substance use at one year post-discharge. Proximal outcomes at follow-up were significantly associated with contemporaneous substance use at follow-up. In addition, those who attended 12-step meetings in the community post-discharge were more likely to maintain the improvements made during treatment on the targeted proximal outcomes. These three studies utilized data from a large and diverse sample. However, caution should be used when generalizing these results to certain populations (e.g., younger adults, females, non-veterans), as participants were male veterans who were relatively older in age. Additionally, in measuring the

different 12-step and C-B proximal outcomes, it is possible that the assessments did not encompass all potential outcomes characteristic of each approach (e.g., spirituality or belief in a higher power).

### **Sample 3: Traditional Chemical Dependency Treatment (TCDT)**

In another study, the processes theoretically expected to mediate change in positive outcomes during traditional chemical dependency treatment (TCDT) were examined (Morgenstern, Frey, McCrady, Labouvie, & Neighbors, 1996). Participants ( $N = 79$ ) were primarily male (68.4%), Caucasian (68.4%), and on average 35.1 years old ( $SD = 8.5$ ). Approximately 22.8% had a drug use disorder diagnosis, 30.4% had an alcohol use disorder diagnosis, and 46.8% had a concurrent alcohol and drug use disorder diagnosis. Admissions entering residential or intensive day treatment at two private hospital-based treatment programs in the Northeast were approached to participate in the study. Twenty-six (24.8%) people either declined to participate or dropped out prior to the baseline assessment. Both programs utilized a TCDT approach – otherwise known as the Minnesota Model. The average length of stay was 26.1 +/- 13.6 days. Assessments measuring five disease model processes (e.g., powerlessness, belief in higher power) and three other treatment processes (e.g., commitment to abstinence, intention to avoid high risk situations, self-criticism) were administered at treatment entry, discharge, and one-month post-discharge. Substance use outcomes at follow-up were available for 75 participants (93.6%) and additional outcome information (e.g., self-help meeting attendance, prayer or meditation, and exposure to high-risk situations) were available for 65 participants (82%).

Results assessed three hypotheses. The first being that participants would demonstrate high levels of denial and low endorsement levels of beliefs associated with treatment processes at treatment entry. However, results indicate that upon treatment entry, levels of endorsement for both disease model and common processes were high among participants – suggesting lower levels of denial (or perhaps, reasonable levels of motivation). The second hypothesis was that the endorsement of disease model and common processes would increase during treatment. The biggest change reported during treatment was a decrease in self-criticism ( $d = 0.63$ ). In addition, participants endorsed a significant increase on all five disease model processes during treatment. Effect size estimates for these five outcomes were small in magnitude, with the largest effects demonstrated among disease attribution ( $d = 0.38$ ) and higher power ( $d = 0.28$ ). There were no significant changes for the two common processes: commitment to abstinence ( $d = 0.03$ ) and intention to avoid high-risk situations ( $d = 0.17$ ). The third hypothesis was that short-term outcomes at the one-month follow-up would be predicted by one's endorsement of disease model and common processes at discharge. To assess the predictive ability of the proximal outcomes, logistic regression was used to examine the processes variables individually while controlling for age and time in treatment. Both common processes variables – intention to avoid high-risk situations and commitment to abstinence – predicted abstinence from alcohol and illicit drugs at one-month post-discharge. No disease model processes nor self-criticism were found to significantly predict substance use outcomes.

**Summary of TCDT sample.** While the researchers' original hypotheses were not entirely supported, results from this study provide evidence that theoretical processes

predicted to occur during substance use treatment do transpire. Specifically, individuals engaged in short-term residential treatment demonstrate changes in their levels of powerlessness, belief in higher power, disease attribution, abstinence violation effect, commitment to AA, and self-criticism. Beyond that, having a higher level of commitment to abstinence and intention to avoid risky situations at the end of treatment are associated with future abstinence. The current study had several limitations. One of these being the lack of random assignment into the treatment program. It is plausible that various pretreatment characteristics might account for the significant changes that occurred during treatment. For example, the sample had relatively high levels of disease model processes at baseline, consistent with the idea that participants may have self-selected into the treatment based on its 12-step approach. Additionally, ceiling effects might explain the relatively small changes made on proximal outcomes during treatment, as baseline scores on both disease and common processes were uniformly high.

### **General Summary**

The use of illicit substances is a growing concern – particularly among young adults. With nearly 11.8 million people misusing opioids in the United States, the associated consequences are devastating (SAMHSA, 2017). Treatment approaches vary widely (e.g., setting, duration, intensity, modality) and years of research has supported the general effectiveness of substance use treatment overall (Simpson, 2004). However, only 40-60% of individuals remain abstinent in the year following treatment and most require multiple treatment episodes before achieving stable recovery (Dennis & Scott, 2007). Relapse might be higher for opioid users (Nunes et al., 2018). Therefore, recent attention has focused on the evaluation of treatment processes – or the mechanisms through which

change occurs (Simpson, 2004). This focus has the potential to allow researchers to operationalize the treatment process, and ultimately enhance patient outcomes.

The eight studies discussed above demonstrate the complexity in understanding the underlying processes that occur during substance use treatment. Overall, individuals experienced significant improvement on a variety of proximal outcomes during their treatment episode. The changes made during treatment were generally consistent across levels of the moderating variables examined, as most individuals demonstrated similar improvements on proximal outcomes of interest. However, the magnitude of these effects varied. Overall, it appears that young adults can benefit from short-term residential substance use treatment. However, those with higher opioid use severity tend to demonstrate less improvement and individuals with a co-morbid psychiatric diagnosis are likely to complete treatment with an overall lower level of functioning. Effects also varied depending upon the treatment type. Although participants demonstrated significant improvement on most proximal outcomes during treatment, it appears that some effects were stronger for professional treatments influenced by 12-step programs – specifically those outcomes related to the 12-step philosophy. This is an important finding because those with higher levels of 12-step meeting attendance following treatment are more likely to maintain improvements over time (Johnson et al., 2006). In general, individual outcomes appear to be relatively weak predictors of substance use within the year following treatment. However, outcomes assessed at follow-up were associated with substance use at follow-up – suggesting the importance of maintaining skills obtained during treatment. Overall, the lack of research specific to the sample of primary interest here (younger opioid dependent individuals) in itself is an important finding and

highlights the slow development of empirical literature in comparison to the rapid growth in substance use trends in the United States.

The current review has led to the following six integrative conclusions: (a) effect size estimates were infrequently reported and generally small to moderate in magnitude, (b) statistical regression may account for some of the observed effects, (c) it is unclear which components of treatment were responsible for the reported changes, (d) outcomes measured in these studies likely encompass a small portion of all potential outcomes associated with treatment, (e) assessments were typically administered at only two time-points during-treatment (e.g., treatment entry and discharge), and (f) findings lack generalizability in terms of participant and setting characteristics.

**Effect size estimates.** Statistically significant changes during-treatment were observed for nearly every proximal outcome examined in the above studies. However, few authors reported effect size estimates in conjunction with statistical significance levels. The absence of effect size estimates – especially in small sample size research – is problematic. The TCDT sample was relatively small with 79 participants. While authors reported statistically significant effects for six of the eight proximal outcome variables, the calculated effect size estimates were small for five outcomes and moderate for one. This limitation is less concerning for the emerging adult and VA samples, which included a larger number of participants. Across studies, effect size estimates were primarily small to moderate in magnitude. A total of 67 effect size estimates were drawn from six of the eight studies and approximately 38% were small, 34% were moderate, and 28% were large. Unfortunately, this information was not easily obtained from the data presented in the other two studies. Authors found that some variables were unexpectedly high at

baseline (e.g., disease model beliefs, motivation; Kelly et al., 2012; Morgenstern et al., 1996). In these instances, a further increase during treatment might be minimal – perhaps providing an explanation for some of the smaller effect size estimates observed. This is ideal, however, as levels of the outcomes should remain high through treatment. The inclusion of effect size estimates, especially when utilizing small samples, is beneficial as statistically nonsignificant results often mask clinically significant effects. This information does not only reduce the opportunity for misinterpretation, but provides insight into the clinical meaningfulness of the results.

**Statistical regression.** Individuals often seek treatment after experiencing a serious, negative consequence resulting from their substance use (e.g., job loss, family conflict, legal issues). At treatment initiation, these individuals might consider themselves to be at “rock bottom” or a particularly low point in their life. Therefore, baseline scores, such as psychological distress, are likely extreme compared to other times in the person’s substance use history. Statistical regression – or the tendency of extreme scores to regress toward the mean – might provide an alternate explanation for the observed effects as none of the above studies included a no-treatment control group. Unfortunately, authors did not attempt to control for or reduce the impact of statistical regression in any of the eight studies. Another limitation of the above studies was the lack of random assignment. Participants self-selected into their respective treatment program. Therefore, certain characteristics not assessed at baseline which contributed to one’s selection of treatment may have influenced outcomes beyond that of the intervention itself. For example, participants in the TCDT sample demonstrated high levels of disease model processes at baseline. It is possible that these individuals self-selected into the program based upon its

12-step approach – perhaps indicating greater receptiveness to the intervention implemented.

**Treatment components.** Despite the lack of random assignment, the above studies demonstrate the effectiveness of residential substance use treatment in general – regardless of modality. However, it is unclear which components of the interventions specifically influence change during treatment. It is possible that the less obvious aspects of the intervention – such as the setting itself (e.g., being in a controlled environment, engaging with other residents) – accounted for the observed results. Additionally, the intensity of residential treatment (e.g., receiving treatment daily vs. once a week) likely played a role in the positive changes made during treatment. Results indicated that 12-step meeting attendance post-discharge increased the likelihood of maintaining gains in the year following treatment (Johnson et al., 2006). Because 12-step meetings are easily accessible and typically attended multiple times per week, it is plausible that the overall intensity in which individuals receive treatment over an extended period of time is critical in influencing – and maintaining – change.

**Potential outcomes.** In addition to the lack of information regarding which components are more and less effective in facilitating outcomes, it is possible that the proximal outcome variables themselves fail to account for all potential changes that occur during treatment. In general, there is a stark disconnect between what clinicians report as important indicators of client progress and the actual outcomes examined by researchers. For example, shame is more common among individuals with problematic substance use and is linked to poorer treatment outcomes (e.g., early dropout; Luoma, Kohlenberg, Hayes, & Fletcher, 2012). While many substance use treatment interventions address

shame, few have been systematically evaluated (Luoma et al., 2012). In general, empirical evidence supporting constructs regarded as important in clinical literature is lacking. Based on conversations with clinicians at the treatment center utilized in the current study, Recovery Unplugged, clients spend an ample amount of time exploring their identity and altering their self-concept to facilitate their recovery while in treatment. In addition, clinicians at Recovery Unplugged report observing changes in clients' self-esteem, self-compassion, and shame. The proximal outcomes assessed in the above studies likely comprise a narrow portion of all potential outcomes associated with treatment. The outcomes most frequently evaluated – in nearly every study – include self-efficacy, coping, and psychological distress. While reducing troubling and unpleasant emotions, increasing capacity to cope with difficulties, and believing in one's ability to succeed are considered critical in achieving recovery, there are likely numerous other variables involved in the process of treatment. This is particularly true as the intensive nature of residential substance use treatment provides a unique context in which clients are able to engage in an initial "reconfiguration" of their self-concept. Therefore, examining constructs related to one's self-concept might provide important information regarding the changes made during treatment. For example, Morgenstern et al. (1996) found the largest change occurring in participant's levels of self-criticism – even when compared to more commonly assessed outcomes (e.g., commitment to abstinence, commitment to AA/NA).

While there is a large gap in the literature focusing on the relationship between short-term residential substance use treatment and outcomes related to self-concept (Brooks, Kay-Lambkin, Bowman, & Childs, 2012), a recent study examined the impact

of long-term (90 days minimum) residential substance use treatment on various outcomes, including self-compassion (Najavits et al., 2014). In this study, the efficacy of a 25-session peer-led Seeking Safety intervention was examined among women ( $N = 18$ ) attending residential substance use treatment. Results suggest that women with comorbid substance use and trauma-related problems demonstrate significant in-treatment gains in self-compassion from baseline to discharge, with a large effect ( $d = 1.68$ ). In another study, a group-based intervention incorporating aspects of acceptance and commitment therapy (ACT) in a short-term residential substance use treatment program was evaluated in terms of its impact on participant's levels of shame (Luoma et al., 2012). Results from the randomized clinical trial suggest that a brief ACT-based intervention targeting shame incorporated into short-term residential substance use treatment produced better sustained reductions in shame and more favorable substance use outcomes 13 weeks post-discharge. Overall, it appears that individuals experience shifts in their self-concept during substance use treatment. However, there is a considerable gap in the existing literature examining important outcomes related to self-concept – and well-being in general (e.g., hope, optimism, gratitude).

Generally weak associations between proximal outcomes at discharge and follow-up time points were observed in the above studies. These findings might lead one to conclude that processes occurring during-treatment have little impact on substance use in the year following treatment. However, it is possible that the constructs measured in these studies do not encompass variables most helpful in maintaining abstinence over time. For example, shame has been identified as playing a potentially detrimental role in the initiation and maintenance of problematic substance use, yet the specific nature of the

relationship is not well documented – particularly in the context of long-term recovery (Luoma et al., 2012). Additionally, examining individual predictors in isolation may be less informative than evaluating latent constructs or higher-order composites in general. The incorporation of measures assessing a wide variety of psychosocial constructs (e.g., self-compassion, shame, self-esteem, hope), as well as their meaningful clusters, would help to obtain a more comprehensive understanding of the treatment process and identify outcomes with stronger predictive abilities.

**Assessment timeline.** Further, most of the studies only assessed participants at treatment entry and discharge, except two which included a mid-treatment assessment. Because of this, authors were unable to determine when changes on these outcomes occurred (e.g., early-treatment, mid-treatment). Also, it is possible that discharge scores may not reflect actual change in levels of the outcome as it is possible that participants experience more intense emotions (e.g., excitement, worry) at the transition out of treatment. Therefore, including assessments during-treatment allows researchers to measure change with a greater degree of precision and evaluate empirically whether the discharge level of a construct is generally consistent with a mid-treatment level of the construct. Gathering objective information on client-level outcomes at multiple timepoints during treatment would allow for rich conclusions to be drawn about treatment process in general, as well as assist in identifying opportunities for improvement (CSAT, 2006). Overall, client performance monitoring is a critical aspect in health service delivery and will likely play a fundamental role in the future funding of treatment (CSAT, 2006).

**Generalizability.** The generalizability of the above findings is compromised as the eight individual studies reflect slight variations in only three samples of participants. Therefore, the collection of studies yield significantly less information – particularly among young adults with opioid use disorders. Specifically, two of the three samples were comprised of primarily middle-age, non-opioid using participants and one sample was limited to male veterans. These data are therefore less applicable to other populations, including women – who are now equally as likely to enter treatment for an opioid-related issue (Achenbach & Keating, 2017). Overall, participants were primarily male, Caucasian, and recruited from isolated areas across the United States (except the VA sample which derived participants from different geographic locations). With over 14,400 treatment facilities operating in the United States, caution should be used when generalizing these findings to other samples and settings, as data were obtained from only 18 treatment facilities total (SAMHSA, 2016). The inclusion of demographically diverse samples of primarily young adults obtained from a variety of treatment programs in geographically dispersed locations would enhance the generalizability of findings.

### **Contributions of the Current Study**

The current study adds to the existing literature in two major ways. First, the current study utilizes an understudied sample of participants considered particularly high risk for problematic substance use and related consequences. Second, the current study examines four proximal outcomes, including constructs that have yet to be explored in the context of short-term residential substance use treatment at multiple timepoints.

The prevalence of illicit substance use, and particularly opioid use, is elevated among young adults (Sharma et al., 2016). As such, the associated consequences (e.g.,

emergency room visits, treatment admissions, overdose deaths) are a growing concern in the United States (NIDA, 2016a). Most research thus far has included samples of primarily middle-age, alcohol-dependent individuals. However, the current study utilizes an understudied, yet particularly vulnerable, sample comprised of primarily young adults with opioid use disorders receiving short-term residential substance use treatment. The findings outlined in this study add to existing literature examining treatment process and provide insight regarding the manner in which this subgroup of the population responds to treatment.

The changes made on two proximal outcomes regarded as critical in recovery – abstinence self-efficacy and commitment to sobriety – were examined in the context of the current study’s unique sample. In general, prior literature has demonstrated the ability of substance-related cognitions (e.g., intention to avoid high-risk situations, commitment to abstinence) to predict relapse rates post-discharge (Morgenstern et al., 1996). This is an important finding in relation to the current study’s sample, as the risk of overdose increases following an extended period of abstinence (e.g., residential treatment) in which tolerance is reduced (Nunes et al., 2018). Although substance-related cognitions have been commonly assessed in the current literature base, few studies examine changes in these constructs among opioid-dependent young adults who pose significant risk of relapse and overdose (NIDA, 2016a). Findings from prior studies examining changes in substance-related cognitions will provide a benchmark for comparing the effects observed in the current study.

Changes in two outcomes related to self-concept – internalized shame and self-compassion – are also examined in the current study. Clinicians have frequently

identified variables related to self-concept (e.g., self-esteem, shame) as indicative of positive change during treatment. However, these outcomes have yet to be explored more extensively in the context of short-term residential substance use treatment – particularly among the population of interest. Self-compassion is the act of providing nonjudgmental understanding to one’s self in times of perceived failure, inadequacy, or suffering (Neff, 2003). However, individuals with substance use disorders tend to exhibit lower levels of self-compassion (Brooks et al., 2012; Phelps, Paniagua, Willcockson, & Potter, 2018). Common triggers for relapse, including depression, anxiety, and stress are more common among people who are less self-compassionate (Neff, 2003). Furthermore, recent studies have identified a strong connection between self-compassion and the body’s hormonal response, including levels of cortisol and oxytocin. Specifically, self-compassion has been shown to decrease cortisol – a hormone released when an individual is under stress (Rockliff, Gilbert, McEwan, Lightman, & Glover, 2008). In addition, self-compassion is associated with increased levels of oxytocin, which can buffer stress, reinforce social stimuli, and inhibit the progression of tolerance and withdrawal to opioids (Lee, Rohn, Tanda, & Leggio, 2016).

Self-compassion is a powerful agent in reducing self-criticism – a common trait among those experiencing shame (Neff, 2003). Shame is a self-conscious emotion in which an individual evaluates him or herself against a set of standards, often leading to feelings of worthlessness and powerlessness (Tangney & Salovey, 1999). In contrast to guilt, which can serve an adaptive function during treatment by motivating one toward reparative action (e.g., apologizing, confessing, etc.), the function of shame is less obvious (Tangney & Salovey, 2010). While both shame and guilt are considered “moral

emotions” and are relevant in the context of substance use, the current study examines changes made in one’s level of shame – an emotion with particularly painful and overwhelming effects (Tangney & Salovey, 2010). While shame is common among the substance using population, disrupts treatment effects, and increases emotional distress and motivation to relapse, relatively little is known in the treatment outcome literature (Ianni, Hart, Hibbard, & Carroll, 2010; Meehan, O’Connor, Berry, & Weiss., 1996).

The information obtained in the current study adds to the literature by examining changes over time on four clinical targets relevant to client functioning among a high-risk population receiving short-term residential treatment. Findings provide unique insight into treatment response and early recovery experiences. The information obtained from the current study can be used to inform alterations in the treatment delivery system in efforts to provide individualized care to a vulnerable population in need. For example, the development of training programs based on these empirical findings will allow service providers to strategically decide how and when to intervene with clients to maximize the effect of treatment. This information can be utilized to inform client-centered treatment planning, performance monitoring, and intervention development in the hopes of enhancing outcomes and improving organizational functioning. Overall, this study adds to the existing empirical literature regarding treatment process – an area that is relatively new, slowly developing, and of significant interest to researchers and treatment providers alike.

## Chapter III: Method

### Participants

Study participants ( $N = 205$ ) were adults aged 18 to 58 ( $M$  age = 29.86,  $SD = 9.99$ ) recruited between January 2017 and July 2018 from Recovery Unplugged, a short-term residential substance use treatment center in Fort Lauderdale, Florida. The sample was predominately male (67.8%), Caucasian (82.9%), and had at least a high school education or GED (88.8%). Most were single (83.7%) and employed full time (55.4%). In the 30 days prior to treatment admission, the most frequently used substances were opioids (62.0%), alcohol (58.0%), and cannabis (57.6%). However, 58.3% reported opioids as being their major problem. A large portion of the sample had a history of injection drug use (52.2%). On average, participants' first use of any substance occurred between the ages of 10 and 26 ( $M$  age = 13.58,  $SD = 2.32$ ). Approximately 74.2% of the participants have attended at least two or more substance use treatment programs. In stark contrast, only 2.9% were being treated for the first time. The rates of provisional comorbid mental health diagnoses were high, with the most common being Major Depressive Disorder (73.9%), followed by Generalized Anxiety Disorder (73.4%) and Post-Traumatic Stress Disorder (PTSD; 57.6%). Approximately 67.8% endorsed involvement in the criminal justice system (i.e., arrested and charged with any crime at least once in their lifetime).

### Setting

The treatment model at Recovery Unplugged is eclectic and informed by cognitive behavioral therapy, 12-step facilitation, and other empirically supported approaches in individual and group formats. The program is multi-disciplinary and offers

integrated mental health care (e.g., clinical assessment, medication management), medication-assisted treatment (MAT) through the use of Vivitrol, and various supplemental therapeutic activities, including biofeedback, yoga, and groups focusing on daily living skills (e.g., budgeting money, healthy eating). The use of music is central to all treatment activities and is considered the glue that binds together the various elements of the multi-faceted treatment experience. According to Bruscia (1998), “Music therapy is a systematic process of intervention wherein the therapist helps the client to promote health, using music experiences and the relationships that develop through them as dynamic forces of change” (p. 20). In general, listening to and playing music have been linked to various positive psychosocial and physical outcomes (Pelletier, 2004). Specific to individuals with substance use disorders, music therapy has been associated with an increased willingness to participate in treatment and decreases in anxiety, depression, anger, and stress (Cevasco, Kennedy, & Generally, 2005; Dingle, Gleadhill, & Baker, 2008). In addition, music therapy has been shown to facilitate safe exploration of emotions without the use of substances (Baker, Gleadhill, & Dingle, 2007).

At Recovery Unplugged, music-based interventions can be relatively passive (e.g., listening to songs performed by popular artists and discussing recovery-related themes present in the lyrical content) or active (e.g., writing and/or performing their own music). These music-based interventions are delivered in both individual and group therapy sessions and can be client-driven – occurring at the residence outside of formal treatment hours. Original live music related to recovery is performed by a Grammy award winning singer/songwriter, Richie Supa, accompanied by staff musicians. During these performances, lyrical content is discussed, allowing the clients to engage more deeply

with the material. According to staff and clients, the use of music at Recovery Unplugged serves five major purposes: (a) facilitates engagement; (b) fosters community; (c) facilitates emotional identification, expression, and regulation; (d) facilitates stress reduction; and (e) acts as a bridge between treatment and life after treatment. In addition, three primary clinicians have Master's level training in fields with a mental health focus (e.g., mental health counseling). Overall, treatment at Recovery Unplugged is focused on changing irrational beliefs, increasing hope, overcoming fears and insecurities, tolerating emotional distress, and reinforcing progress.

### **Procedure**

During a prospective participant's intake, the study's project coordinator described the study, including the nature of the study and the participant's role. The participant signed the consent document which detailed all study procedures, risks, and benefits associated with participation in the study. During the recruitment period, 330 individuals were exposed to the study consent. Of those individuals, 267 (80.9%) consented to participate in the study. Of the 267 who consented to study participation, 205 (76.8%) remained in the study, 26 (9.7%) left treatment prematurely against medical advice, 24 (9.0%) were removed administratively (i.e., only stayed for a brief stabilization period), and 12 (4.5%) opted to discontinue participation. Assessment measures were administered by research staff on three occasions during treatment: baseline, day 14 (mid-treatment), and discharge. The baseline assessment was administered within the first few days of treatment and included both an interviewer-assisted, semi-structured interview and several self-report measures completed online using the SurveyMonkey platform. The mid-treatment and discharge assessments were

completed through the SurveyMonkey platform, under the supervision of the project coordinator. Treatment length ranged from 18 to 48 days ( $M = 30$ ,  $SD = 5.23$ ).

## **Measures**

### **Pre-treatment status.**

**Addiction severity index.** The Addiction Severity Index 5<sup>th</sup> Edition (ASI-5; McLellan et al., 1992) is a semi-structured interview designed to provide comprehensive background information (McLellan, Luborsky, O'Brien, & Woody, 1980). It is a commonly utilized addiction assessment tool, takes approximately 45 to 60 minutes to complete, and must be administered by an interviewer. The ASI-5 assessed seven potential problem areas related to participant functioning, including medical, employment/support, alcohol use, drug use, legal, family/social, and psychiatric. In addition, demographic information (e.g., gender, age, race) was obtained through the ASI-5 assessment. In the current study, several items were incorporated into the ASI-5 for the purposes of collecting additional relevant data (e.g., age of onset, frequency and quantity of substance use). A number of items from the ASI-5 were used to assess various constructs examined in the current study (e.g., lifetime history of sexual abuse).

**Predictors.** Twenty-four variables (e.g., demographic information, substance use history, mental health symptoms) were explored as predictors of initial status and rate of linear change over time for each of the four primary outcomes in the current study.

**Demographic information.** During ASI-5 administration, participants were asked to provide their date of birth. A chronological age variable was computed by subtracting participant's date of birth from the date of the assessment. Based on participant self-identification, a single dichotomous item assessed gender (e.g., male, female).

Participants identified their race using one item with nine categorical response options (e.g., White – Not of Hispanic Origin, Black – Not of Hispanic Origin, American Indian, Alaskan Native, Asian or Pacific Islander, Hispanic – Mexican, Hispanic – Puerto Rican, Hispanic – Cuban, Other Hispanic). Based upon participant's responses, a new variable was created by categorizing participants into one of two groups: (a) individuals who identified as 'White – Not of Hispanic Origin' and (b) individuals who identified as any other racial category. A single item asked participants to indicate their highest level of completed education which corresponded to a year value (e.g., high school diploma/GED = 12 years, Bachelor's degree = 16 years). Finally, employment status was assessed by participant's report of their usual employment pattern over the prior three years (e.g., full-time, part-time, unemployed, student). Based upon participant's responses, a new variable was created which categorized participants into one of three groups: (a) unemployed, (b) working full-time, and (c) other (e.g., working part-time, student).

***Substance use history.***

*Substance identified as the major problem.* In the ASI-5, participants are asked to identify the major drug of abuse (e.g., "Which substance is the major problem?") using 14 categorical response options (e.g., alcohol, heroin, methadone, other opiates/analgesics, barbiturates, other sedatives/hypnotics/tranquilizers, cocaine, amphetamines, cannabis, hallucinogens, inhalants, polydrug, alcohol/drug, no problem). 'Polydrug' was selected if the participant reported a major problem with two or more drugs, not including alcohol. If the participant endorsed a major problem with two or more drugs with at least one of those substances being alcohol, then 'Alcohol/drug' was

selected. Finally, if participants believed they did not have a problem with any of the listed substances, this would correspond with the ‘No problem’ response option.

*Opioids identified as the major problem.* Participants who identified either ‘Heroin,’ ‘Methadone,’ or ‘Other Opiates/Analgesics’ as their major problem during ASI-5 administration were directed by the study’s project coordinator to complete a slightly modified version of the online SurveyMonkey portion of the baseline assessment. Specifically, these participants completed an assessment battery which included a severity measure of opioid dependence. In contrast, participants who identified any other substance (i.e., alcohol, cocaine, cannabis) as their major problem completed an assessment battery which included a severity measure of dependence on a variety of substances. Participants who completed the opioid-related baseline assessment were grouped to create a new variable measuring opioids, of any type, as the major problem.

*Substances used with an injection route of administration.* For each drug category (i.e., alcohol, heroin, cocaine), participants were asked to identify the primary route of administration using five categorical response options (e.g., oral, nasal, smoking, non-IV injection, IV injection). These items were used to compute number of substances used with an injection route of administration by adding the number of substances used with either a non-IV injection or IV injection route of administration across all drug categories.

*Number of substances used in the past 30 days.* A variable that assessed the number of substances used by the participant in the past month (i.e., 30 days) was computed by adding the number of substances endorsed as being used at least one day in the past month (across all drug categories assessed on the ASI-5).

*Number of substances used in the past 90 days.* Similarly, the number of substances used in the past three months (i.e., 90 days) was measured by adding the number of substances endorsed as being used at least one day in the past three months (across all drug categories assessed on the ASI-5).

*Frequency of use in the past 30 days.* For each drug category, participants identified the number of days in which they had used the substance in the past month. The substance with the highest number of use days was selected to measure the frequency of use in the past 30 days. For example, if a participant reported using alcohol on 20 days and cocaine on four days within the past month, the total number of use days would be 20.

*Number of substances used before 13.* An item measuring participant's age of first use for each drug category was created for the study and incorporated into ASI-5 administration (e.g., "At what age did you first use heroin?"). These items were used to compute number of substances used before age 13 by adding the number of substances used prior to age 13 across all drug categories.

*Total years of use.* Total years of use was obtained for each drug category by asking participants the number of years they had any use of the substance of interest (e.g., lifetime use in years of cocaine). Consistent with ASI-5 administration guidelines, six months or more of regular or problematic use was rounded up to one year.

*Duration of most recent period of abstinence.* An item from the ASI-5 was used to assess participant length of their most recent period of abstinence, in months, from the substance they identified as their major problem (e.g., "How long was your last period of

voluntary abstinence, of at least one month, from this major substance?”). Any period of abstinence that was less than one month was recorded as “0.”

*Number of substance use treatments.* Two items on the ASI-5 were used to measure the number of times the participant had received treatment for either alcohol use (e.g., “How many times in your life have you been treated for alcohol abuse?”) or drug use (e.g., “How many times in your life have you been treated for drug abuse?”). Any type of substance use treatment was included (e.g., detoxification, halfway housing, inpatient, outpatient, AA/NA). These items were summed to compute a variable measuring total number of substance use treatment episodes in the participant’s lifetime.

***Legal history.***

*History of arrests and charges.* In assessing legal history through ASI-5 administration, participants were asked to only report incarcerations, convictions, and charges that occurred in the participant’s adult life (i.e., 18 years of age or older) unless they were detained as an adult while still a juvenile. A single, dichotomous item assessed any history of prior arrests and charges (No/Yes), “Have you ever been arrested and charged with any crime?”

*Number of convictions.* If participants responded “Yes” to the item assessing history of arrests and charges, they were then prompted to specify the total number of charges that led to convictions (e.g., “How many of these charges resulted in convictions?”). According to the ASI-5, a conviction is considered fines, probations, suspended sentences, incarceration, guilty pleas, and parole or probation violations.

*Lifetime incarcerations.* Incarceration history was measured by asking participants, “Have you ever been incarcerated,” with a dichotomous response option (No/Yes).

***Relationship history.***

*Number of lifetime relationship problems.* The number of lifetime relationship problems was assessed using an item on the ASI-5. Relationship problems was defined as “a significant period in which you have experienced serious problems getting along” (e.g., poor communication, lack of trust and/or understanding, animosity, frequent arguments) to the intensity in which these problems might jeopardize the relationship. Participants indicated whether or not they had experienced relationship problems using a dichotomous scale (No/Yes) for nine categories of relationships (i.e., mother, father, brothers/sisters, sexual partner/spouse, children, other significant family, close friends, neighbors, and co-workers). The number of relationship problems endorsed was summed across all relationship categories to arrive at a total number of relationship problems in one’s lifetime.

*Number of relationship problems in the past 30 days.* The number of relationship problems in the past 30 days was measured using the same definition and response options as the item assessing lifetime relationship problems. However, participants were asked to report on relationship problems occurring only within the past month. The total number of relationship problems endorsed was summed across all relationship categories to arrive at a total number of relationship problems in the past month.

*Family history of substance use.* Participants were asked if, in their opinion, any of the following family members had ever had a substance use problem: biological

parents, biological grandparents, or biological siblings. Several indicators of a substance use problem (e.g., heavy use over a long period of time, allowing substance use to interfere with life's responsibilities) were provided for participant reference. Response options were dichotomous (No/Yes). If participants were unsure, they were able to endorse "I don't know." Responses were summed across relationship type (i.e., biological parents, biological grandparents) to compute a variable measuring total number of family members with a history of problematic substance use.

***Mental health.***

*Provisional PTSD diagnosis.* The Life Events Checklist for DSM-5 (LEC-5; Weathers et al., 2013a) is a 17-item measure of one's lifetime exposure to 16 potentially traumatic events (e.g., combat, captivity, sexual assault, natural disaster) known to result in distress or PTSD. One additional item assesses for other extraordinarily stressful events not included in the prior 16 items (e.g., "Any other very stressful event or experience"). Participants select one or more of the four response options reflecting type of exposure (e.g., happened to me, witnessed it, learned about it, part of my job). In addition, participants are given the option to endorse "not sure" or "doesn't apply" for each item. The LEC-5 was administered in combination with the PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013b). The PCL-5 is a screen for and severity measure of PTSD symptoms in the prior month. Based upon one's answers to the LEC-5, participants identify the single most stressful event they have experienced and respond to PCL-5 items based upon their identified event (referred to as "the stressful experience"). The PCL-5 is comprised of 20 items (e.g., "How much have you been bothered by repeated, disturbing dreams of the stressful experience?") rated on a 5-point Likert scale

ranging from “not at all” to “extremely.” Using the recommended cut-off score of 33 on the PCL-5 (Weathers et al., 2013b), a new variable was computed by summing participant’s responses to the 20 items and categorizing into one of two groups: (a) provisional PTSD diagnosis (total PCL-5 scores of 33 or higher) and (b) no provisional PTSD diagnosis (total PCL-5 scores of 32 or lower). The PCL-5 demonstrated excellent internal consistency in the current study ( $\alpha = .96$ ).

*Provisional depression diagnosis.* The Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001) is a screening tool and severity measure of depressive symptomatology during the past two weeks. Nine items rated on a 4-point Likert scale assess common symptoms of depression (e.g., “Over the last two weeks, how often have you been bothered by little interest or pleasure in doing things?”) with response options ranging from “not at all” to “nearly every day.” One additional item measures the impact of the depression-related symptoms on one’s functioning (e.g., “If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?”). This item is rated on a 4-point Likert scale with response options ranging from “not at all difficult” to “extremely difficult.” Responses to the first nine items are summed to generate a total PHQ-9 score. Scores of 5, 10, 15, and 20 are the recommended cut-off points for mild, moderate, moderately severe, and severe depression (Kroenke et al., 2001). A new variable was computed by categorizing participants into one of two groups: (a) provisional depression diagnosis (total PHQ-9 scores of ten or higher) and (b) no provisional depression diagnosis (total PHQ-9 scores of nine or lower). In the current study, internal consistency for the PHQ-9 was excellent ( $\alpha = .90$ ).

*Provisional anxiety diagnosis.* The Generalized Anxiety Disorder questionnaire (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006) is designed as a screener and severity measure for symptoms of generalized anxiety disorder during the past two weeks. The GAD-7 has seven items assessing common indicators of generalized anxiety disorder (e.g., “Over the last two weeks, how often have you been bothered by worrying too much about different things?”). Items are rated on a 4-point Likert scale ranging from “not at all” to “nearly every day.” One additional item measures the impact of the anxiety-related problems on one’s ability to function (e.g., “If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?”). This item is rated on a 4-point Likert scale with response options ranging from “not at all difficult” to “extremely difficult.” Responses to the first seven items are summed to calculate a total GAD-7 score. Scores of 5, 10, and 15 are the recommended cut-off points for mild, moderate, and severe anxiety (Spitzer et al., 2006). In the current study, a new variable was computed by categorizing participants into one of two groups: (a) provisional anxiety diagnosis (total GAD-7 scores of ten or higher) and (b) no provisional anxiety diagnosis (total GAD-7 scores of nine or lower). The GAD-7 demonstrated excellent internal consistency ( $\alpha = .90$ ).

**Primary outcomes.**

*Substance-related cognitions.*

*Abstinence self-efficacy.* Abstinence self-efficacy was assessed using a single item rated on a 10-point Likert scale: “How confident are you that you will be able to stay clean and sober in the next 90 days or 3 months?” Ten response options range from “not

at all confident” to “very confident.” Relative to the 20-item measure (DiClemente, Carbonari, Montgomery, & Hughes, 1994), this single item has demonstrated better predictive ability for substance-related outcomes (Hoeppner, Kelly, Urbanoski, & Slaymaker, 2011).

*Commitment to sobriety.* Commitment to sobriety was measured using five items designed to assess one’s level of commitment to discontinuing all alcohol and drug use and maintaining abstinence (e.g., “I will do whatever it takes to recover from my addiction”; Kelly & Greene, 2014). Items are rated on a 6-point Likert scale ranging from “disagree strongly” to “agree strongly.” This measure demonstrates strong internal consistency and significant incremental prediction relative to other measures of motivation (Bergman et al., 2014). In the current study, internal consistency was excellent across all timepoints ( $\alpha$ s = .93 – .94).

***Self-concept.***

*Internalized shame.* Internalized shame was measured using nine items from the shame subscale of the Internalized Shame Scale (ISS; “I feel intensely inadequate and full of self-doubt”; Cook, 1987). Items on this self-report measure are rated on a 5-point Likert scale with options ranging from “never” to “almost always.” The ISS demonstrates excellent internal consistency, convergent and discriminant validity with other measures of shame and guilt, and test-retest reliability (Cook, 1996). In the current study, the ISS demonstrated excellent internal consistency across all three timepoints ( $\alpha$ s = .92 – .95).

*Self-compassion.* Self-compassion was assessed using the Self-Compassion Scale – Short Form (SCS-SF; “I’m disapproving and judgmental about my own flaws and inadequacies”; Raes, Pommier, Neff, & Van Gucht, 2011). This self-report measure

consists of 12 items rated on a 5-point Likert scale ranging from “almost never” to “almost always.” The SCS-SF has the same factor structure and is strongly correlated with the long form (Raes et al., 2011). In the current study the SCS-SF demonstrated adequate internal consistency across all three timepoints ( $\alpha$ s = .83 – .89).

### **Hypotheses**

The current study tested one primary hypothesis - that participants would demonstrate significant changes in the favorable direction on all four proximal outcomes during the course of treatment. Specifically, participants would experience significant increases in self-efficacy, commitment to sobriety, and self-compassion, as well as significant decreases in internalized shame. In a set of exploratory analyses, several possible variables (e.g., demographic information, substance use history, mental health symptoms) were included as predictors of initial status and rates of change in an attempt to better understand both initial status and responses to treatment.

## Chapter IV: Results

### Overview

Individual growth curve models were used to measure change over time at both the aggregate and individual levels on the four proximal outcomes of interest: (a) abstinence self-efficacy, (b) commitment to sobriety, (c) internalized shame, and (d) self-compassion. Analyses occurred in several stages and utilized the general analytical framework outlined by DeLucia and Pitts (2006). The individual growth curve models estimated in the current study can be thought of as extensions of the classic repeated measures analysis of variance (ANOVA) models. As will be discussed in more detail below, in repeated measures ANOVA models only the aggregate (i.e., average) trajectory is estimated. In the individual growth curve modeling framework, data are modeled at both the aggregate and individual levels. (Additional assumptions of ANOVA, like fixed measurement occasions, can also be relaxed.) Longitudinal data collected in three waves informed the models described below. Twenty-four additional variables (e.g., gender, age, mental health symptoms, prior treatment experience) were examined as predictors of intercept and slope variability. For all analyses, it was determined a priori that statistical significance would be evaluated at the .05 level. Cohen's *d* was used to quantify the magnitude of various effects of interest (Cohen, 1988).

### Descriptive Data

Tables 2-5 include descriptive data for the four primary outcomes across three repeated observations. These data suggest, at the sample level, participants increased levels of abstinence self-efficacy, commitment to sobriety, and self-compassion and decreased levels of internalized shame during treatment. Effect size estimates were

medium in size for abstinence self-efficacy ( $d = .49$ ) and commitment to sobriety ( $d = .44$ ) and large for internalized shame ( $d = -.81$ ) and self-compassion ( $d = .87$ ). For internalized shame and self-compassion, the skew and kurtosis values are consistent with a normal distribution. However, for abstinence self-efficacy and commitment to sobriety, skew and kurtosis values were more suggestive of departures from univariate normality (this issue is discussed in additional detail below).

Table 2  
*Descriptive Statistics for Abstinence Self-Efficacy*

Statistics	Measurement Occasion		
	Time 1 ( $N = 205$ )	Time 2 ( $N = 118$ )	Time 3 ( $N = 190$ )
Abstinence Self-Efficacy			
<i>M</i>	7.60	8.29	8.65
<i>SD</i>	2.37	2.20	1.84
Skew	-.69	-1.26	-1.58
Kurtosis	-.30	.88	2.73
Correlations			
Time 1	1		
Time 2	.57**	1	
Time 3	.29**	.49**	1

\*\*  $p < .01$ .

Table 3  
*Descriptive Statistics for Commitment to Sobriety*

Statistics	Measurement Occasion		
	Time 1 ( <i>N</i> = 202)	Time 2 ( <i>N</i> = 119)	Time 3 ( <i>N</i> = 187)
Commitment to Sobriety			
<i>M</i>	4.98	5.36	5.45
<i>SD</i>	1.24	1.06	.95
Skew	-1.41	-1.98	-2.12
Kurtosis	1.47	3.85	4.38
Correlations			
Time 1	1		
Time 2	.65**	1	
Time 3	.57**	.62**	1

\*\*  $p < .01$ .

Table 4  
*Descriptive Statistics for Internalized Shame*

Statistics	Measurement Occasion		
	Time 1 ( <i>N</i> = 205)	Time 2 ( <i>N</i> = 203)	Time 3 ( <i>N</i> = 189)
Internalized Shame			
<i>M</i>	2.48	2.16	1.66
<i>SD</i>	.97	1.04	1.08
Skew	-.26	.03	.32
Kurtosis	-.43	-.69	-.60
Correlations			
Time 1	1		
Time 2	.60**	1	
Time 3	.44**	.70**	1

\*\*  $p < .01$ .

Table 5  
*Descriptive Statistics for Self-Compassion*

Statistics	Measurement Occasion		
	Time 1 ( <i>N</i> = 196)	Time 2 ( <i>N</i> = 200)	Time 3 ( <i>N</i> = 187)
Self-Compassion			
<i>M</i>	2.50	2.75	3.10
<i>SD</i>	.62	.69	.74
Skew	-.14	-.11	.02
Kurtosis	.14	-.11	.66
Correlations			
Time 1	1		
Time 2	.67**	1	
Time 3	.47**	.74**	1

\*\*  $p < .01$ .

### Exploration of Response Patterns and Trajectories

Figures 1-4 display raw data trajectories for random samples of 20 cases with complete data for each outcome. The *x*-axis contains the measurement occasion and the *y*-axis contains the primary outcome of interest. The trajectories in Figures 1-4 indicate variability in both the initial status and rate of change over time for each of the four outcomes.

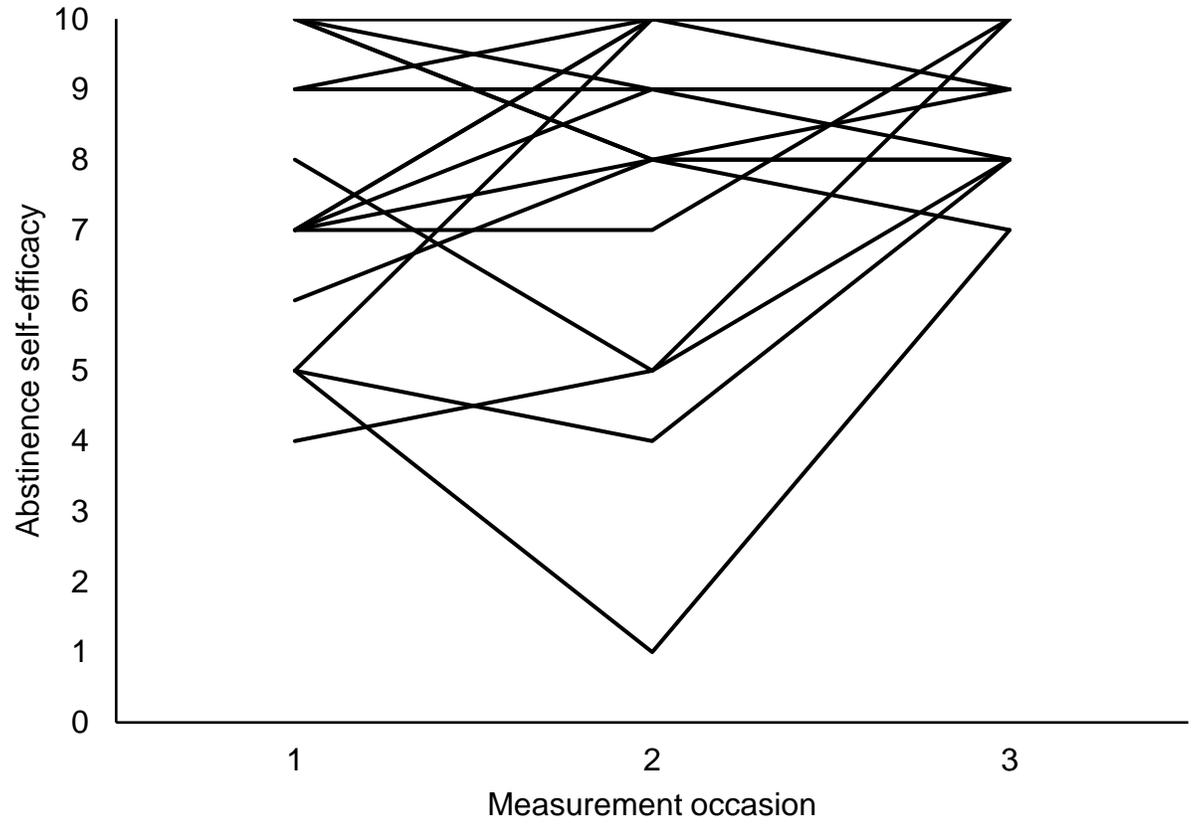


Figure 1. Plot of raw data of abstinence self-efficacy for 20 participants selected at random.

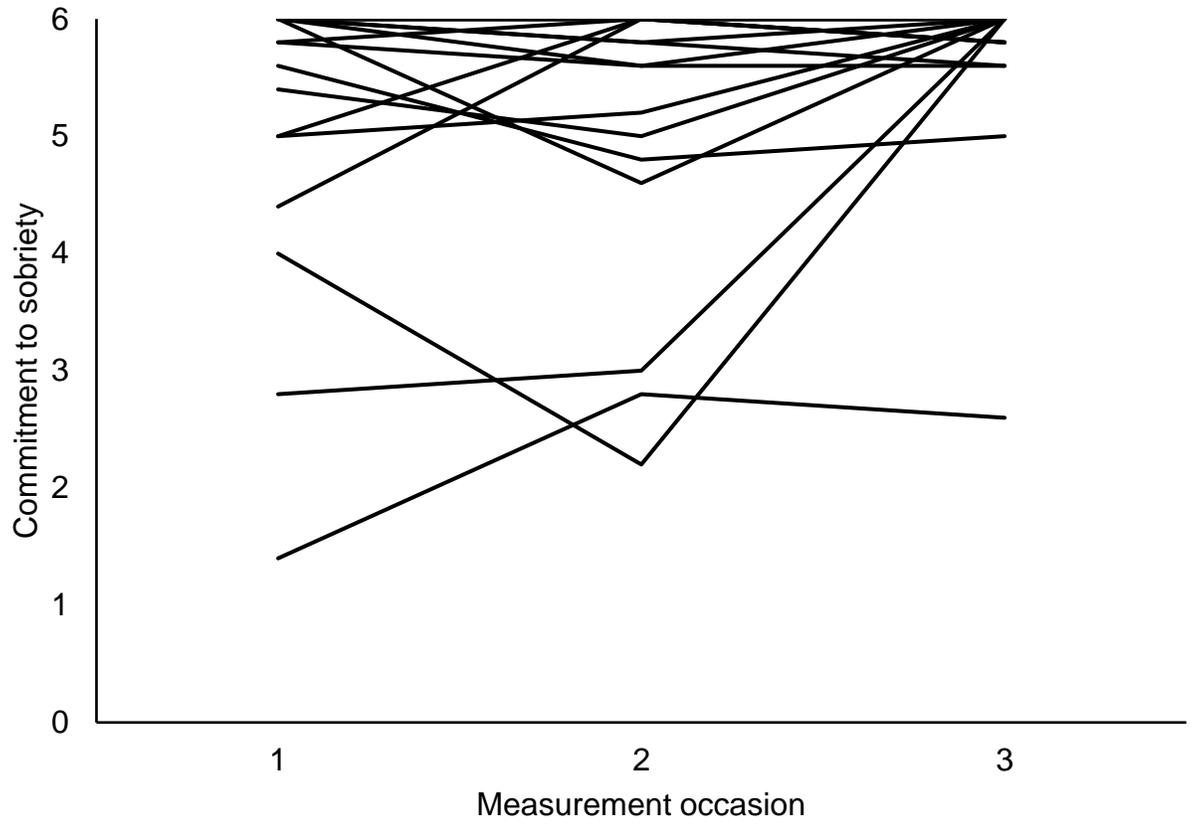


Figure 2. Plot of raw data of commitment to sobriety for 20 participants selected at random.

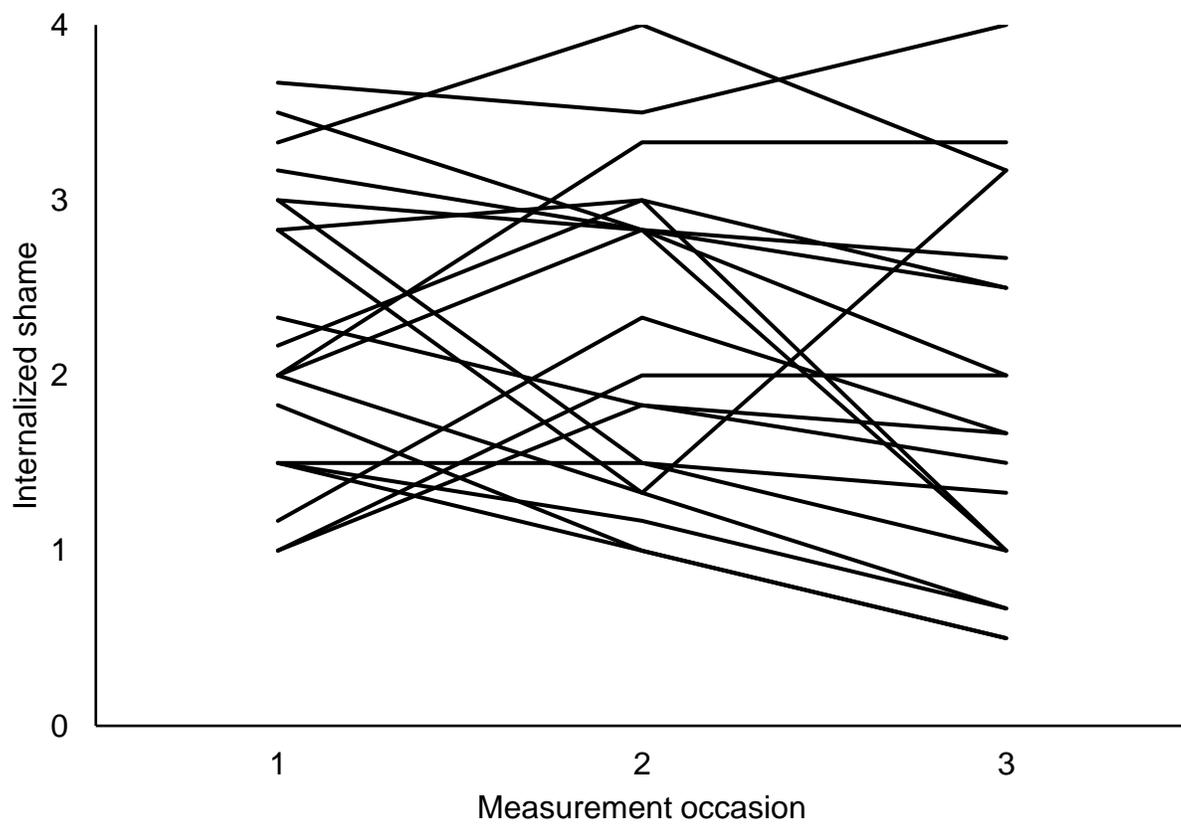


Figure 3. Plot of raw data of internalized shame for 20 participants selected at random.

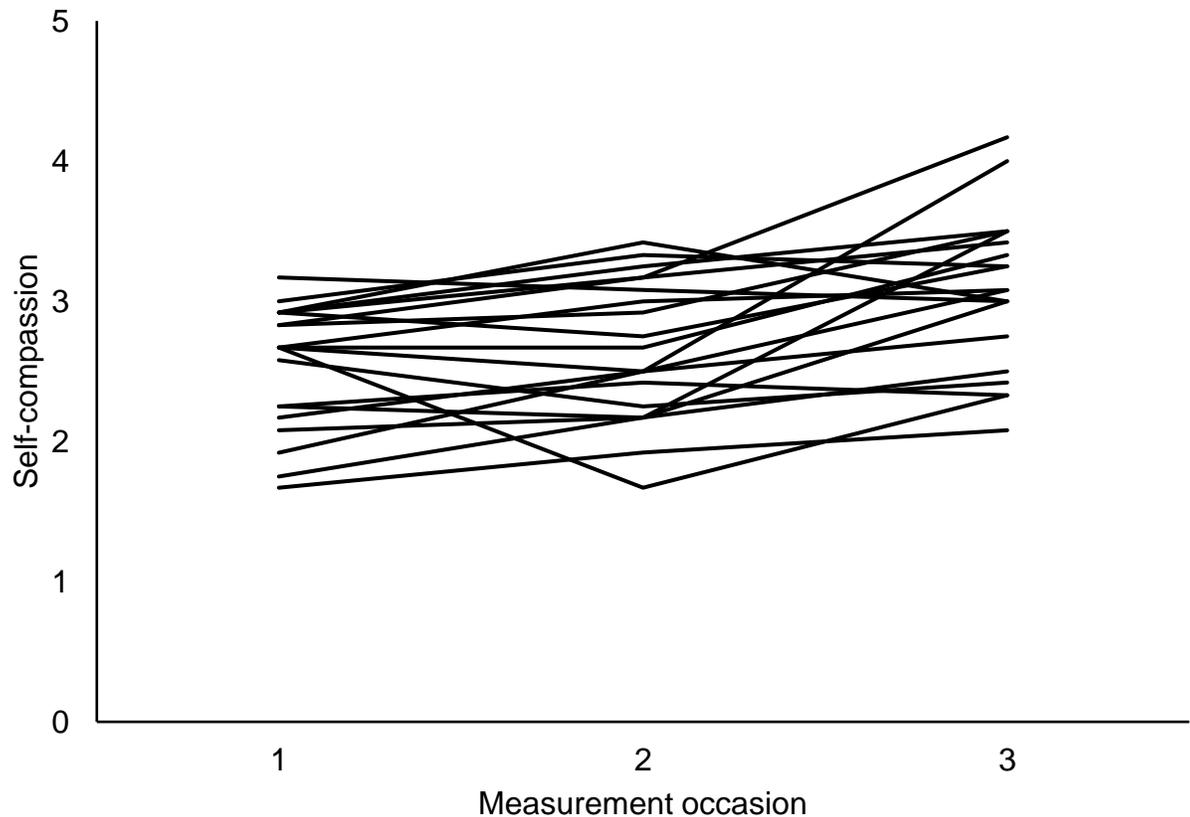


Figure 4. Plot of raw data of self-compassion for 20 participants selected at random.

### **Nesting**

In “rolling admission” studies like this one, it is important to explore nesting within larger treatment cohorts, as this could lead to violations of the independence assumption. Two possible cohort effects were examined – one based upon admission week and one based upon admission month. Variance estimates for treatment cohort were estimated at close to zero. Based upon these findings, two-level growth curve models with repeated observations (level 1) nested within participants (level 2) were retained for the final analyses.

### **Model Specification**

The time elapsed since treatment admission was coded in days and centered on the average lag between treatment admission and completion of the baseline assessment. A series of unconditional growth models were evaluated to determine which model resulted in the best relative fit for each of the four outcomes. Identifying the optimal functional form of growth establishes how the repeated measures of the four primary outcomes change as a function of time (Curran, Obeidat, & Losardo, 2010). Based on the findings of relevant likelihood ratio (chi-square change) tests, random effects were retained. In comparison to the traditional fixed effects ANOVA models, random effects in individual growth curve models allow individuals to have different initial starting points and different rates of change over time (Rogosa, Brandt, & Zimowksi, 1982).

Random linear models resulted in the best fit to the data for each of the four outcomes. In such models, the fixed intercept represents the average predicted score on the outcome at the baseline assessment. The fixed linear effect represents the constant rate of change in the outcome. Random intercepts and linear component capture individual deviations from the fixed effects – allowing participants to have their own trajectories. Dimensional predictor variables were grand-mean centered to improve interpretability of the fixed growth parameter estimates, which (under grand-mean centering) are estimated for the average participant.

### **Preliminary Models**

With the optimal growth models established, the next step in model testing involved incorporating predictors of variability in the growth parameters. Twenty-four variables were included as predictors of initial status and rate of linear change over time for each outcome – in separate models (similar to estimating a correlation between the

predictor in question and both initial status and rates of change). Significant predictors of intercept variability were retained in the final models to predict intercept variability and significant predictors of slope variability were retained to predict both slope and intercept variability in the final models. All significant predictors were entered simultaneously in “preliminary final” models and predictors that failed to reach significance were eliminated from further consideration. In the final models for each of the four primary outcomes, significant effects were probed and plotted to better quantify results (see Aiken & West, 1991; Holmbeck, 2002). Effect size estimates are reported using Cohen’s *ds*. These estimates were computed by dividing the difference between model-implied average levels of the outcome at baseline and discharge by the average weighted observed standard deviations for the three measurement occasions. The observed standard deviations—rather than the pooling of the variances of the difference scores—were used to provide a more conservative effect size estimate.

### **Abstinence Self-Efficacy**

For abstinence self-efficacy, the random linear model resulted in the best fit to the data (with both fixed and random effects for intercepts and linear rates of change). The only significant predictor of intercept and slope variability was number of substances used in the prior 30 days. Number of substances used in the prior 30 days was negatively associated with intercept variability, suggesting individuals reporting a lower number of substances used in the prior 30 days experienced higher levels of abstinence self-efficacy at treatment entry ( $est = -.27, se = .08, p = .001$ ). Number of substances used in the prior 30 days was also a significant predictor of slope variability ( $est = .01, se = .004, p = .007$ ).

Figure 5 displays growth curves of abstinence self-efficacy among three groupings of participants: (a) low risk (i.e., reported using zero substances in the prior 30 days), (b) moderate risk (i.e., reported using one substance in the prior 30 days), and (c) high risk (i.e., reported using two or more substances in the prior 30 days). Although the simple slopes for each of the three groups were positive, only the high risk group demonstrated statistically significant change on abstinence self-efficacy over time, with a small effect size ( $\Delta d = .35$ ).

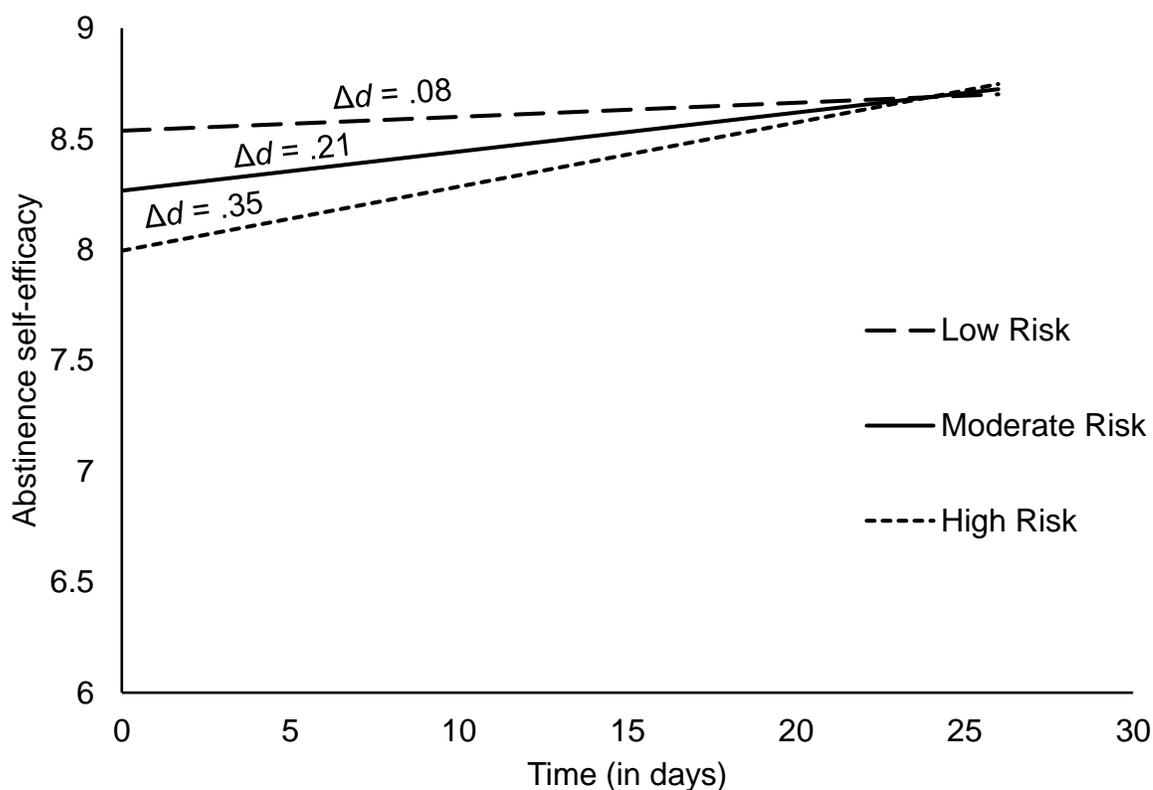


Figure 5. Plot of growth curves of abstinence self-efficacy among low, moderate, and high risk groups.

The data for abstinence self-efficacy were non-normal. Therefore, a transformation using the natural logarithm (of the reversed scale) was used to reduce

departures from univariate normality. Effects were generally replicated using the transformed outcome, so results based on the original outcome were reported.

### **Commitment to Sobriety**

For commitment to sobriety, the random linear model resulted in the best fit to the data (with both fixed and random effects for intercepts and linear rates of change). Age was the only significant predictor of intercept variability and there were no significant predictors of slope variability. Age positively predicted intercept variability, suggesting older individuals reported higher levels of commitment to sobriety at treatment entry ( $est = .02, se = .008, p < .001$ ). To reduce departures from univariate normality, a transformation using the natural logarithm (of the reversed scale) was used with the data for commitment to sobriety. Effects were replicated using the transformed outcome, so the original results were reported.

### **Internalized Shame**

The random linear model resulted in the best fit to the data (with both fixed and random effects for intercepts and linear rates of change) for internalized shame. Significant predictors of intercept variability included: (a) gender; (b) provisional mental health diagnoses of PTSD, anxiety, and depression; and (c) relationship problems within the prior 30 days. There were no significant predictors of slope variability. Gender was negatively associated with intercept variability, suggesting females reported higher levels of internalized shame at baseline ( $est = -.50, se = .11, p < .001$ ). Provisional mental health diagnoses of anxiety ( $est = .40, se = .14, p = .005$ ), depression ( $est = .43, se = .15, p = .003$ ), and PTSD ( $est = .26, se = .11, p = .024$ ) were all positively associated with intercept variability. Therefore, higher levels of internalized shame were reported among

individuals endorsing symptoms consistent the above mental health diagnoses at treatment entry. Relationship problems within the prior 30 days positively predicted intercept variability, suggesting those reporting more relationship problems during the past month endorsed higher levels of internalized shame ( $est = .09, se = .03, p = .003$ ).

Figure 6 displays parallel lines depicting the same rate of linear decline ( $\Delta d = -.90$ ) for two groups of participants – lower risk individuals at baseline (i.e., men, individuals failing to meet provisional mental health diagnoses, and individuals reporting fewer relational problems) and higher risk individuals at baseline (i.e., women, individuals meeting provisional mental health diagnoses, and individuals reporting more relational problems). Despite parallel trajectories, variations in baseline risk result in a large difference in internalized shame at each timepoint ( $\Delta d = -1.82$ ).

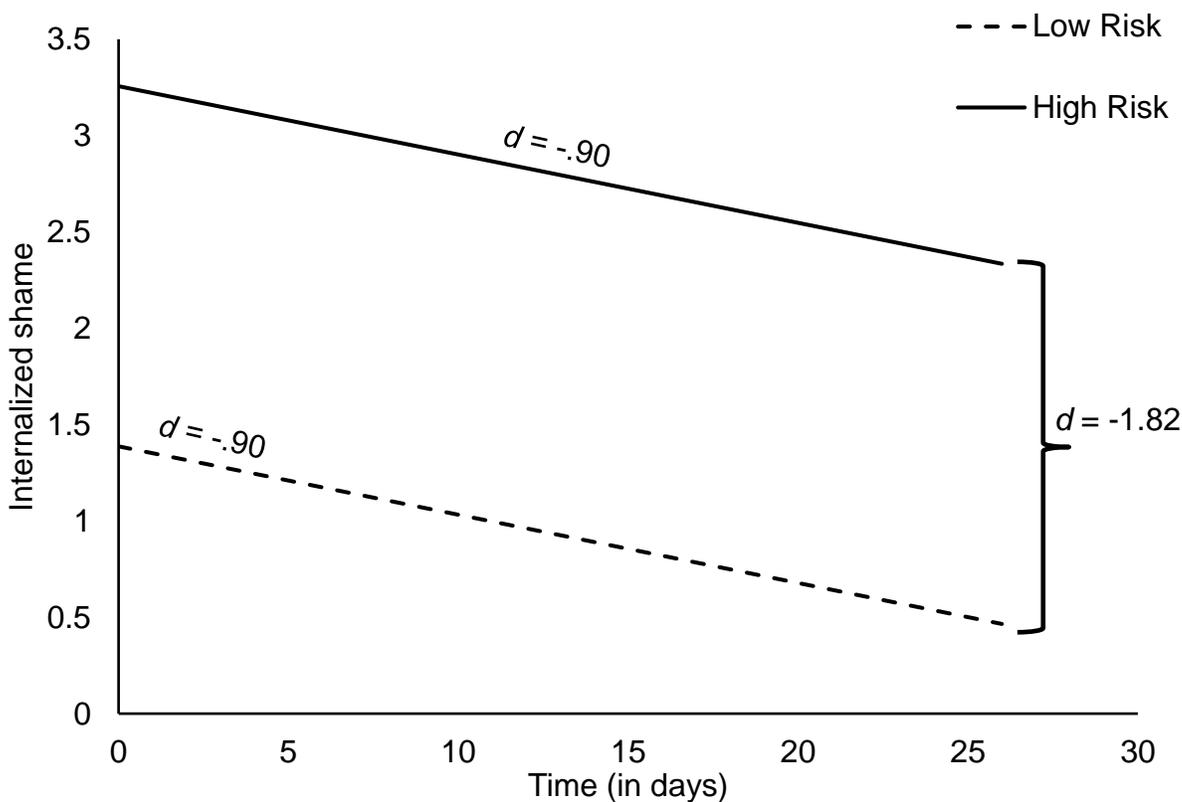


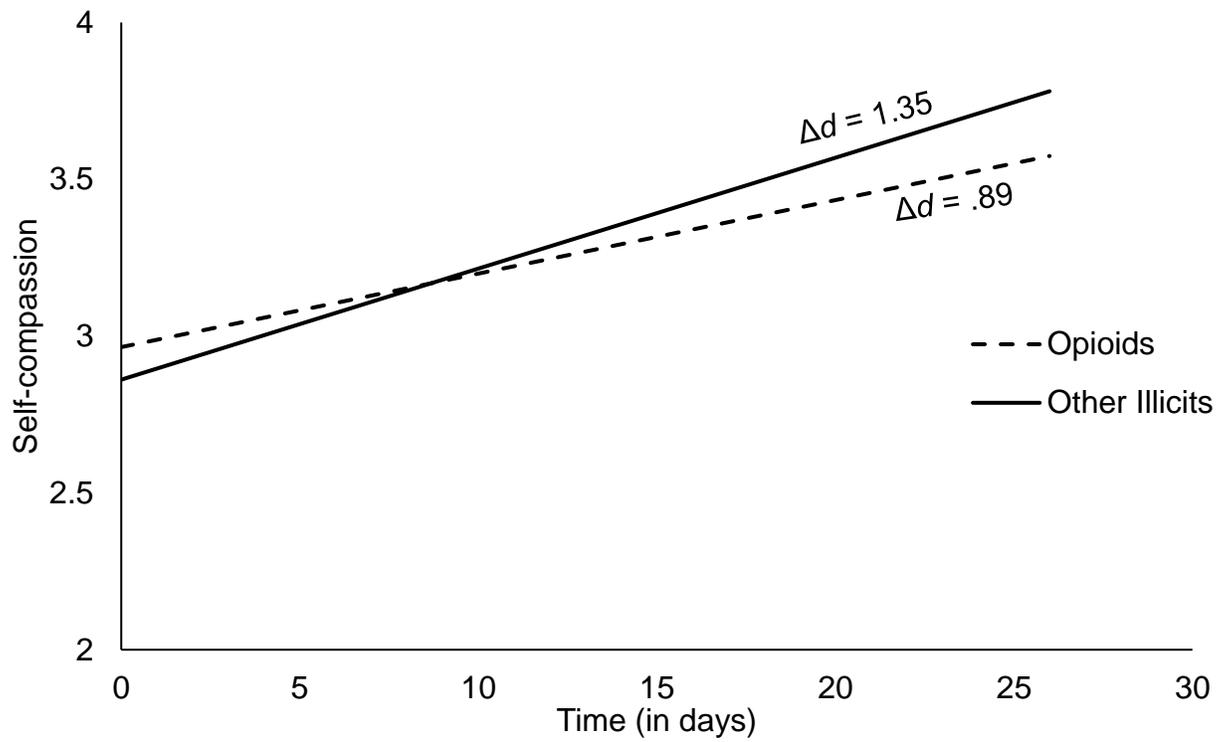
Figure 6. Plot of growth curves of internalized shame between low and high risk groups.

### Self-Compassion

For self-compassion, the random linear model resulted in the best fit to the data (with both fixed and random effects for intercepts and linear rates of change). Gender and provisional mental health diagnoses of PTSD and anxiety significantly predicted intercept variability. The only significant predictor of slope variability was substance identified as the participant's major problem. Gender was positively associated with intercept variability, suggesting females reported lower levels of self-compassion at baseline ( $est = .23, se = .08, p = .004$ ). Provisional mental health diagnoses of anxiety ( $est = -.37, se = .09, p < .001$ ) and PTSD ( $est = -.26, se = .08, p = .002$ ) were both negatively associated with intercept variability. This finding suggests that individuals endorsing symptoms

consistent with anxiety and PTSD reported lower levels of self-compassion at treatment entry.

Substance identified as the participant's major problem was a significant predictor of slope variability ( $est = .005, se = .002, p = .04$ ). Individuals who identified opioids as their major problem significantly differed from individuals who identified anything except opioids or alcohol as their major problem (e.g., cocaine, cannabis, etc.) on self-compassion over time. Individuals who identified anything except alcohol or opioids as their major problem reported significantly greater gains in self-compassion ( $\Delta d = 1.35$ ) relative to those who identified opioids as their major problem ( $\Delta d = .89$ ). Figure 7 displays growth curves of self-compassion between these two groups of participants.



*Figure 7.* Plot of growth curves for self-compassion between participants who identified opioids as their major problem (e.g., “Opioids”) and participants who identified anything except opioids or alcohol as their major problem (e.g., “Other Illicits”).

## Chapter V: Discussion

The current study sought to examine proximal outcomes of short-term residential substance use treatment using a sample comprised of primarily young adults with opioid use disorders. The two main objectives included: (a) evaluate changes in four proximal outcomes measuring substance-related cognitions (i.e., abstinence self-efficacy and commitment to sobriety) and self-concept (i.e., internalized shame and self-compassion) during short-term residential substance use treatment and (b) examine several possible moderating influences (e.g., demographic information, substance use history, mental health symptoms) as predictors of initial status and rates of change.

### Proximal Outcomes

The first objective of the current study was to evaluate changes in substance-related cognitions and self-concept among individuals attending short-term residential substance use treatment. Specifically, it was hypothesized that participants would demonstrate significant increases in abstinence self-efficacy, commitment to sobriety, and self-compassion and significant decreases in internalized shame. Study hypotheses were supported as participants demonstrated significant changes in the expected direction on all four primary outcomes. Effect size estimates were medium to large in magnitude.

**Abstinence self-efficacy.** Participants in the current study demonstrated significant gains in abstinence self-efficacy during the course of treatment. In general, the average rate of change was consistent with the rates of change observed in Bergman et al. (2014), Greenfield et al. (2012), and Kelly et al. (2012). Participants exhibited relatively high levels of abstinence self-efficacy at baseline, although this finding is comparable to previous studies utilizing a sample of treatment-seeking young adults (Bergman et al.,

2014; Kelly et al., 2012). Given the initial high rates of abstinence self-efficacy at treatment entry, this likely restricted the amount of change observed – resulting in an effect size that is moderate in magnitude.

The number of substances used in the prior 30 days to treatment entry significantly predicted both intercept and slope variability of abstinence self-efficacy. The number of substances used was inversely related to participant levels of abstinence self-efficacy at baseline. Therefore, individuals endorsing a larger number of substances reported lower levels of abstinence self-efficacy at treatment entry. This finding may reflect the perceived difficulty of effectively coping with a new reality, or lifestyle, characterized by abstinence. In general, the participants endorsing a higher number of substances used prior to initiating treatment may have been less confident in their ability to discontinue substance use as a result of the increased number of substances they would be required to “cut ties” with. In general, the number of substances one uses may contribute to his or her attributions regarding the difficulty of abstaining, and therefore, their level of self-efficacy. In addition, the quantity of substances used prior to treatment entry may be indicative of substance use severity. In general, measures of substance use severity (e.g., frequency of use, substance-related problems) have been associated with lower levels of self-efficacy (Ilgen, McKellar, & Moos, 2007).

Although individuals who reported using a greater number of substances prior to treatment entry exhibited lower levels of abstinence self-efficacy at baseline, these individuals experienced significantly greater gains in the outcome over time. Previous studies have credited changes in self-efficacy to both client-specific attributes, as well as the behaviors and level of engagement during treatment (Ilgen et al., 2007). Participants

in the current study likely enhanced levels of abstinence self-efficacy as a result of their involvement with treatment programming and participation in coping skills training – regardless of the number of substances used prior to treatment entry. It is possible that those endorsing low levels of abstinence self-efficacy at baseline exhibited significantly greater gains in the outcome over time as their initial lack of confidence may have resulted in an increased willingness to participate in and learn from the treatment process. Overall, the difference in the magnitude of change on levels of abstinence self-efficacy was small between participants reporting differences in the number of substances used at baseline. It is plausible that individuals endorsing a higher quantity of substances simply had more room for improvement, given the relatively high scores in abstinence self-efficacy observed in the sample at baseline.

**Commitment to sobriety.** During treatment, a significant increase in commitment to sobriety was observed among study participants. The magnitude of effect was medium in size and comparable to the rates of change observed in previous studies (Bergman et al., 2014; Schuman-Olivier et al., 2014). Similar to abstinence self-efficacy, baseline scores of commitment to sobriety were, on average, relatively elevated among study participants. As such, it is possible that a ceiling effect impacted the amount of observable change in the outcome.

Age significantly predicted intercept variability, with younger adults reporting lower levels of commitment to sobriety at treatment entry. In general, adolescence and young adulthood is characterized by the evolution of one's identity, which is heavily influenced by societal norms and expectations. For young adults, the use of substances can aid in the development of social bonds contributing to one's sense of identity

(Rodriguez & Smith, 2014). Society's normalization of substance use (e.g., binge drinking in college), as well as the high rates of perceived use of illicit substances among peers, may make committing to sobriety and adopting a recovery-oriented identity harder for young people (Schulenberg et al., 2018). This process would likely require radical changes in one's sense of self. Adopting an "in recovery" self-concept is strongly predicted by one's use of treatment recovery support services, including mutual-help organizations and recovery community centers (Kelly, Abry, Milligan, Bergman, & Hoepfner, 2018). Unfortunately, there is a lower prevalence of young adults in various recovery support services, with AA/NA having only 13-14% of members under the age of 30 (Kelly, Stout, Greene, & Slaymaker, 2014). Given the abstinence-based model utilized in many of these recovery services, young adults are likely less exposed to this approach and may have fewer social supports available to model behavior consistent with a commitment to sobriety. Interestingly, young adults demonstrated similar rates of change on commitment to sobriety as compared to older participants in the sample during treatment. Perhaps participating in treatment, having access to recovery support services, and simply being in a stage of life in which one is accustomed to continually refining his or her sense of self aided in the adoption of a recovery identity (at least in the short term), and therefore, increased commitment to sobriety.

**Internalized shame.** Participants demonstrated significant decreases in their levels of internalized shame during treatment. In addition, a large effect size estimate was observed. Although less research has focused on the impact of short-term residential treatment on levels of internalized shame, previous studies exploring similar constructs (e.g., self-criticism) or changes in shame through different treatment formats (e.g., ACT-

based group therapy) report similar findings (Johnson et al., 2006; Luoma et al., 2012). Several moderators emerged as significant predictors of intercept variability, including gender, mental health symptoms, and relationship problems. Further, no moderators significantly predicted rates of change in internalized shame during the course of treatment.

Gender significantly predicted intercept variability for internalized shame, with women presenting to treatment with overall higher levels of the outcome. This finding is in accordance with prior literature examining the relationship between gender and shame among substance using populations (O'Connor, Berry, Inaba, Weiss, & Morrison, 1994). Despite strong evidence supporting addiction as a chronic disease, as well as increased attention on mental health and substance use in the public, stigmatizing beliefs and misconceptions continue to afflict individuals with substance use disorders (ASAM, 2011). For example, the loss of control over one's use – a defining feature of substance use disorders – is sometimes regarded as a moral failing, lack of willpower, or weakness. Women may be at particularly high risk of experiencing this stigma, as they tend to lose control over their substance use more quickly and experience greater health consequences as compared to males (Brady & Randall, 1999). Further, women may face a higher degree of social disapproval as a consequence of societal expectations associated with gender norms. The cultural emphasis on reproductive roles create an extra layer of perceived persecution and judgement among women with addiction – who are likely to be characterized as having dysfunctional lifestyles and poor parenting practices (Matendechere, 2018; Sanders, 2012). In general, the prevalence of substance use is higher among males and the culture of recovery has been primarily dominated by men

(National Institute on Drug Abuse [NIDA], 2018; Sanders, 2012). Women's issues have historically been overlooked and undervalued in the treatment of addiction (Sanders, 2012). In conjunction with the relatively small portion of women in the current sample, these issues likely contributed to feelings of unworthiness and shame prior to entering treatment.

Provisional mental health diagnoses of PTSD, depression, and anxiety were significantly associated with higher levels of internalized shame at baseline. These findings mirror previous research examining the link between psychopathology and shame. In a recent study by Cunningham, Davis, Wilson, and Resick (2018), shame and guilt were found to account for 46% of the variance in PTSD symptom severity among research participants, with shame accounting for two-thirds of the explained variance. While shame has been shown to predict PTSD symptom severity, shame is also a common emotional reaction following trauma exposure (Cunningham et al., 2018). In the current sample 96.1% endorsed experiencing at least one traumatic event within their lifetime and 57.6% endorsed symptoms consistent with PTSD at treatment entry. This finding is illustrative of the overall high rates of comorbid PTSD and substance use within treatment-seeking adult populations (McCauley, Killeen, Gros, Brady, & Back, 2012). In terms of depressive symptomatology, previous literature has demonstrated a robust correlation with shame (Kim, Thibodeau, & Jorgensen, 2011). In general, there is a strong overlap between shame and depression in terms of phenomenology (e.g., feelings of helplessness and worthlessness), behavioral tendencies (e.g., isolation, withdrawing), and attributional patterns (e.g., intractable focus on global identity; Kim et al., 2011). Finally, prior explorations of the connection between anxiety and self-

conscious emotions have revealed strong, positive associations between shame and generalized anxiety (Fergus, Valentiner, McGrath, & Jencius, 2010). Low self-esteem and beliefs of personal inadequacy or incompetence are common among individuals exhibiting high levels of worry – which may elicit the emotional experience of shame (Schoenleber, Chow, & Berenbaum, 2014). In addition, the interpersonal challenges that commonly occur with generalized anxiety disorder (e.g., dependency, avoidance, anger/irritability) may give rise to shame – a self-conscious emotion with social underpinnings. Given the steep rates of trauma exposure and symptoms of all three mental health diagnoses within the current sample, it is not surprising that provisional mental health diagnoses predicted levels of internalized shame at treatment entry.

The number of relationship problems reported within the prior 30 days of treatment entry significantly predicted intercept variability of internalized shame in the current study. Shame – often regarded as a social emotion – is theoretically intertwined with concerns of negative evaluation from others (Tangney & Salovey, 2010). Therefore, it is plausible that participants with higher levels of shame experience greater difficulty interacting with others due to a perception of being unworthy or incapable of connection. In these circumstances, one might isolate, withdraw, or avoid socialization – thereby preventing the development of close and supportive relationships (Black, Curran, & Dyer, 2013). While the experience of shame may result in interpersonal challenges, the psychosocial consequences of substance use – particularly in one's social relationships – may give rise to or intensify the emotional experience of shame. It is plausible that participants entered treatment with a great deal of regret, guilt, and shame in response to the disruption their substance use has caused loved ones. This might explain the

significant association between recent relationship problems and internalized shame at baseline in the current study.

**Self-compassion.** A significant increase in self-compassion was observed among study participants, resulting in a large effect size. Virtually no prior research has investigated changes in self-compassion during residential substance use treatment. At Recovery Unplugged, interventions are targeted at increasing motivation, developing skills for emotion regulation, and enhancing adaptive coping skills. Therefore, participants may have improved their ability to soothe themselves, identify and learn from past mistakes, and motivate themselves for success – all of which impact levels of self-compassion (Germer, 2017). Gender and mental health symptoms significantly predicted intercept variability, while substance identified as the major problem predicted slope variability.

Males and females demonstrated significantly different levels of self-compassion at baseline, with women endorsing overall lower levels of self-compassion. This result is consistent with previous literature examining gender differences in self-compassion. In general, women tend to be less self-compassionate and engage in higher levels of self-criticism and negative self-talk when compared to men (Yarnell, Neff, Davidson, & Mullarkey, 2018). Given the unique stigmas women face in response to society's views of gender roles and substance use, women in the current study likely engaged in harsh self-judgment, had exaggerated beliefs of personal inadequacy, and experienced isolation as a result – all of which are directly related to lower levels of self-compassion (Neff, 2003).

Previous research has consistently demonstrated an inverse relationship between self-compassion and psychological functioning. A robust association between self-compassion and psychopathology was observed in a systematic review of studies on mental health and self-compassion (MacBeth & Gumley, 2012). Overall, lower levels of self-compassion are associated with higher levels of PTSD, depression, anxiety, and stress (Dahm et al., 2015; MacBeth & Gumley, 2012). In general, those with lower levels of self-compassion exhibit more extreme and negative emotional reactions, higher levels of rumination, and less accepting thoughts (Leary, Tate, Adams, Batts Allen, & Hancock, 2007). While symptoms of PTSD and anxiety emerged as moderating influences in the current study, depressive symptomatology did not significantly predict levels of self-compassion.

In the current study, substance identified as the participant's major problem significantly predicted slope variability in self-compassion. Participants who identified anything except alcohol or opioids as their major problem (i.e., cocaine, cannabis, etc.) experienced greater gains in self-compassion during treatment when compared to participants who identified opioids. Those who described alcohol as their main problem did not differ significantly from either group in their rates of change in self-compassion. Individuals dependent upon opioids likely experience different stigmas when compared to those with other forms of substance use disorders. For example, given the impact of opioid overprescribing, individuals who receive opioids through a prescription may be assigned less "blame" versus those who obtain opioids through alternative means (e.g., friends, drug dealers, etc.; Goodyear, Haass-Koffler, Chavanne, 2018). Therefore, it is plausible that young adults with opioid use disorders experience a greater degree of

stigmatization, given the lower likelihood of obtaining an opioid prescription through a medical source in this age group (National Academies of Sciences, Engineering, and Medicine, 2017). Given the large proportion of young adults, as well as participants endorsing injection drug use, it is likely that the current sample has experienced a high degree of stigmatization, and therefore, more difficulty practicing self-compassion.

### **Clinical Implications**

Several moderators emerged as significant predictors of initial status at treatment entry, including age, gender, mental health symptoms, relationship problems, and the number of substances used within the past 30 days. In general, lower rates of abstinence self-efficacy, commitment to sobriety, and self-compassion and higher levels of internalized shame were observed among participants who were younger in age; female; endorsed symptoms of PTSD, depression, and anxiety; experienced an increased number of relationship problems within the past 30 days; and used a higher quantity of substances within the past 30 days of treatment entry. These findings give rise to several clinical implications.

Overall, increased attention should be given to individuals' status at treatment entry. Specifically, providers should gather information pertaining to the above demographic, clinical, and substance use information in efforts to target individuals who might be considered more "high risk" at the start of treatment. In general, similar rates of change were observed on the four primary outcomes, regardless of one's initial status. However, participants who were younger in age, female, reported a higher level of mental health symptoms, and endorsed recent interpersonal difficulties entered treatment with overall poorer levels of the outcomes, and therefore, ended treatment in the same manner – with

less optimal scores on the outcomes assessed (relative to lower risk individuals). For example, despite parallel trajectories in changes of internalized shame between the high risk (i.e., women, higher mental health symptoms, more relational problems) and low risk (i.e., men, lower mental health symptoms, less relational problems) groups, the high risk group experienced substantially higher levels of internalized shame at discharge. Given that the primary outcomes explored in the current study are associated with post-treatment relapse rates, psychological functioning, and overall well-being, this finding has important implications for treatment providers (Germer, 2017; Kelly et al., 2012; Neff, 2003). Specifically, clients who are young, female, exhibiting mental health symptoms, and reporting relationship issues at treatment entry may be at particularly high risk for relapse, psychological distress, and reduced well-being after discharge. Within these subgroups of the population, it may be beneficial for providers to develop individualized treatment plans that incorporate specific interventions designed to target constructs associated with one's substance-related cognitions and self-concept. In addition, linking clients to appropriate aftercare services, such as community-based 12-step organizations, may enhance the likelihood of maintaining the gains achieved during treatment post-discharge.

Finally, further efforts should be made in challenging stigmas and stereotypes associated with substance use disorders. Policymakers, clinicians, and researchers are encouraged to continually explore personal attitudes, beliefs, and biases regarding addiction and educate oneself by remaining up-to-date with new literature. For example, a recent study examining terminology in the substance use disorder treatment field found strong, negative associations with commonly used descriptors (i.e., 'addict') of

individuals with substance use disorders (Ashford, Brown, & Curtis, 2018). A simple change in one's choice of words in efforts to be more respectful and inclusive can assist in reducing stigma. In general, a non-judgmental, compassionate approach when treating individuals with substance use disorders communicates understanding, acceptance, and most importantly, the value of human life. Stigmas regarding high-risk behaviors, like opioid use, are socially constructed based upon cultural norms, values, and beliefs (Collins et al., 2012). Fortunately, these beliefs are fluid and change substantially over time. With the increased attention and interest surrounding the "opioid crisis" within the United States, a unique platform exists for policymakers, healthcare professionals, and researchers to both educate and advocate for individuals with substance use disorders. Research should be frequently disseminated in a manner that is easily accessible and understandable to the general population. This might allow for a more widespread adoption of addiction as a chronic health condition – as opposed to a moral or personal failing, thereby reducing stigma.

### **Limitations**

Several limitations of the current study influence the interpretation of the findings and are therefore worth noting. First, this study utilized a naturalistic longitudinal design and did not include a comparison group. Consequently, alternative explanations of the observed effects should be considered. Specifically, it is possible that the positive changes made on primary outcomes of interest are associated with factors other than the intervention itself. The impact of statistical regression might also account for at least some of the change observed. Although it is heartening that the general effects observed

in the current study were consistent with effects reported in the existing literature, as the literature base of reference generally lacks controlled trials.

Second, it is possible that some form of self-selection bias may account for the observed effects. For example, self-identified musicians or individuals with a proclivity toward artistic expression may be more inclined to select *Recovery Unplugged* for its music-based approach. These individuals might also be more receptive to the intervention, resulting in higher levels of engagement, and therefore, more improvement in the outcomes observed. It is worth noting that the current sample exhibited a similar level of risk as indexed by the ASI-5 composite scales in relation to other samples in the published literature (e.g., Denis, Cacciola, & Alterman, 2013; Rosen, Henson, Finney, & Moos, 2000; Zanis, McLellan, & Corse, 1997).

Third, proximal outcomes were only examined during the course of short-term residential treatment and levels of the outcomes were not further evaluated post-discharge. It is possible that participants experienced rapid, yet superficial, changes during treatment and returned to their baseline levels of the four outcomes after discharge. In addition, it is unclear to what extent changes in the proximal outcomes during treatment will impact rates of abstinence following one's involvement in treatment. Previous literature has cited individual outcomes as poor predictors of abstinence in the year following treatment (e.g., Johnson et al., 2006).

Finally, characteristics of the current study likely limit the generality of the results. The sample was predominantly young, male, Caucasian, and opioid dependent. Caution should be used when generalizing the current study's findings to other samples. For example, prior research has demonstrated a significant association between educational

level and abstinence self-efficacy (Ilgen et al., 2007). In the current sample, nearly half (48.3%) of the sample had at least some college education. It is possible that samples of participants with lower levels of educational attainment might endorse different initial status and rates of change in abstinence self-efficacy. In addition, the treatment provided at Recovery Unplugged is novel, eclectic, and strongly focuses on creative expression and music-based interventions. It is unknown to what extent the findings in the current study are generalizable to other treatment settings. However, prior literature suggests participants demonstrate similar improvements over time, regardless of treatment type (Finney et al., 1998; Ilgen et al., 2007), and many of the findings reported in the current study are consistent with prior empirical work (as noted above, in several places).

### **Strengths**

Despite the limitations discussed above, the current study had many strengths. First, the study's large sample size resulted in sufficiently powered statistical tests and likely lessened the impact of more extreme observations. Second, effect size estimates were reported to enhance interpretability regarding practical significance. Third, data were collected at three timepoints with the incorporation of a mid-treatment assessment. Many studies examining change during treatment only assess outcomes among participants at treatment entry and discharge. Therefore, the assessment timeline allowed for a greater degree of precision in understanding when changes in the outcomes occur. Fourth, the analytic strategies employed in the current study were a strength. Individual growth curve models allow for the estimation of change at both the aggregate (i.e., population) and individual (i.e., participant) levels (DeLucia & Pitts, 2006). These models are less restrictive than traditional approaches in understanding repeated measures

data (e.g., repeated measures analysis of variance). Specifically, individual growth curve models can be estimated with partially missing data and generalize to non-normal data (Curran et al., 2010). Further, the exploration of moderating influences allowed for rich conclusions to be drawn from the results. Finally, the current study adds to the literature base by further exploring the “black box” of treatment in efforts to develop a better understanding of the underlying processes of change. A focus was placed on a particularly high-risk, yet understudied, group of individuals. In addition, two commonly assessed outcomes – abstinence self-efficacy and commitment to sobriety – provided a benchmark in comparing treatment response, while two lesser studied constructs (i.e., internalized shame and self-compassion) established new insights regarding the impact of treatment on individual’s self-concept. Overall, the current study provides a more comprehensive understanding of the treatment process by identifying important clinical targets of treatment among a vulnerable population.

### **Future Directions**

Several recommendations for future research are identified as a result of the findings from the current study. First, future studies should continue examining a variety of proximal outcomes associated with residential substance use treatment by incorporating measures of psychosocial constructs that have yet to be evaluated within the treatment process literature base. Second, these outcomes should be assessed at multiple time points, both during and after treatment. The ability of these outcomes to predict substance use post-discharge should be evaluated. Third, through the inclusion of demographically diverse samples obtained from a variety of treatment programs in geographically dispersed locations, the generality of the findings will be improved. In

addition, examining treatment response among specific subgroups of the population (e.g., young adults, women) with various clinical presentations (e.g., mental health symptoms, interpersonal difficulties) and substance use histories should allow for a better understanding of unique needs in efforts to assist clients in achieving optimal benefits during treatment. Finally, the effect of specific interventions, the treatment setting, and the intensity in which treatment is delivered should be continually explored in efforts to expand insights regarding treatment process and inform future treatment decisions.

### **Conclusions**

The findings in the current study provide further support for the use of short-term residential treatment among adults with substance use disorders. Results suggest that treatment is effective at increasing one's level of commitment and confidence in maintaining sobriety, as well as altering self-view in a non-judgmental and compassionate manner – all of which are important aspects in reducing substance use and enhancing overall well-being. In general, individuals appear to experience similar improvements during treatment on key therapeutic targets linked to substance-related cognitions and self-concept. However, several variables significantly predicted initial status and rates of change on the four proximal outcomes of interest. In general, participants who were younger in age, female, endorsed higher levels of mental health symptoms, and reported recent interpersonal difficulties exhibited less optimal scores on the primary outcomes assessed. Given the current study's focus on young adults with opioid use disorders, two distinctive findings were observed among this exceptionally high-risk and understudied population. First, young adults appeared to enter treatment with overall lower levels of commitment to sobriety. Second, individuals who identified

opioids as their major problem experienced less improvement in self-compassion over time. These findings illustrate the potential impact of diversity factors, clinical characteristics, interpersonal functioning, and substance use history in one's presentation at treatment entry, as well as their response to treatment interventions over time. Overall, this information helps lay the groundwork in developing a conceptual model of treatment process which can be utilized to inform future treatment decisions and hold treatment programs more accountable for client progress and outcomes. Improving the quality of care provided to individuals diagnosed with substance use disorders would reduce economic burden, challenge stigmatizing beliefs, and most importantly, save lives.

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