


APPROVAL SHEET

Title of Dissertation: Pathways to success in early recovery from Opioid Use Disorder:
Comparing the change process and contextual factors of recovery between individuals using and
not using medications

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ABSTRACT

Title of Document: PATHWAYS TO SUCCESS IN EARLY
RECOVERY FROM OPIOID USE DISORDER:
COMPARING THE CHANGE PROCESS AND
CONTEXTUAL FACTORS OF RECOVERY
BETWEEN INDIVIDUALS USING AND NOT
USING MEDICATION

Catherine Corno, Doctorate of Philosophy, 2018

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Promoting recovery among individuals with Opioid Use Disorder (OUD) is urgent given the increasing morbidity and mortality associated with opioid use. However, recovery is a complex change process with multidimensional contextual variables involved (health, community integration) and multiple pathways. The current study sought to compare the change process and the contextual variables of recovery between two groups categorized by their chosen pathways of recovery: medication (methadone, buprenorphine, naltrexone) and no medication. The current study investigated these constructs among individuals who demonstrate initial success in the early stages of recovery from Opiate Use Disorder (OUD), such that they have achieved at least one month and less than six months of essential abstinence (i.e., abstinence with the possibility of a slip). Participants

were recruited from community treatment agencies. Those participants deemed eligible completed a self-report survey assessing sociodemographics, other background variables, the change process variables of interest (stage of change, behavioral processes, confidence, temptation), and the contextual variables of interest (health pathology, quality of life, social recovery capital, consequences). To conduct the tests of the primary aims, a special case of MANOVA was used: Profile Analysis. Additionally, a subsample of participants completed interviews from which qualitative data were collected.

The primary quantitative analyses revealed that there were no significant differences between individuals who chose to take medications compared to those who did not across indicators of engagement in the change process or the experience of the multidimensional contextual recovery variables. Both groups revealed profiles of individuals engaged in the change process with contextual recovery factors characteristic of early recovery. Qualitative analyses revealed themes that helped to contextualize the quantitative findings. Overall, this study suggests that individuals taking medications can be engaged in the change process, dispelling some of the myths associated with recovery medication use.

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PATHWAYS TO SUCCESS IN EARLY RECOVERY FROM OPIOID USE
DISORDER: COMPARING THE CHANGE PROCESS AND CONTEXTUAL
FACTORS OF RECOVERY BETWEEN INDIVIDUALS USING AND NOT USING
MEDICATION

By

Catherine M. Corno

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Dedication

For my family who have always provided me with comfort, love, and support. For Jeff who is an endless source of strength, while constantly challenging me and helping me grow every day. For my friends, classmates, and lab mates who have been invaluable in my successes, especially Meagan Graydon, Chandra Edwards, Michele Crisafulli, and Angela Petersen.

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Chapter 1: Introduction

Opioid Use

Opioids are a class of drugs that act on the opioid receptors in the brain producing analgesic and pleasurable effects (Koob, 2006; ASAM, 2006). Opioids include illegal drugs such as heroin and legal prescription medications intended for pain treatment (e.g., oxycodone, codeine, morphine, hydrocodone, fentanyl, and others) (Koob, 2006; ASAM, 2016). Both illegal and legal opioids have the potential for abuse and have increased in prevalence in the United States over the last decade. According to results of the 2014 National Survey on Drug Use and Health, there were 4.3 million nonmedical users of pain relievers and 435,000 heroin users aged 12 or older in the United States (Center for Behavioral Health Statistics and Quality, 2015). The potential for developing a diagnosable Opioid Use Disorder (OUD) among those who use both illegal and legal opioids is high, such that nearly one-quarter (23%) of individuals who use heroin develop an OUD (ASAM, 2016). In 2014 there were 1.9 million Americans aged 12 and older that had an OUD involving prescription pain medication and 586,000 had an OUD involving heroin (ASAM, 2016), as defined by individuals who met criteria for opioid abuse or dependence using the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV TR).

While the prevalence of opioid use is relatively low, representing 2% and .2% of the United States population for nonmedical users of pain relievers and heroin users, respectively, the societal and individual burden is high. Opioid addiction has been consistently associated with crime, unemployment, relationship breakdown, the spread of infectious disease, violence, and high law enforcement costs (Wesson & Smith, 2010; Mattick, Breen, Kimber, & Davoli, 2014; Amato et al., 2005). Achieving abstinence after developing a Substance Use Disorder

(SUD), OUD in particular, is difficult, evidenced by the high rates of individuals who return to problematic use after achieving a period of abstinence (White, 2008; White, Malinowski Weingartner, Levine, Evans, & Lamb, 2013; Institute of Medicine, 1998; McLellan, 2002). Reported rates of relapse vary depending on the drug of interest in the study but have been shown to be as high as 79.5% for polysubstance drug users one year after treatment (crack, alcohol, heroin, and marijuana) (Laudet, Stanick, & Sands, 2007) and 92% for treatment seeking heroin users (Hall, Havassy, & Wasserman, 1990). The societal costs, in developed countries, have been estimated to be about 0.4% of GDP (UNIDCP, 2001; Amato et al., 2005). Additionally, drug overdoses are now the leading cause of accidental death in the U.S., with more persons dying in 2014 due to drug overdose than any other year on record (ASAM, 2016). The primary drug involved in these overdose deaths was opioids (ASAM, 2016). According to the most recent Center for Disease Control and Prevention (CDC) estimates, of drug overdose deaths in the United States in 2014, 61% were attributable to opioids (heroin and prescription medications). Drug overdoses attributable to opioids has increased 200% between 2000 and 2014 (CDC, 2016). Given the dire costs to the individual and society, there is an urgent call to researchers, policy makers, and service providers in the addiction field to focus on how to promote recovery.

Recovery

Traditionally, addiction was conceptualized as an individual failing of morals or self-control. It was assumed that with “enough” treatment an individual struggling with a substance addiction would “learn their lesson,” see the error in their ways, and stop using all substances of abuse (McLellan, McKay, Forman, Cacciola, & Kemp, 2005). It follows that researchers have traditionally defined recovery solely in terms of abstinence from alcohol and drugs (Laudet,

2008; Scott, Foss, & Dennis, 2005), specifically in opioid use research (Flynn, Joe, Broome, Simpson, Brown, 2003). However, White (2007) asserted that when recovery is treated as synonymous with abstinence, a large portion of the experience is missed: “addiction is often intricately bundled (concurrently and sequentially) with other problems and that the resolution of addiction is often inseparable from the resolution of problems in which it is nested” (p. 234). Additionally, research has consistently demonstrated that abstinence from the primary drug of abuse may be necessary but is not sufficient for longer-term outcomes, such as sustained abstinence, improved health, and community integration (McLellan, 2005; White et al., 2013).

There has been a shift in the addiction field towards a holistic understanding of recovery, beyond the traditional view of abstinence. Relatedly, the model of addiction treatment has been shifting from a rehabilitation-oriented model, which focuses on the elimination of symptoms and promotion of abstinence as the goal, to a recovery-oriented model, which focuses on enhancement of comprehensive wellness with holistic recovery as the goal (Laudet & Humphreys, 2013; Kaskutus et al., 2014; White, 2007; White, 2008). However, this shift has been progressing without a precise definition of recovery (White, 2007; Laudet, 2008). Without a clear and common definition clinical research, clinical practice, and collaboration between various aspects of the field is compromised (White, 2007). Therefore, there have been many attempts to gain consensus on a definition of recovery.

Proposed definitions of recovery. Given that the traditional definition of abstinence is not sufficient, a range of stakeholders (individuals and family members in recovery, various cultural community leaders, treatment providers, policy makers, and researchers) have collaborated and recently proposed definitions of recovery that expand the conceptualization of recovery beyond abstinence (White, 2007).

Center for Substance Abuse Treatment (CSAT). During the 2005 National Summit on Recovery, convened by the Substance Abuse and Mental Health Service's Administration's (SAMSHA's) CSAT, leaders in the field of addiction treatment and recovery met to develop the guiding principles of recovery for individuals with a SUD. Participants of this summit developed the following definition: "Recovery from alcohol and drug problems is a process of change through which an individual achieves abstinence and improved health, wellness, and quality of life" (CSAT, 2007). Additional guiding principles developed alongside the definition highlight that recovery is a continuous process of seeking improved health/wellness, including overcoming stigma and rejoining life in the community.

Betty Ford Institute. The Betty Ford Institute convened a panel of experts, including 12 individuals who were experienced in the field of addiction treatment and policy, many of whom identified as being "in recovery" (Panel, 2007). This panel was tasked with reaching consensus on a definition of recovery that could be the jumping off point for further communication and understanding of the concept of recovery. They developed the following definition, which was called preliminary, "recovery is a voluntarily maintained lifestyle characterized by sobriety, personal health, and citizenship." This panel agreed that sobriety from the primary drug of abuse is most reliably achieved with abstinence from all other drugs of abuse but that there are multiple pathways to recovery, including medications to aid in one's recovery. Therefore, individuals using prescribed medications to aid in their recovery were deemed as abstinent by this panel. The panel defined "personal health" as "improved quality of personal life as defined and measured by validated instruments" and "citizenship" as "living with regard and respect for those around you."

Addiction researchers. White (2007) discussed and addressed ten questions that were deemed critical to the development of a definition of recovery and then proposed the following definition: “Recovery is the experience (a process and a sustained status) through which individuals, families, and communities impacted by severe alcohol and other drug (AOD) problems utilize internal and external resources to voluntarily resolve these problems, heal the wounds inflicted by AOD-related problems, actively manage their continued vulnerability to such problems, and develop a healthy, productive, and meaningful life.” Overall, White argued that recovery 1) is both a process and a goal for which individuals strive, 2) requires individuals to draw on their own unique internal and external resources to achieve, and 3) includes multiple factors, including improved health (physical, emotional, and relational), reduction of anti-social behavior and enhancement of pro-social behaviors, and continued seeking of life meaning/purpose.

Finally, in addition to White’s contributions, McLellan and colleagues (2005) highlighted that the short-term goal of reducing alcohol and drug use is “necessary but rarely sufficient for achievement of longer-term goals of improved health and social function and reduced threat to public safety” (pp.448). This assertion highlights the importance of reduction in alcohol and drug use, improved personal health (medical and psychiatric), improved social function (employment, family and social relationships), and reduction in threats to public safety (spread of infectious disease, personal and property crimes) as the major components of recovery.

Key features of recovery. Review of the proposed definitions from leaders in the addiction field revealed several key features of recovery, introduced below.

1) Recovery is a process of change. Several of the proposed definitions of recovery highlighted that recovery is not a fixed state but is more accurately conceptualized as a process.

There is substantial evidence to indicate that addiction and recovery is chronic and cyclical in nature (Scott, Foss, & Dennis, 2005; McLellan, Lewis, O'Brien, & Kleber, 2000; Dennis, Foss, & Scott, 2007; Dennis, Scott, Funk, & Foss, 2005; Laudet, 2008; Laudet & Humphreys, 2013). Recovery is characterized by high rates of relapse (White et al., 2013; Gossop, Stewart, Treacy, & Marsden, 2002; Laudet et al., 2007) and often takes multiple attempts and many treatment episodes, often lasting two decades or longer (Dennis et al., 2005; Laudet & White, 2004; Laudet, 2008). For severe SUD, recovery is only considered stable (defined as the risk of relapse is less than 15%) after four to five years of sustained abstinence (White, 2007; Flynn et al., 2003; Hser, Hoffman, Grella, & Anglin, 2001). Individuals in recovery also describe the experience of recovery as a process as compared to an endpoint (Laudet, 2008). The Transtheoretical Model of intentional behavior change (Prochaska & DiClemente, 1983; 1986) is the framework used in the current study to understand the process of changing one's substance use behavior and seeking recovery. This is reviewed in detail in the section labeled, "Process of Recovery: The Transtheoretical Model of Intentional Change."

2) Recovery is multidimensional. Recovery includes a constellation of several common contextual factors elucidated in the proposed definitions of recovery: maintained abstinence, improved health (reduced health pathology and improved quality of life), and community integration (reduced substance related problems/anti-social behaviors and improved pro-social behaviors). Each of these contextual factors are multidimensional and will be of interest in the current study. They are all described in further detail in the section labeled, "Contextual Factors of Recovery."

3) There are multiple pathways to recovery. There are multiple ways in which individuals seek recovery that have been increasingly accepted in the addiction field: traditional

substance use disorder treatment; use of various medications to aid in one's recovery (opiate-substitution therapy); 12-step engagement; other mutual support group support; religious, spiritual, or secular avenues; attaining various gradations of abstinence (complete, partial, abstinence from primary drug of abuse only); no formal help (labeled "natural recovery") (White & Kurtz, 2006; White, 2007; Kaskutas et al., 2014; Sobell, Ellingstad, & Sobell, 2000).

The use of medications to aid in one's recovery, specifically opioid-substitution therapy (e.g., methadone, buprenorphine), is of particular interest in the current study, as it is a common pathway of recovery for individuals with OUD. Methadone has been used as a medication to aid in OUD recovery since the 1960s and the use of buprenorphine has increased in the last ten years (Andrews, D'Aunno, Pollack, & Friedmann, 2014) as an alternative to methadone with less potential for harm (i.e., addiction and overdose). It is notable, that despite the increased use, acceptance, and scientific evidence of its efficacy, there remains persistent stigma towards recovery medications. Three primary pathways to recovery will be of interest in the current study: individuals who are using methadone, buprenorphine, and no medication. The process of change and contextual factors of recovery will be investigated in individuals who have achieved abstinence in each of these pathways. Further discussion of these pathways is reviewed in the section labeled, "Multiple pathways to recovery: Medication Assisted Recovery."

Change Process: The Transtheoretical Model of Intentional Behavior Change

The Transtheoretical Model of intentional behavior change is the framework used in the current study to understand the process of changing substance use behavior. The Transtheoretical Model of intentional behavior change (TTM; Prochaska & DiClemente, 1983; 1986) is an integrative perspective of the intentional change process, marking an individual's progression towards a desired behavior. The TTM was originally developed examining

psychotherapy studies and studying smoking cessation but has since been applied to change of numerous addictions and health behaviors including, but not limited to, alcohol (DiClemente & Hughes, 1990), illicit drugs (Nidecker, DiClemente, Bennet, & Bellack, 2008; Migneault, Migneault, Adams et al., 2005; Naar-King et al., 2006), condom use (Ferrer et al., 2009; Gazabon, Morokoff, Harlow, Ward, & Quina, 2007), and physical activity (Marshall & Biddle, 2001). This model can apply to behavior change that involves cessation (stopping a problem behavior), modification (reducing a problem behavior), or initiation (starting a healthy behavior) of a behavior. It has been used many times to understand the process of change for individuals struggling with opioid use (Belding, Iguchi, Lamb, Lakin, & Terry, 1995; Belding, Iguchi, & Lamb, 1996; Belding, Iguchi, & Lamb, 1997; Tejero, Trujols, Hernandez, de los Cabos, & Casas, 1997; Gossop et al., 2006). The stages of change are perhaps the most widely known component of the TTM but there are several other important components, reviewed below.

Stages of change. The TTM model includes five stages of change characterized by how ready, willing, and able a person is to make a change, and in the current study to change their opioid use: precontemplation, contemplation, preparation, action, and maintenance. The model posits that successful behavior change requires progression through the stages of change and successful completion of the tasks associated with each stage. Individuals in the precontemplation stage are not considering change of their opioid use in the near future. In order for individuals to progress out of the precontemplation stage they need to raise their awareness and concern about the problems associated with their opioid use, as well as increase their hope and confidence in their ability to change their opioid use. Individuals in the contemplation are considering change and demonstrate ambivalence about their opioid use (i.e., there are components of their behavior that are rewards and risks). To move to the preparation stage,

individuals in contemplation must conduct a "risk-reward analysis," meaning weigh the pros and cons and connect their reasons for changing with their values. Once individuals in the contemplation stage have resolved their ambivalence, such that the pros of changing outweigh the cons of changing, either in number or value, and have made a decision to change then they can progress to preparation. Individuals in the preparation stage have made a decision to change their opioid use and are in the process of preparing to begin that change. It is common for individuals in this stage to have made a decision to change but not yet have a thorough plan or strong commitment. Therefore, in this stage, individuals must solidify their commitment to change and create an acceptable and effective plan. Individuals in the action stage have put their developed plan into action and started changing the behavior of interest (i.e., stopped using non-prescribed opioids). The action stage typically lasts at least six months, before the behavior change has become easier to maintain. In this stage, there is the highest likelihood of a relapse, lapse, and/or slip. A relapse, lapse, and slip all indicate that something is missing from one's behavior change plan and, therefore, individuals need to continually revise their behavior change plan to account for situations that present as particularly challenging. Conceptually, relapse is defined as a return to one's problematic pattern of behavior or, for the purposes of the current study, opioid use. A lapse and slip are periods of use that do not reach one's previous problematic level. A slip is defined as a single, brief period of use (Brandon et al., 2007), whereas a lapse is a more substantial period of use or a series of slips that does not reach the level of a relapse (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). Finally, after at least six months in action, an individual can transition to maintenance during which behavior change is sustained and integrated into one's life (Prochaska & DiClemente, 1983; DiClemente, 2003).

Stage of change and opioid use. There is substantial evidence of the presence of these stages across multiple substances and behaviors. In opioid using samples in particular, Belding and colleagues (1995) investigated several TTM constructs in a sample of 276 methadone maintenance patients. This study showed that among participants at various stages of change for drug use, participants endorsed profiles consistent with theorized predictions according to the TTM. Similarly, in that same sample of 276 methadone maintenance patients, Belding and colleagues (1996) conducted a study investigating the relation between a measure of the stages and drug use across five classes of drugs. Results showed that higher scores on the action subscale (endorsement of attitudes and activities consistent with the action stage of change) related to lower use of opiates, cocaine, and benzodiazepines, consistent with the theorized relation in the TTM.

Action stage and opioid use. The current study will be investigating individuals in the action stage of change, within the first six months of recovery, for opioid use. The high rates of relapse among individuals with an OUD have been established and it is clear that relapse is part of the recovery process (White, 2013; Gossop et al., 2002; Laudet et al., 2007). The early stages of recovery are particularly variable, characterized by high rates of relapse (White, 2008; Hall et al., 1990) and frequent transitioning or recycling between relapse, treatment, and recovery (Gossop et al., 2002; Laudet et al., 2007; Laudet, 2008; Scott et al., 2005). Relapse frequently occurs within a short time after discharge from treatment. Gossop and colleagues (2002) conducted a study of 242 individuals in inpatient or residential programs who reported heroin use (with high rates of polydrug use) in the three months prior to entering treatment (53% daily users, 84% weekly users). On average, individuals were interviewed 94 days after leaving residential treatment; 60% of the sample reported using heroin at least once after their discharge

from treatment, 34% reported using within three days of leaving treatment, 45% within 7 days, 50% within 14 days, and 57% after 30 days. Notably, 95% of heroin use happened within 30 days. Therefore, for the current study the focus will be on individuals who have been in the action stage for at least one month.

Processes of change (POC). The POC are the “internal and external experiences and activities that enable individuals to move from stage to stage” (p.32; DiClemente, 2003). Conceptually the POC are the “how” of change or the mechanisms that propel individuals through the stages of change to successful behavior change (DiClemente, 2007). There are both cognitive/experiential processes of change and behavioral processes of change. Theoretically, the cognitive/experiential processes are most important in the earlier stages of change (precontemplation and contemplation) and the behavioral processes of change are most important in the later stages of change (action and maintenance). See table 1 below for detailed description of each process.

Table 1. Processes of Change

	Processes	Description
Cognitive/ Experiential	Consciousness-raising	Increasing knowledge and awareness of problem behavior and its effect on one's life
	Emotional Arousal/ Dramatic relief	Intense emotions related to the problem behavior (or associated cues) and possible solutions
	Self-reevaluation	Reassessing cognitive and emotional self-appraisal, specifically as it relates to the problem behavior
	Environmental reevaluation	Reassessing the impact of problem behavior on their environment
	Social liberation	Identifying and noticing society's attempts to manage prevalence of behavior in the environment
Behavioral	Self-liberation	Committing to self to change behavior
	Counter-conditioning	Changing reaction to triggers by replacing problem behavior with positive alternatives
	Stimulus control	Preparing to cope with triggers (remove or avoid triggers)
	Contingency management/ Reinforcement	Creating reinforcers for a desired behavior
	Helping relationships	Identifying and creating positive, supportive relationships that facilitate change

There are many studies that support the proposed temporal relationships for the processes of change, broadly such that the cognitive/experiential processes are utilized in the earlier stages of change and the behavioral processes in the later stages of change (Carbonari & DiClemente, 2000; Perz, DiClemente, & Carbonari, 1996; Allen, Anton, Babor, & Carbonari, 1997; Stotts, DeLaune, Schmitz, & Grabowski, 2004). This pattern has been documented for several substances including smoking (Perz, DiClemente, & Carbonari, 1996; Prochaska & DiClemente, 1983; 1985; Prochaska, DiClemente, Velicer, Ginpil, & Norcross, 1985), alcohol (Freyer et al., 2006), and illicit drugs (Belding et al., 1995). Carbonari and DiClemente (2000) used data from Project MATCH, a national multisite study of the treatment of alcohol use disorder, to compare 673 outpatient and 510 aftercare clients based on their drinking status one year after treatment (abstinent, moderate, and heavy). The abstinent group demonstrated higher scores on the behavioral processes compared to heavy or moderate users, whereas their experiential processes were slightly lower than the moderate group and similar to the heavy group. This finding is consistent with TTM, such that in the action stage high utilization of behavioral processes and low utilization of experiential processes would be expected. The moderate use group had behavioral process use higher than the heavy group but lower than the abstinent group, again consistent with theory that prior to action there should be an increase in behavioral processes. Figure 1 below demonstrates the distribution of processes by stage elucidated in many of the reviewed cross-sectional studies (Prochaska, DiClemente, & Norcross, 1992)

Figure 1: Processes of Change by Stage of Change

	Stages of Change				
	Precontemplation	Contemplation	Preparation	Action	Maintenance
Processes	Consciousness raising Dramatic relief Environmental reevaluation Self-reevaluation		Self-liberation	Contingency management Helping relationships Counterconditioning Stimulus control	

While, there has been substantial cross-sectional literature supporting the temporal relationships between the processes and the stages, there is also contradictory literature. For example, a meta-analysis conducted by Rosen (2000) reviewed 47 cross-sectional studies of various behaviors. Results showed that the use of processes consistently differed across various stages but that the pattern of these differences varied by the health behavior of interest. For example, in smoking cessation the cognitive processes were used more in the earlier stages as compared to the behavioral processes, while for exercise and dieting the use of behavioral and cognitive processes increased similarly across the stages. There were inconsistent results for the temporal pattern for substance abuse and psychotherapy. Given that the majority of the research to date is cross-sectional (Rosen, 2000; DiClemente, Bellino, & Neavins, 1999), there is a need for additional research, specifically longitudinal research designs, to help clarify the inconsistent findings of the cross-sectional studies (Joseph, Breslin, & Skinner, 1997; Littell & Girvin, 2002; Sutton, 2001; Weinstein, Rothman, & Sutton, 1998). Research on the relation between process utilization and stage or stage transition can shed light on the complex relation between processes, stages, and behavior change (Prochaska & Velicer, 1997).

There have been prospective studies to show the relation of processes to stage transition and outcomes of interest. Callagan and Herzog (2006) conducted a secondary data analysis of a two-year longitudinal smoking cessation study, demonstrating that individuals that transitioned from precontemplation to contemplation showed increased experiential process use from baseline to two-year follow-up compared to those who remained in precontemplation. This study did not show that there was increased behavioral process use among those who transitioned from contemplation to preparation over that two-year period. However, given that the majority of behavior process use is theorized and shown to occur in action, this is not unexpected.

A seminal study on process use was conducted by Perz and colleagues (1996), which investigated whether the timing of process use for smoking affects quit behavior. All participants (n = 388) were in the contemplation or preparation stage upon entry to the study (baseline) and all participants made at least a 24-hour quit attempt (transitioned to action) between baseline and the first follow-up (one month later). Participants completed a six-month follow-up as well. The investigators used multiple methods to capture whether or not an individual uses the “right” processes at the “right” time, categorizing individuals who did and did not use the processes in the theorized order. Multivariate analysis of covariance was used to relate the three methods of categorizing ideal process use to various measures of smoking behavior at the one- and six-month follow-ups. Results showed that all methods of measuring ideal process use predicted all smoking behavior outcomes at the one-month follow-up and some of the behavior measures at the six-month follow-up. This study has been consistently used to evidence the importance of using cognitive processes earlier in the stages and behavioral processes later in the stages to quit a behavior.

Segan and colleagues (2004) sought to replicate Perz and colleagues' (1996) study. Investigators used a different sample and replicated the same analyses (except instead of a one-month follow-up, investigators used a three-month follow-up). Results showed that investigators could replicate Perz and colleagues (1996) findings. When the stage of change at baseline was added as a covariate the relation remained significant. However, when stage of change at the three-month follow-up was added as a covariate then ideal process use was not predictive of abstinence at the six-month follow-up. While this study has been cited as a rebuttal to Perz and colleagues' (1996) findings, it shows that the ideal pattern predicts follow-up behavior but not above and beyond that stage of change immediately preceding the measurement of behavior.

Parrish and colleagues (2016) aimed to provide evidence for the theorized temporal relation between the processes and behavior change. The sample was 830 non-treatment seeking women who were at risk of alcohol-exposed pregnancy, recruited from jails, residential SUD treatment, obstetrics/gynecology clinics, primary care clinics, and the community. The participants were assigned to either the control conditions (brochures on alcohol use and women's health and local resources) or to the intervention condition (CHOICES intervention including 14 weeks of counseling and contraception consultation - four MI and one contraception session). The outcomes of interest were risky drinking, ineffective contraception, and the risk of alcohol-exposed pregnancy. The investigators used path analyses to test the theorized model of the processes mediating outcome, specifically investigators tested the model of intervention condition at baseline relating to the experiential processes use at a three-month follow-up relating to behavioral process use at a nine-month follow-up, which predicted outcome at the 9-month follow-up. This model demonstrated good overall fit for multiple outcomes (risky drinking and ineffective contraception use) and significant direct relations for intervention

conditions on experiential processes, experiential processes on behavioral processes, and behavioral processes on each outcome. An alternative hypothesis was tested, such that the experiential and behavioral processes have unique and direct influences on the outcome. The models testing this hypothesis did not demonstrate good fit. Therefore, this study demonstrates support for the hypothesized proximal relation of processes to outcome.

Overall, the processes of change have been widely researched and documented as predictive of stage progression and behavior change. The pattern of use of the processes across the stages has been shown to be complex, with some research suggesting it varies by behavior (Sutton, 2001) but more detailed analyses have recently revealed in smoking and alcohol that the theorized temporal ordering is founded (Perz et al., 1996; Segan et al., 2004; Parrish et al., 2016).

POC and opioids. There is research specifically on the processes of change in samples of individuals who use opioids, albeit less robust than alcohol and smoking. Belding and colleagues (1995) conducted a cross-sectional study of 276 methadone maintenance patients' process use for poly-drug use. Participants were categorized into a stage based on their behavior and intention regarding their illicit drug use, which included but was not limited to opioids. The factors that were founded and used in the current analyses were re-evaluation (including consciousness raising, self-re-evaluation, dramatic relief, and environmental re-evaluation), self-liberation, reinforcing relationships (including contingency management and helping relationships), and behavioral processes (including counterconditioning, stimulus control, and interpersonal stimulus control). Results showed that processes related to later stages of change had significant, modest correlations with drug use over the past 30 days. Additionally, comparisons across the stages on the processes generally revealed behavioral process use in

preparation, action, and maintenance and no differences across the stages in re-evaluation (a cognitive process).

There are limited prospective studies for processes and opioid use. Belding and colleagues (1997) conducted a study attempting to predict urinalysis results at a 12-week follow-up among a sample of methadone maintenance patients, but the processes were not predictive. Tejero and colleagues (1997) compared groups based on drug use status in a sample of 178 patients who met criteria on the DSM-III for opioid dependence (all were IV heroin). All individuals in the sample had requested treatment from a drug-dependence unit in a hospital, 77 of which were outpatients using heroin regularly with the goal of abstinence, 37 of which were outpatients that were not using opioids for anywhere from three to 57 days, and 64 of which were patients in a detoxification program. In this study the processes of change measure was modified for “opioid addicts.” Results from this study revealed significant differences between abstinent and non-abstinent participants on two of the ten processes of change: counter-conditioning and stimulus control. Notably, these are two behavioral processes for which we would expect to see differences between those in action (abstinent) and those in pre-action (non-abstinent). This comparison between abstinent and non-abstinent might not have been sensitive enough to detect differences on the other processes, such that we might expect differences between the experiential processes for individuals in pre-contemplation and contemplation compared to later stages. There is limited research on the processes of change in opioid use in particular. However, the evidence to date suggests consistency with the TTM theory such that higher behavioral process use is seen in the later stages and is linked to drug use outcomes. Therefore, further research is warranted in samples of individuals with an OUD and specifically process use for changing opioid use as most studies that focus on poly-drug use outcomes.

Markers. The markers of change (i.e., self-efficacy and decisional balance) are indicators of stage progression (Carbonari & DiClemente, 2000; DiClemente, 2003; Prochaska, Velicer, Rossi et al., 1994).

Self-efficacy. Self-efficacy, as defined by Bandura (1977a; 1977b), is an individual's appraisal of their ability to achieve a desired outcome and the conviction that they can carry out the necessary behaviors to produce the desired outcome. Self-efficacy in the TTM is represented by the individual's *confidence* in changing their behavior in situations that are likely to trigger relapse. In the TTM, situational confidence is measured alongside an individual's *temptation* to engage in their old behavior in those same high-risk situations, specifically their opioid use in the current study. Successful progression through the later stages of the TTM is related to one's confidence in his/her ability to make that change (Prochaska & DiClemente, 1986). Although important throughout the stages, self-efficacy may be most important in the stages that require behavioral engagement (preparation, action, and maintenance) (DiClemente, 2003).

There has been substantial research demonstrating the predictive ability of self-efficacy on multiple behavioral outcomes, for example for alcohol use (Ilgen, Tiet, Finney, & Moos, 2006; Moos & Moos, 2006; Boden & Moos, 2009), condom use (Sheeran, Abraham, & Orbell, 1999), smoking (Gwaltney, Metrik, Kahler, & Shiffman, 2009), and drug use (Ilgen, McKellar, & Tiet, 2005; Greenfield, Venner, Kelly, Slaymaker, & Bryan, 2012). Temptation, specifically, has been shown to predict relapse (Gokbayrak, Paiva, Blissmer, & Prochaska, 2015). Carbonari and DiClemente (2000), using data from Project MATCH, compared individuals who were abstinent, drinking moderately, and drinking heavily one-year post-treatment on TTM constructs at two time points (baseline and end of treatment). The abstinent group showed the greatest change in the magnitude of temptation and confidence from pre- to post-treatment and the

greatest difference between confidence and temptation at post-treatment. The heavy drinking group consistently demonstrated a negative shift from pre- to post-treatment such that temptation exceeded confidence by a larger magnitude at the end of treatment.

While these studies show that temptation and confidence are important pieces of the TTM profile, Shaw and DiClemente (2016) further demonstrated the importance of confidence and temptation in predicting relapse, to alcohol use specifically. Investigators computed a Temptation minus Confidence score from the Alcohol Abstinence Self-Efficacy Scale, which was used to predict two alcohol use-related outcomes (time to first drink and number of drinks on first drinking day) among 627 participants from Project MATCH who relapsed after achieving a period of abstinence after treatment. Results showed that the Temptation minus Confidence score predicted both alcohol use outcomes during a one-year follow-up period. Taken together, these studies show that temptation and confidence are both important in the change process and predict substance use-related outcomes.

There is limited research on self-efficacy for opioid use behavior in particular. One study conducted by Majer and colleagues (2015) investigated both abstinence self-efficacy and abstinence social support among a sample of 270 adults recruited from inpatient treatment centers, with a history of using heroin/opioids (41.4%), cocaine (27.8%), alcohol (12.8%), polysubstance use (11.3%), and cannabis (6.4%). This study demonstrated a significant negative relation between substance use behavior and abstinence self-efficacy. Investigators found a group difference in abstinence self-efficacy between those categorized as low psychiatric severity compared to high psychiatric severity, such that those with high psychiatric severity had lower abstinence self-efficacy. Overall, self-efficacy has been consistently shown to be important throughout the stages, and particularly in the later stages of change. Given that the

current study will focus on individuals in the action stage of change, self-efficacy will be investigated.

Decisional balance. The decisional balance, originally conceptualized by Janis & Mann (1977), is the individual's personal reasons for or against making a behavior change (i.e., the pros and cons of change). This marker is indicative of the decision-making process of the contemplation stage in which an individual has to work through their ambivalence and ultimately decide that the pros outweigh the cons of change either in number or value. Therefore, the decisional balance is a strong indicator of stage movement for the earlier stages of change (Prochaska et al., 1994). This will not be a focus of the current study, given that it is most salient in the pre-action stages.

In summary, the TTM provides a comprehensive model to conceptualize the change process in opioid recovery. It highlights the processes of change and markers of change that are most relevant in the action stage of change, which will be one of the primary foci of the current study.

Contextual Factors of Recovery

The review of the proposed definitions of recovery revealed the following contextual factors involved in recovery: maintained abstinence, improved health (reduced health pathology and improved quality of life), and community integration (reduced substance related problems/antisocial behaviors and improved pro-social behaviors). Each of these contextual factors is multidimensional and described below and the rationale for each is also presented.

Abstinence. Many questions regarding abstinence arose in the development of a definition for recovery. First, is abstinence from one's drug of choice necessary? There is substantial literature to suggest that abstinence is more effective than moderated sustained use in

resolving problematic use. Many studies have demonstrated that moderation leads to more relapses or “failed remission attempts” as compared to abstinence (Burman, 1997; Maisto et al., 2002; McLellan et al., 2005). Ilgen and colleagues (2008) conducted a study of individuals who sought help for an alcohol use disorder and recorded their use at one-year, eight-years, and 16-years after intake. At the one-year follow-up the participants were grouped into three categories based on their alcohol use in the last year: abstinence (36%), non-problem drinking (16%), and problem drinking (48%). Results showed that of those individuals in the abstinence group at one-year follow-up, 77% reported positive outcomes (either non-problem drinking or abstinence) throughout the follow-up period; whereas, of those individuals in the non-problem drinking group at the one-year follow-up, 48% reported positive outcomes throughout the follow-up period. Comparably, of those who reported problematic alcohol use at one-year follow-up, 43% reported positive outcomes over the follow-up period. Overall, those individuals who reported non-problematic use and those individuals who reported problematic use one-year after intake had similar rates of positive outcomes over the following 15 years. Those individuals who reported one-year of abstinence after intake had substantially higher rates of positive outcomes in the following 15-year period. It follows that while moderated use may be possible for some individuals who suffer from SUD, it is recommended to follow a substantial period of abstinence and may not be attainable for most people.

Second, is abstinence from all drugs of abuse necessary? Laudet (2008) investigated the experiences of former substance users (individuals who had a severe history of DSM-IV dependence to crack or heroin), specifically asking the question, what does recovery mean to persons engaged in that process? Participants in this study were 289 individuals who had a severe history of dependence (as defined by the DSM-IV) to crack or heroin that had lasted, on

average, 18.7 years. All participants had been abstinent from illicit drugs for, on average, 31 months upon entry to the study. Each participant was asked to choose one of the following responses that best describes their personal definition of recovery: 1) moderate/controlled use of any drugs and alcohol, 2) no use of drug of choice/some use of other drugs and alcohol, 3) no use of any including marijuana) and some use of alcohol, and 4) no use of any drug or alcohol. Of the 289 participants, 86.5% endorsed total abstinence as their personal definition of recovery. Additionally, even among those who did not indicate that abstinence was critical to their definition of recovery, they indicated that abstaining from mood-altering substances is a pre-requisite to experience the other benefits of recovery. However, some individuals in recovery did indicate that partial abstinence (i.e., abstinence from drug of choice but not all illicit drugs) was their definition of recovery. Additionally, there is evidence to suggest that some individuals choose to gradually reduce their use of drugs of abuse, as compared to stopping all drugs at once (Bacchus, Strange, & Watson, 2000). For inclusivity, individuals in the current study may be abstinent from all illicit drugs or only opioids.

What about individuals who have lapsed? Various gradations of success have been conceptualized in recovery research: from complete abstinence, essential abstinence, shifted from clinical to subclinical use, to clinical use but lower problem severity. Essential abstinence is defined as “low volume of consumption on rare occasions that result in no measurable problems” (White, 2007, p. 231). Therefore, for the current study, individuals who have achieved essential abstinence, defined as achieving abstinence but experiencing a slip (not a lapse or relapse), and complete abstinence will be included.

Does use of medication constitute abstinence? Betty Ford Institute Consensus Panel addressed this question and concluded that medication to aid in one’s recovery is one method

through which individuals seek recovery and should be included in our definition of recovery. There is still some resistance towards prescription psychoactive medications and medications specifically used to assist in the recovery process (e.g., methadone, buprenorphine). More individuals have been presenting to SUD treatment and recovery organizations with co-occurring disorders for which psychiatric medications are necessary (White, 2007). Additionally, the use of medications specifically to aid in recovery from opioids has been increasing in recent years as their efficacy has been elucidated and promoted (Andrews et al., 2014). For the current study, individuals will not be excluded for being on prescription psychoactive medications and individuals both using and not using medications to aid in their recovery will be included (which will be reviewed in more detail in the Medication Assisted Recovery section).

Health. In the above review of recovery definitions, health was supposed to include not only a reduction or absence in an individual's health pathology but also the enhancement of quality of life. Quality of life is an individuals' subjective satisfaction with various aspects of their life (De Maeyer et al., 2010). In conjunction with the evolution of the concept of recovery, several prominent health organizations elaborated on their definitions of health for chronic disorders. The World Health Organization (WHO) defined health as, "a state of complete physical, mental, and social well-being, not merely the absence of disease" (WHO, 2016). The National Institutes of Health indicated three major domains of health: physical health (including functional symptoms), psychological health (emotional distress, cognitive, and psychological functioning), and social health (role participation and social support) (el-Guebaly, 2012). Therefore, both health pathology and quality of life are multidimensional constructs including physical, psychological, and social health domains. While these two concepts are related, they are distinct (De Maeyer et al., 2010). For example, quality of life has been shown to increase as

duration of abstinence increases, while distress decreases over time (Laudet, 2008). Higher levels of quality of life have been shown to relate to sustained abstinence from both drug and alcohol use after one to two years (Laudet, 2008). While, higher levels of stress, distress, and negative emotions are associated with relapse (Laudet & Humphreys, 2013; Laudet, 2008). Therefore, the current study will include both constructs and each will be reviewed below.

Health pathology. There is extensive literature researching health pathology among individuals with a SUD and an OUD specifically. White and colleagues (2013) found that individuals who identified as being in recovery reported worse health pathology (more health-related problems, barriers to health care, risk behaviors associated with chronic health problems) compared to individuals with no history of alcohol or drugs. De Maeyers and colleagues (2010) conducted a review of 38 articles examining health in opioid-dependent populations. At the start of and during opioid-substitution medication treatment, opioid-dependent individuals have poorer health pathology (measured using the Short Form Survey- 36), compared with the general population and other comparison groups (medical and psychiatric), in the domains of general health, social functioning, physical health, mental health, and role limitations (Deering et al., 2004; Millson et al., 2004; O'Brien et al., 2006). Two of the studies reviewed compared the health pathology of opioid-dependent individuals to those with minor medical problems, major medical problems, and psychiatric problems (Ryan & White, 1996; Millson et al., 2004). These studies showed that opioid-dependent individuals have better physical functioning than the three comparison groups. Compared to the group with psychiatric problems, the opioid-dependent individuals had similar health profiles except worse general health and social functioning (Ryan & White, 1996); it has been suggested that this may be due to high prevalence of comorbid psychiatric problems in opioid-dependent populations (De Maeyer et al., 2010).

De Maeyer and colleagues (2010) also reviewed 16 longitudinal studies that compared the medium and long-term effects after opioid-substitution medication treatment on health pathology and quality of life. Overall, these studies showed that at admission to treatment participants demonstrated high levels of health pathology (measured by the Short Form Survey - 36) (Habrat, Chmielewska, Baran-Furga, Keszycska, & Taracha, 2002; Millson et al., 2006), including emotional problems and health problems (poor sleep); then during the first months of treatment, among those retained in methadone maintenance therapy, there were improvements on multiple domains of health pathology (measured by the Nottingham health profile), most strongly in mental health status (Torrens et al., 1997). The improvements documented in opioid-dependent individuals in medication treatment were comparable or even more substantial than individuals treated with maintenance medication for other chronic illnesses (e.g., diabetes, schizophrenia). Finally, after the initial improvements in health pathology in the first few months of treatment, studies showed that as individuals are retained in opioid-substitution medication treatment health pathology remained stable (measured by the Nottingham health profile) (Torrens et al., 1997) or showed slight decline (not to pre-treatment levels) (measured by Short Form Survey-36) (Habrat et al., 2002).

Quality of life (QOL). Since 2000 there has been an increasing attention in the addiction field to the construct of QOL (De Maeyer et al., 2010). Studies investigating the QOL of opioid-dependent individuals have shown worse QOL than that of a control group or the general population (De Maeyer et al., 2010), specifically at admission to medication treatment (measured by subjective quality of life profile) (Dazord et al., 1998). White and colleagues (2013) found that individuals who identified as being in recovery reported worse quality of life (less perceived connection to family, neighborhood, and community life), compared to individuals with no

history of alcohol or drugs. Consistent with the pattern documented for health pathology, there is evidence for QOL in various life domains improving in the first few months of treatment (measured by self-developed instrument of generic quality of life (Reno & Aiken, 1993) followed by subsequent stabilization (measured by WHO-QOL BRref) (Lawrinson et al., 2008) or regression but not to pre-treatment levels (measured by the Lancashire QOL profile) (Giacomuzzi et al., 2005).

Specifically, Dazord and colleagues (1998) conducted a study in Geneva of individuals who initiated medication treatment (Methadone). Results showed low scores for QOL (measured by Subjective Quality of Life Profile) at the start of medication treatment and subsequent improvement after 12 months, specifically on the “health,” “worries,” “material conditions,” and “money” domains. Padaiga and colleagues (2007) conducted a study among opioid-dependent individuals who initiated medication treatment (Methadone) for the first time and found similar results for QOL (measured by WHOQOL-BREF) after 6 months. Vignau and Brunelle (1998) found similar positive QOL (measured by TEAQV) outcomes for individuals in medication treatment (buprenorphine) prescribed by a general practitioner (n=32) and by a specialized addiction agency (n=37) after three months. Individuals in this study attained QOL that was comparable to their QOL before using heroin and improvements were found in “family relationships,” “occupational status,” and “physical fitness.”

Overall, individuals who have suffered from an OUD have worse health (greater health pathology and lower QOL) compared to the general population, across multiple domains. However, it is clear that as individuals progress in their recovery, their health improves. Promotion of reduction in health pathology and improvement of QOL is particularly important as it is related to sustaining abstinence and recovery.

Community integration. Community integration includes both decreases in problem behavior (i.e., substance-related consequences) as well as increases in pro-social meaningful activities. There have been several studies suggesting that increased engagement in the community, engagement in meaningful activities, and an active social network that is supportive of recovery is necessary for successful recovery (Best, et al., 2011; Hibbert & Best, 2011). For the current study, the pro-social component of community integration will be conceptualized as social recovery capital and the anti-social component of community integration will be conceptualized as substance-related problems.

Social recovery capital (pro-social behavior). Recovery capital is defined as the amount and quality of internal and external resources individuals draw upon to sustain their recovery (Cloud & Granfield, 2001; Granfield & Cloud, 1999; Best et al., 2012; Neale & Stevenson, 2015). Granfield and Cloud (2001) proposed the concept of recovery capital, building upon the concept of social capital. The two primary domains of recovery capital are social recovery capital and personal recovery capital. Social recovery capital includes the benefits related to social group membership, supportive family relationships, access to resources in community, emotional social supports, and pro-social motivation and engagement that supports recovery (Mawson, Best, Dingle, & Lubman, 2015). Personal recovery capital refers to the internal resources and skills that support recovery such as education, physical and psychological health, material resources, coping skills, sense of meaning and purpose, and self-efficacy (Mawson et al., 2015). Both domains impact an individual's recovery process in a dynamic manner; some research shows that social recovery capital may moderate personal recovery capital such that high social recovery capital mitigates the negative effects of low personal recovery capital

(Mawson et al., 2015). The domain of social recovery capital is most relevant in understanding community integration and, therefore, of primary interest in the current study.

Neal and Stevenson (2015) investigated recovery capital among individuals who were homeless and were current drug and alcohol users. Specifically, semi-structured interviews were conducted with 30 individuals who reported current alcohol or drug problems that were recruited from three hostels in England. Follow-up interviews were conducted with 22 of the 30 residents four to six weeks later. Participants reported small network sizes (mean of eight people at interview one and seven people at interview two). Despite the small size of the social networks reported, hostel residents also reported the presence of social capital; participants reported their relationships as sources of practical and emotional support, protection, companionship, and love. Additionally, the residents reported having people in their lives who would cook for them, take care of their possessions, loan them material resource, look after their children, provide them with housing, and encourage them to address their alcohol and substance use problems. Alongside social capital, residents reported having interpersonal relations that were negative such as difficult family backgrounds, relationship conflicts, loss, drinking and drug use, mental health problems, and reasons for distrust. This qualitative study revealed that while individuals struggling with homelessness and substance use problems may have small social networks and negative interpersonal relations, they also reported strong social capital. This points to the importance of a strengths-based approach in samples struggling with substance use problems; recovery capital and specifically social recovery capital adds to our understanding of the recovery process above and beyond what social difficulties alone might explain.

The research on recovery capital is in its infancy, however there is literature suggesting that recovery capital promotes the recovery process and relates to desired recovery outcomes

(e.g., abstinence, quality of life). It has been asserted that after multiple interventions and a sufficient amount of recovery capital are accumulated then there is a shift towards stable recovery (Dennis et al., 2005). Granfield and Cloud (2001) conducted semi-structured interviews with individuals (n=46) who identified as being formerly dependent (abstinent for one year at least) on alcohol and drugs and did not seek treatment or participate in self-help groups in seeking recovery. Of the study participants, 25 reported having had alcohol use problems, whereas 21 reported having had drug use problems (i.e., powder cocaine, “crack” cocaine, methamphetamines, and heroin). Results of this study led investigators to conclude that individuals who have high recovery capital are better equipped for recovery, both for sustaining abstinence and attaining improved quality of life. Additionally, investigators indicated that those individuals who attain success in recovery without treatment or self-help groups might have higher recovery capital.

Mawson and colleagues (2015) sought to examine the relation of social networks, recovery capital, and quality of life. The participants of this study were emerging adults (18 to 21-years old) in residential treatment for SUD for an average of 19 days, mostly recruited from short-term detoxification treatment. The primary substances of abuse were mainly alcohol, cannabis, and amphetamines. Results of the study showed that higher levels of substance use in social networks was significantly related to lower personal and social recovery capital. Additionally, each of the QOL domains to be assessed in the current study (psychological, physical, social, and environment) was significantly related to social recovery capital.

Overall, recovery capital, and social recovery capital in particular, captures the community integration construct purported to be integral to the context and experience of recovery. While the research on this construct as it relates to addiction is limited, early studies

suggest that social recovery capital supports the recovery process and may be higher among individuals who attain success in recovery without formal treatment.

Substance-related problems (anti-social behaviors). There is substantial literature documenting a significant positive relation between substance use and substance related problems, specifically among opioid users (Rosen, Hunsaker, Albert, Cornelius, & Reynolds, 2011). Most relevant to the current study, evidence shows that as individuals with a SUD decrease or stop using substances their level of substance-related consequences decreases (Blomqvist, 2002).

Teesson and colleagues (2015) conducted a large-scale, naturalistic, prospective study of heroin dependence. The sample consisted of 615 individuals diagnosed with heroin dependence, who were part of the Australian Treatment Outcome Study (ATOS). In the ATOS, participants were 825 individuals who used heroin who were entering methadone or buprenorphine maintenance treatment, entering detoxification, entering drug-free residential rehabilitation, or not in treatment. Of the original ATOS sample, 431 participants were recruited between 2001 and 2002 and had 11-year follow-up data and thus deemed eligible for the study. Results of this study showed that 98.7% had used heroin in the last month at baseline and only 24.8% had used heroin in the last month at the 11-year follow-up. Additionally, results showed that this documented reduction in current heroin use was related to reductions in risk-taking behavior, crime, injection related health consequences, and improvements in general physical and mental health.

Feelemyer and colleagues (2014) conducted a review of QOL and addiction severity in individuals who were using opioid-substitution medications to aid in their recovery. This review specifically looked at addiction severity measured by the Addiction Severity Index, which

assesses seven problem areas related to drugs (employment, drug use, alcohol use, legal status, family/social status, and psychiatric status). Investigators discussed that many studies have been conducted in high-income countries and have revealed that among individuals who begin using opioid-substitution medications there are changes in ASI scores in several of the seven problem areas (Brown, Myers, Mott, & Vik, 1993; Kakko, Svanborg, Kreek, & Heilig, 2003). This review focused on studies that have been conducted in middle- and low-income countries, specifically 13 different studies from five different countries. There were a total of four studies reviewed that investigated changes in ASI scores longitudinally after initiating medication therapy (methadone or buprenorphine), which were conducted in Ukraine and China. In these studies, there were relatively low levels of addiction severity (including consequences of addiction), across the ASI domains, at baseline. After six to 12 months of the medication therapy, all domains remained at the same low levels or decreased over time (representing clinical improvements). Specifically, changes after initiation of opioid substitution medication were found in the drug, psychological, legal, and family domains but not alcohol, medical, and employment.

Overall, substance abuse-related problems (e.g., unemployment, criminal activity, interpersonal difficulties) are higher among individuals who suffer with an OUD but decrease as individuals progress in their recovery. Therefore, it would be expected that pro-social activities increase and antisocial activities decrease as individuals attain some success in the recovery process.

In summary, the multiple contextual factors related to recovery that will be of focus in the current study are health pathology, QOL, social recovery capital, and substance-related

problems. Each of these factors have been shown to be indicators of progress in recovery and important to sustained recovery.

Multiple Pathways to Recovery: Medication Assisted Recovery

It is clear that recovery is an ongoing process for which individuals traverse many different pathways to achieve recovery. The focus of the current study will be individuals who have achieved initial success in their opioid recovery through various pathways, including recovery that is assisted by opioid-substitution medications. Medication assisted recovery (MAR) refers to recovery from a SUD accompanied by legal prescription medications aimed to assist that recovery process. There are multiple objectives of MAR: increase treatment retention throughout the recovery process, manage acute withdrawal during detoxification, attenuate cravings to use drugs during initial recovery, and prevent relapse to sustain recovery (Douaihy, Kelly, & Sullivan, 2013). Of particular interest for the current study is MAR for initial recovery and relapse prevention. While MAR for detoxification is important, as it can help alleviate withdrawal symptoms and break the cycle of using to curb withdrawal, MAR for detoxification alone has limited long-term effectiveness and is associated with relapse (Sigmon et al., 2012; Bart, 2012). Neurobiological changes in brain pathways arise from repeated use of opioids and these changes do not disappear immediately following detoxification (Wesson & Smith, 2010). Therefore, although detoxification may be necessary, it is not sufficient for recovery. Since the goal of MAR for detoxification is different from the goal of MAR for initial recovery and relapse prevention, the current study will only focus on the later.

Overview of medication types. There are two types of opioid-substitution medication options of focus in the current study, as they are the most widely used. Each of the two most widely used medications for MAR has a different mechanism of action: full agonists and partial

agonists. Full agonists bind to the opioid mu receptors and activate these receptors to their maximum effect in a dose dependent manner. Once the agonists occupy all opioid receptors a response plateau is reached additional doses will not have an effect. When all mu receptors are occupied then continued use could lead to respiratory depression and overdose. Most opioid drugs of abuse (heroin, oxycodone) are full agonists, as is one of the major opioid-substitution medications used for recovery, methadone. While methadone mirrors the action of heroin, the pharmacological kinetic profiles are different; methadone is longer acting meaning that the dose response is flatter and elongated, such that the person experiences less of an initial peak of opiate activity and a slower decrease in activity over time, compared to heroin (Bart, 2012). Partial agonists bind to the same receptors as the full agonists (mu receptors) and have the same dose-dependent action at low doses. However, at high doses these medications exhibit a ceiling effect, as the receptor activation will no longer increase proportionally with the dose. These medications do not activate the mu receptor to its full potential. The medication, buprenorphine, is a partial opiate agonist at the mu receptor (Bart, 2012). Both of these classes of opioid-substitution medications will be discussed below. For each medication considerations for clinical use are discussed and a review of the literature on the medication's efficacy is conducted.

Methadone.

Considerations for use. Methadone can be used throughout the recovery process (McClellan et al., 2006). The goal for MAR with methadone is to first find a dosage that prevents craving and curbs withdrawal but does not produce an associated high (Douiahy et al., 2013). There is addictive potential with methadone and it has its own associated lengthy and difficult withdrawal, can be fatal, and can be bought and sold illegally (Douiahy et al., 2013). Methadone must be delivered in methadone specialty clinics initially and only after an

established pattern of using it as prescribed is take-home dosing considered. Within these specialty clinics there are typically psychosocial services (e.g., counseling, psychiatric services) mandated alongside methadone administration (Gryczynski, Schwartz, O'Grady, & Jaffe, 2009).

Efficacy. Methadone is the most widely studied of the medications available for opioid MAR. Methadone is used in two ways: methadone-assisted detoxification and methadone maintenance. Methadone assisted detoxification involves the use of methadone to ease the experience of withdrawal during the detoxification phase of treatment. Methadone maintenance involves long-term methadone use and is typically prescribed alongside counseling, case management, medical and other psychosocial services (Erdelyan & Young, 2009). The focus of the current review will be on methadone maintenance, as this will be the focus of the current study.

A recent Cochrane review deemed methadone-maintenance efficacious for multiple outcomes relevant to MAR treatment goals: treatment retention, heroin use, criminal activity, and mortality (Mattick, Breen, Kimber, & Davoli, 2009). In this review, 11 randomized controlled trials of the methadone medication were included with a total of 1,969 participants. These participants were primarily male, 30-40 years old, majority unemployed and unmarried, and typically poly-drug users. The study period varied for each study but generally was at least several weeks up to two years, with the shortest study period of 45 days. Results showed that methadone maintenance demonstrated a superior retention rate compared to control conditions (seven studies and 1,287 participants). This finding was confirmed when analyzing the four most recent studies (n=750), such that there were documented higher levels of retention in the methadone maintenance group (RR= 4.44, 95% CI:3.26-2.04). In these four more recent studies, the rate of retention was 154 per 1000 in the no methadone group and 684 per 1000 in the

methadone group. Heroin use was measured in two different ways: urine/hair analysis and/or self-reported use. Of the total 11 studies (n=1129), six conducted urine/hair analysis. Results from these studies showed less risk of heroin use in the methadone maintenance groups compared to control conditions (RR = 0.66, 95% CI 0.56-0.78). The majority of the reviewed studies that included assessment of self-reported use were consistent with the studies using urine/hair analysis: five of the six studies that assessed self-reported use showed that the methadone maintenance group had less risk of use compared to control. There was one study that was not consistent, showing no difference between these groups on self-reported heroin use (i.e., Gruber, Delucchi, Kielstein, & Batki, 2008). The results from three studies with 363 participants were examined for differences in criminal activity, showing no significant differences between those in methadone maintenance and other groups. Finally, four studies with 576 participants showed a trend for mortality such that the risk of mortality among those in methadone maintenance was less than other groups (RR=0.48, 95% CI: 0.10-2.39). While this Cochrane review did not show statistically significant differences for the superiority of methadone maintenance for reduction in negative consequences of heroin use (criminal activity and mortality), other reviews have demonstrated such. Evidence has shown that the use of methadone is related to decreases in criminal activity, reduction in HIV and Hepatitis C, and improved psychosocial functioning (Douaihy, Kelly, & Sullivan, 2013). Separate reviews reported that methadone maintenance treatment reduced needle sharing (Gowing, Farrell, Bornemann, Sullivan, & Ali 2004) and HIV contraction (Ward, Mattick, & Hall, 1998).

The reviewed evidence strongly supports the efficacy of methadone maintenance for treatment retention and reduction of heroin use but there are some important limitations to note (Mattick, et al., 2009). Firstly, the doses of methadone reported in the studies included in the

Cochrane review are typically high doses as this is recommended for a maintenance dose (60-80mg of methadone and 12-16mg of buprenorphine). In the past, the dose used in the field was less than the recommended dose, however this has shifted such that the majority of patients are receiving the recommended dose (D'Aunno, Pollack, Frimpong, & Wuchiett, 2014). This highlights the importance of assessing the dose of medication in the current study. Secondly, the conditions compared to methadone maintenance varied from placebo medication, withdrawal or detoxification (that was or was not medically assisted), drug-free rehabilitation treatment (e.g., therapeutic communities), and waitlist controls/no treatment. This could be interpreted as further strength of the evidence base for methadone maintenance as in comparison to all these groups; the 11 studies reviewed demonstrated significant benefits from methadone maintenance treatment. However, generalizability of this evidence is not clear as methadone maintenance is rarely used alone as a recovery tool, instead individuals typically will engage in multiple services across the recovery process (e.g., use some form of assisted detoxification and engage in therapeutic communities after inpatient treatment). Therefore, in clinical practice, the picture is much more complex. Thirdly, methadone maintenance treatment is typically accompanied by additional psychosocial services. In the studies included in the Cochrane review the accompanying services varied so it is not clear if and how this confounded the results. Fourthly, the length of methadone maintenance varied between studies, ranging from 45 days to two years. Therefore, the recommended or proscribed length of time for which methadone maintenance should be assessed is not clear and points to a larger murkiness in the field regarding whether how and when to discontinue methadone maintenance. All in all, the evidence base for methadone-assisted detoxification and methadone maintenance indicate that it is helpful in achieving the goals of treatment across treatment phases.

Buprenorphine.

Considerations for Use. Buprenorphine is also considered useful throughout the process of recovery (Douiahey et al., 2013). Buprenorphine prescription does not necessitate visiting a specialty clinic but instead a doctor with a specialized certification. Buprenorphine also has an abuse potential but has a lower risk of overdose compared to methadone and an easier withdrawal. In order to mitigate the potential for abuse of buprenorphine another drug was developed that combined buprenorphine with naloxone (Suboxone). While the primary effect of Suboxone is to bind to the opioid receptors, acting as a partial agonist, if Suboxone is injected or used intra-nasally then the effect of the buprenorphine is negated due to the naloxone (opioid antagonist); Suboxone a safer alternative to methadone. (Douaihy et al., 2013; Wesson & Smith, 2010)

Efficacy. Similar to methadone, buprenorphine is used in two ways: buprenorphine-assisted detoxification and buprenorphine maintenance. Therefore, again, the literature only pertaining to buprenorphine's efficacy for buprenorphine maintenance is reviewed here, as it is the focus of the current study. Of note, the use of buprenorphine has increased in the last 10 years or so; one study suggests that among a nationally representative sample of opioid treatment programs, between 2005 and 2011, the rate of buprenorphine use for detoxification has increased 24% and for maintenance has increased 47% (Andrews et al., 2014).

There is substantial literature investigating the efficacy of buprenorphine-maintenance. Mattick and colleagues (2014) conducted a Cochrane review, comparing buprenorphine maintenance with placebo, as well as buprenorphine maintenance to methadone maintenance. Authors reviewed 31 studies including 5,430 participants. Participants were majority male, heroin-dependent, around 30 years old, with varied treatment history and other drug use. The

buprenorphine maintenance administration lasted between two weeks and 52 weeks. There were 11 studies comparing buprenorphine maintenance and a placebo. Authors concluded from this comparison that there was high quality evidence to show the buprenorphine is superior to placebo for retention (defined as number of participants still in treatment at the end of the study) at all dose levels: low doses of 2-6 mg (5 studies, n=1131, RR = 1.50), medium doses of 7-15 mg (4 studies, n=887, RR = 1.74), and high doses of greater than 16 mg (5 studies, n=1001, RR =1.82). Additionally, across these 11 studies, illicit opioid use was examined. Results showed that high-dose buprenorphine was more effective than placebo in suppressing illicit opioid use (3 studies, n=729, standardized mean difference = -1.17), whereas medium doses did not suppress illicit opioid use compared to the placebo.

While there is strong evidence demonstrating the efficacy of buprenorphine maintenance there are limitations in the studies reviewed. The results of the Cochrane review described above show evidence that buprenorphine is efficacious for treatment retention compared to placebo but may only be efficacious at reducing illicit drugs at high-doses. (Mattick et al., 2014)

Challenges. Taking into account both the considerations for use and evidence base for each medication option for opioid MAR several challenges arise. Firstly, the addiction potential of some of the medications present a significant challenge to the widespread use and acceptance of MAR. Both the full and partial agonist medications (methadone and buprenorphine) have addiction potential. Along with the addiction potential comes the potential for their black-market distribution. There are several first-hand accounts of clients in substance abuse treatment having experience buying medications off the streets or selling their prescribed opioid agonist medications for money (Fishman, 2014).

Secondly, the availability of these medications is a concern. For example, Andrews and colleagues (2014) discussed the adoption of evidence-based buprenorphine among opioid treatment programs. While authors did highlight that the use of buprenorphine for detoxification and maintenance increased between 2005 and 2011, they point out barriers to adoption. The use of buprenorphine was more common in programs that rely on private insurance. The use of buprenorphine also depended on the level of state subsidies available to cover the cost of this medication. Therefore, in addition to the evidence, the decision of treatment programs to adopt certain evidence-based techniques (i.e., buprenorphine) depends on financial factors.

Thirdly, there is limited literature investigating when or how methadone or buprenorphine can be discontinued after sustained remission from opioids of abuse (Dakwar & Kleber, 2015). It has been shown that among individuals who taper off opioid-substitution medications there are high rates of return to problematic use (Bart, 2012). There have been initial attempts to study methods of discontinuation from methadone (Camarasa et al., 2007) and buprenorphine (Dakwar & Kleber, 2015), specifically using naltrexone-assisted discontinuation. Camarasa and colleagues (2007) conducted a pilot study investigating naltrexone-assisted rapid methadone discontinuation. This pilot study investigated a three-day detoxification procedure along with naltrexone to speed up the process in ten individuals on methadone maintenance. Authors reported that there was a shortened withdrawal syndrome but also a reappearance of some withdrawal symptoms after two days. Similarly, Dakwar and Kleber (2015) investigated the efficacy of naltrexone in facilitating discontinuation from buprenorphine among six individuals; all participants had achieved sustained full remission from opioids of abuse and had begun to taper off buprenorphine but had been unable to stop altogether. All participants received supervised buprenorphine discontinuation, oral naltrexone titration, and administration

of a long-acting injected naltrexone. Participants were then tracked for five weeks after the injected naltrexone and assessed at a six-month follow-up. Results showed that all participants tolerated the procedure well and were able to sustain their abstinence from opioids over the study period. Notably, participants did not experience any noticeable increase in their subjective withdrawal. Both these studies demonstrate that naltrexone may be a viable method of aiding individuals in discontinuing opioid-substitution therapies and additional research is warranted. However, there remains limited understanding of when individuals can begin considering discontinuation of opioid-substitution therapies. Overall, more research on discontinuation is crucial.

Finally, there are concerns regarding overdose associated with methadone and with illegal usage associated with both methadone and buprenorphine. The relative importance of using effective medications has to be weighed with the associated risks. This is an individual challenge and a societal challenge.

In summary, evidence demonstrates the efficacy of methadone- and buprenorphine-assisted maintenance medications. It is clear that both medications can support an individual in their recovery process. The current study will focus on comparing the recovery experience of those individuals taking methadone and buprenorphine compared to those who do not currently use medications. The available literature on comparing these recovery pathways will be reviewed below.

Comparison across Pathways of Recovery: Methadone, Buprenorphine, No Medication

The current study will compare among individuals in the action stage who are using methadone, who are using buprenorphine, and who are not currently using medication across variables relevant to their change process and the contextual factors of recovery.

Descriptive characteristics. Before presenting evidence comparing the change process and contextual factors related to recovery among individuals in the various pathways of recovery investigated in the current study, the characteristics of individuals who choose each pathway is reviewed. There are several characteristics that have been identified in the literature that are relevant to group membership and recovery. The most commonly cited characteristics that might distinguish the various recovery pathways are sociodemographic, drug use-related (other drug use and drug use history), and mental and physical health-related variables (De Maeyers et al., 2010). These constructs (sociodemographic, drug-use related, mental and physical health-related variables) are relevant to recovery; each measured pre-treatment has been shown to predict recovery outcomes, such as retention in medication treatment, opioid use, and other illicit drug use (Marsch et al., 2005).

The Australian Treatment Outcome Study (ATOS) compared 825 individuals upon entrance for different types of treatment (Teesson et al., 2015). Specifically, 277 were entering methadone or buprenorphine maintenance treatment, 288 were entering detoxification, 180 were entering drug-free residential rehabilitation, and 80 were not in treatment (Ross et al., 2005). Overall participants had a mean age of 29.5 years, were 65% male, and had completed on average 10 years of secondary education. Of all participants, 41% had a prison history, 50% reported social security as their primary source of income, 21% reported criminal activity as their primary source of income, and 17% had a job with income wage/salary as their primary source of income. The majority of the sample reported past 30-day criminal activity (55%), reported injection related health problems (74%), reported history of heroin overdose (58%), and met criteria for antisocial personality disorder (72%). Smaller portions of the sample reported severe psychological distress (49%), current major depression (28%), history of a suicide attempt

(37%), and lifetime history of PTSD (42%), as well as screened positive for borderline personality disorder (47%). There were notable differences between the individuals entering methadone or buprenorphine maintenance treatment and those who were not in treatment; the no treatment group revealed a higher percentage of males, more past 30-day drug use, lower frequency of past month criminal activity, and less psychological distress. Interestingly, there were no differences found between the methadone or buprenorphine maintenance treatment group and the no treatment group on income, age of first drug use, length of time using heroin, physical health status, and psychiatric diagnoses. Importantly, females had worse physical and psychological health (more pathology), more distress, higher frequency of suicide attempts in last year, more likely to have a diagnosis of PTSD, more likely to be depressed; males were more likely to have an antisocial personality disorder diagnosis.

Maremmani and colleagues (2007) compared the effects of methadone and buprenorphine among 213 patients in long-term OUD treatment across several outcomes: retention in treatment, urine-drug testing results, psychiatric status, social adjustment, and quality of life. Individuals enrolled in the study after their third month of treatment and remained in the study until their 12th month of treatment. At the beginning of treatment individuals were compared across several demographics: there were more males and fewer unemployed participants in the buprenorphine group and no differences between the groups for age, education, marital status, and welfare benefits. Additionally, at the beginning of treatment individuals in the buprenorphine group had a less severe health profile, such that they had fewer physical complications, less psychopathology, fewer job problems, less severity of illness, and lower severity of problems in relationships. There was no difference in other contributing factors between the groups in rates of HIV or AIDS, family problems, legal problems, or

indicators of severity of use (age of first use, number of substances abused, frequency of use of heroin, duration of addiction, number of previous treatment episodes, age of first treatment, and presence of associated treatments).

Overall, comparisons between individuals who are using methadone, buprenorphine, and no medication reveal that there are differences on sociodemographic, drug use-related, and other health-related variables. Overall, individuals that do not use medications may have less psychological distress compared to those who use medications (Ross et al., 2015; Teesson et al., 2015) and individuals who use buprenorphine may have less severe health problems (physical, psychological, and social) compared to those who are using methadone (Maremmani et al., 2007). In the current study, the participants in each group will be characterized and compared on sociodemographic, drug-use related variables, and mental and physical health-related variables as these had been shown to distinguish these groups in past literature (Teesson et al., 2015; Maremmani et al., 2007) and have been shown to be important to recovery outcomes (Marsch et al., 2005).

Stigma. In addition to the sociodemographics and health-related variables reviewed, stigma emerged as an important consideration in the discussion of using opioid agonist medication (methadone or buprenorphine) or no opioid medication. Individuals suffering with an OUD report significant self- and perceived-stigma related to their OUD (Bozinoff, Anderson, Bailey, & Stein, 2018). There is also discussion of the profound impact of stigma targeted at individuals seeking opioid agonist treatment (Olsen & Sharfstein, 2014). Therefore, among individual with an OUD disorder, those seeking opioid agonist treatment may experience compounded stigma. Stigma has been cited as a barrier to opioid agonist treatment, impeding access and retention (Olsen & Sharfstein, 2014; Wakeman & Rich, 2008; McElrath & Joseph,

2017). The source of such stigma cited is varied: friends and family, coworkers, employers, the general public, government officials, health insurers, clinicians, and recovery communities such as Narcotics Anonymous (NA) and other psychosocial treatment programs (Olsen & Sharfstein, 2014; Wakeman & Rich, 2008; Earnshaw, Smith, & Copenhaver, 2013). Systemic barriers were noted as contributing to the stigma related to opioid agonist treatment, such as treatment program restrictions on opioid agonist treatment use, certain chapters of Narcotics Anonymous' exclusion of individuals on opioid agonist treatment from positions of leadership or from attendance, separation of opioid medication treatment from the rest of health care treatment (perhaps more stark for methadone clinics but still true for buprenorphine), and the lack of access to these medications in the criminal justice system (Olsen & Sharfstein, 2014). Overall, individuals with an OUD experience self- and perceived stigma, and in addition there is a reported additional burden of stigma on individuals who choose to use opioid medications. This literature suggests that stigma is part of the experience for individuals in their early recovery and potentially an important consideration for individuals as they determine their pathway for recovery (i.e., methadone, buprenorphine, and no opioid medication).

Change process. There is limited literature investigating the change process variables (stage of change, processes of change, and markers of change) between the various groups of interest in the current study (individuals who are using methadone, buprenorphine, and no medication). However, the impact of opioid-substitution medication on the process of change is a topic of much debate theoretically. There are two major perspectives: 1) use of opioid-substitution medications promotes engagement in the process of change by eliminating withdrawal symptoms and 2) use of opioid substitution medications interferes with the process of change as it simply substitutes one addiction for another, such that individuals are over-reliant on

the medication and do not engage in the behavioral processes necessary to sustain change (NIDA, 2012).

First, it is important to note that these medications are not purported to be sufficient to prevent relapse and support recovery; these medications are recommended alongside psychosocial or behavioral treatments. The goal of psychosocial or behavioral treatments is to engage individuals in the process of change, teaching coping skills and behavioral strategies to enable long-term abstinence (NIDA, 2012). It has been well-documented that combined treatment (opioid-substitution therapy along with psychosocial treatment) is more effective at reducing dropout, reducing opiate use during treatment, and reducing opiate use at follow-up, than opioid-substitution therapy alone (Amato et al., 2011). Therefore, the psychosocial or behavioral treatment has added value above and beyond medications that is, theoretically, attributable to enhanced engagement in the process of change necessary for long-term abstinence. Taken together, it is not expected that the medications alone would promote engagement in the recovery process, specifically the behavioral processes.

The primary goal of using opioid-substitution medications (methadone and buprenorphine) is to curb withdrawal symptoms and reduce craving to help prevent relapse and promote recovery (NIDA, 2012). For detoxification, opioid-substitution medications are administered for stabilization and typically for up to 21 days (Bart, 2012). There is a long line of literature to suggest that methadone-assisted detoxification is effective for promoting completion of detoxification, with completion rates documented as high as 80%. Similarly, among studies of buprenorphine-assisted detoxification, there are high completion rates, ranging from 65% and 100%, for various detoxification periods (three days to multiple weeks) (Harspool, Seivewright, Armitage, & Mathers, 2008). Therefore, justification for use during the detoxification period is

clear: opioid-substitution therapies can curb withdrawal symptoms and enhance completion rates of detoxification for both types of medications. However, both methadone- and buprenorphine-assisted detoxification have been shown to be ineffective as the sole treatment strategy, such that after completion of detoxification there is a high rate of return to problematic use of opioids (Fullerton et al., 2014; Milby et al., 1988; Horspool et al., 2008).

What is the justification for use of these opioid-substitution medications past detoxification and initial stabilization? Well, as reviewed above, detoxification alone is not sufficient for promoting long-term abstinence (Fullerton et al., 2014; Milby et al., 1988; Horspool et al., 2008). Use of methadone and buprenorphine medication for maintenance (long-term) has been shown to promote retention in medication treatment and abstinence from opioids, while individuals are receiving the opioid substitution medication (Mattick et al., 2009; 2014). However, there is no evidence to suggest that individuals sustain these changes after discontinuing medication maintenance treatment (methadone or buprenorphine). Notably, literature suggests that when individuals stop using maintenance opioid-substitution medications, there is a high rate of return to problematic opioid use (Bart, 2012). Specifically, among individuals who taper off of buprenorphine maintenance there are relapse rates as high as 90% (Bart, 2012). Maddux (1992) conducted a ten-year follow-up after entry to methadone maintenance treatment and compared individuals who had spent at least one year on methadone (n=95) with a control group of chronic opioid users who spent less than one year on methadone (n=77). During the ten-year follow-up period the methadone group had on average 54 months on methadone whereas the control group had only an average of two months on methadone. At the end of the ten-year follow-up period, 7% of the average 54-month methadone group and 26% of the average two-month methadone group had been continuously abstinent for three years or

longer. This finding seems to suggest that use of maintenance opioid-substitution therapies for more than one year may negatively relate to the recovery process. Overall, it appears that opioid-substitution therapies are effective at promoting retention, abstinence, and recovery outcomes while using the opioid-substitution medication. However, it is probable that there is an over-reliance on the medication, such that when medication is stopped these recovery outcomes are not sustained. Therefore, it is expected in the current study, that individuals using medications to aid in their recovery may exhibit a profile that indicates lower engagement in the change process compared to those who are not currently using medications. This information will be used to hypothesize about differences in the process of change variables between individuals using medications and those not using medications to aid in their recovery.

Retention. Literature on the comparison of retention rates between medication types can relate to stage of change, such that individuals who drop out of treatment can be an indicator of regressive stage movement. Mattick and colleagues (2014) conducted a Cochrane review of studies comparing buprenorphine maintenance with placebo, as well as buprenorphine maintenance to methadone maintenance. Authors compared 20 studies based on retention in treatment and illicit opioid use. Results showed that among those participants receiving flexible opioid-substitution medication doses (as compared to fixed), meaning doses that were titrated to meet clients' needs, were more likely to drop out of buprenorphine maintenance than methadone maintenance (5 studies, $n=788$, $RR=0.83$). Those participants that received low-fixed dose buprenorphine were more likely to drop out of treatment compared to participants receiving low-fixed dose methadone (3 studies, $n=253$, $RR = .67$). Finally, there was no difference between participants receiving fixed medium doses or high doses of buprenorphine and methadone. In clinical settings prescribing doctors are less likely to use predetermined fixed doses of

medications (Mattick et al., 2014) but instead will tailor treatment to the individual's preference or need and are more likely to use high doses of medications (D'Aunno et al., 2014). Therefore, the results demonstrating that medium or high fixed doses yield comparable retention rates have some applicability to the field but should be interpreted with caution. Therefore, it is possible that in a clinical setting there is no difference between retention for individuals who are using methadone compared to those who are using buprenorphine or buprenorphine may prove slightly less effective at retaining individuals in treatment compared to methadone maintenance (Mattick et al., 2014). For the current study, dose will be assessed. Retention will not be an outcome of the current study, given that this study is cross-sectional and will only include individuals who have demonstrated success in their early recovery (i.e., essentially abstinent for at least one month). However, this literature is used to generate hypotheses on struggling to maintain abstinence (which is addressed in the section below).

Stage of change. The current study will only include individuals who are in the action stage of change; there should be no differences between the groups on measurement of this stage. There is no expected between individuals taking methadone compared to those taking buprenorphine on their struggle to maintain their recovery. This is based on evidence showing similar retention rates between these groups in past research (Fareed et al., 2010; 2011). There is some evidence suggesting that methadone is more effective at promoting retention but only when compared to flexible or low dose buprenorphine (Mattick et al, 2014); it is most common that individuals are receiving high doses of medication (D'Aunno et al., 2014). Additionally, there has been extensive literature indicating that use of opioid-substitution medications improve retention (Bart, 2012) and therefore it would be expected that those individuals not using medication would demonstrate more struggle to maintain their abstinence.

Processes of change. There is no literature comparing the processes of change by the pathways of recovery examined in the current study. It is noteworthy that individuals who are engaged in methadone maintenance and in the later stages of change demonstrate more use of behavioral processes than those in methadone maintenance in the earlier stages of change (Belding et al., 1995). This highlights that even though medication is being used as a coping strategy, individuals are also engaging in the behavioral processes of change while using medications. Additionally, in a sample including individuals in outpatient therapy using heroin, individuals in outpatient therapy not using heroin, and individuals in detoxification therapy, there was higher use of behavioral processes in those who were abstinent compared to those who were not (Tejero et al., 1997). This again suggests that among individuals using and not using medications there is overall higher behavioral process use in the early stages of recovery.

Based on the literature reviewed, it has been shown that use of opioid-substitution medications promotes retention, abstinence, and recovery outcomes during medication treatment (Mattick et al., 2009; 2014); once these medications are stopped then a return to problematic use is likely (Bart, 2012). Therefore, it is likely that there is inadequate engagement in the processes necessary for movement from action to maintenance and there is an overreliance on the use of opioid-substitution therapies.

The TTM model suggests that successful progression through the stages of change and completion of the tasks associated with each stage requires adequate engagement in the processes of change: “Thus the processes create and sustain movement through the stages” (p. 24; DiClemente, 2003). Specifically, for individuals in the action stage, successful progression through the action stage to maintenance requires committed and adequate engagement in the “right” processes of change; individuals need to engage actively and thoroughly in the behavioral

processes. It follows that inadequate engagement in the behavioral processes would lead to regressive stage movement. Therefore, it is expected that individuals using opioid-substitution medications will endorse less use of the behavioral processes compared to individuals not using medications. Whereas, there is no expected difference between the groups on cognitive process use as these processes are not as important or highly endorsed in the action stage of change.

Markers of change. There is some literature comparing confidence and temptation by recovery pathways. Literature investigating craving in individuals who use MAR can inform our understanding of temptation. One of the goals of MAR, both methadone and buprenorphine, is to reduce craving, so it would be expected, and many studies show that the use of methadone and buprenorphine is associated with decreased craving (Bart, 2012). However, Fareed and colleagues (2011) conducted a review of methadone maintenance treatment and heroin craving, showing that there is inconsistent literature on the relation; seven studies showed that use of methadone decreases heroin craving, four studies showed that methadone has a neutral effect on craving, one study showed that methadone increases heroin craving, and four studies showed that individuals on methadone maintenance can still experience heroin craving. Based on the preponderance of research that supports methadone relates to decreased craving, the investigators concluded that it is reasonable to expect that methadone can reduce heroin craving yet there is evidence that individuals will still experience cue-induced heroin cravings.

To further add to the complexity, there is literature suggesting that heroin craving is higher among individuals on higher doses of methadone (De Vos et al., 1996). This is consistent with clinical practice, such that those individuals who have higher craving for heroin prior to treatment are recommended to take higher doses of medication. Therefore, it is unclear if the higher craving for individuals on higher doses of medication is an effect of taking the medication

or instead a characteristic of who is being prescribed that high of a dose. Overall, it might be reasonable to expect that those individuals who use medications to aid in their recovery would have reduced craving after using medication treatment compared to before using medication treatment. It has been well-documented that opioid-substitution medications curb withdrawal symptoms and craving (Bart, 2012). Therefore, it is expected that those individuals who use medications will report lower levels of temptation compared to the no-medication group.

Additionally, while the relation between temptation and confidence is complex and not linear, there is an overall negative relation between the two; the magnitude of that relation is smallest in early action (DiClemente, Prochaska, & Gibertini, 1985). Therefore, if individuals who initiate MAR have lower levels of temptation we might expect them to have higher level of confidence. Overall, it is expected that individuals who use medications will endorse less temptation and higher confidence compared to those who are not using medications. There is no literature to suggest that there will be differences between the two medication groups on their relative endorsement of confidence and temptation.

Multidimensional contextual factors of recovery. The available literature that compares the three pathways of recovery on the identified contextual factors of recovery is reviewed below.

Abstinence. Mattick and colleagues' (2014) Cochrane review compared the illicit opioid use of participants using buprenorphine maintenance medication with placebo and the illicit opioid use of participants using buprenorphine maintenance with participants using methadone maintenance. Of those retained in treatment, there were no observed differences in illicit opioid use between those participants using buprenorphine and methadone maintenance medications; this finding was consistent when comparing individuals using multiple doses of medications and

when illicit opioid use was measured using self-report measures or urinalysis. At high doses of medication there was a documented difference in illicit opioid use between individuals using medication and a placebo group, such that individuals using medication had less heroin use than those using the placebo.

Health (health pathology and quality of life). There are several studies that investigate health among individuals in MAR. De Maeyers and colleagues (2010) conducted a review of 38 articles on health (health pathology and quality of life) in opioid-dependent populations. Overall, both constructs were shown to improve for opioid-dependent individuals in recovery using opioid-substitution medications. Investigators reviewed nine studies (three cross-sectional and six longitudinal) that compared the effectiveness of multiple types of opioid-substitution medications on individual's health pathology and quality of life. Both methadone and buprenorphine were shown to have a positive effect on health pathology and QOL. Consistent with De Maeyer's (2010) review, a review of studies of opioid-substitution medications conducted in middle- and low-income countries showed that there was no difference between samples using buprenorphine versus methadone on changes in quality of life from baseline to follow-up (Feelemyer et al., 2014).

O'Brien and colleagues (2006) compared health status for individuals who use heroin across three types of medications (naltrexone, methadone, and buprenorphine). Overall, the results showed that there were improvements after three months in MAR across all the health domains on the Short Form Survey (general health, mental health, pain, physical functioning, role limitations due to physical problems, role limitations due to emotional problems, vitality) and on the mental and physical health composite scores. Notably, the mental and physical health composite scores were similar to that of the norms of the general population after three months.

Importantly, there were no differences between the groups on the physical or mental health composite scores at follow-up.

Maremmanni and colleagues (2007) compared the effect of methadone and buprenorphine among 213 patients in long-term OUD treatment across several outcomes: retention in treatment, urine-drug testing results, psychiatric status, social adjustment, and quality of life. After three months in treatment, there were no significant differences between the groups regarding the urinalysis findings for opioids or cocaine, functional health (psychological, social, and occupational), or emotional distress. There were differences on the overall quality of life and quality of work, such that individuals in buprenorphine treatment demonstrated better quality of life; these findings were inconsistent with previous findings. It has been consistently shown that there are no differences between the health pathology of individuals using methadone compared to buprenorphine. However, there have been inconsistent findings regarding QOL and therefore a more detailed analysis is necessary.

There is evidence demonstrating that the dosage of medication impacts findings related to quality of life. Dwee Shion and colleagues (2014) compared the quality of life (measured by WHO-QOL BREF), among 108 opioid users, between individuals on methadone compared to buprenorphine-naloxone (Suboxone). Results showed that the individuals on high doses of methadone (greater than or equal to 50mg) and high doses of Suboxone (greater than or equal to 8 mg) showed significant differences in quality of life, such that individuals on the high doses of methadone had better quality of life mean scores in psychological, social, and environmental domains. However, the individuals taking low doses of Suboxone (less than 8 mg) demonstrated better overall quality of life and quality of social health. Over time in the U.S. there has been a shift in the typical dosage of methadone maintenance medication given to patients; in 1988,

79.5% of patients received below 60mg and, in 2011, 22.8% of patients received dosages below 60mg (D'Aunno, Pollack, Frimpong, & Wuchiett, 2014). Therefore, it is most common for patients to be prescribed high doses of methadone. Similarly, the recommended maintenance dose of buprenorphine is 12 to 16 mg, which is a high dose (CSAT, 2004). Therefore, hypotheses will be made based on the assumption that individuals are going to be receiving a high dose of medication. Dose of medication is important and will be assessed in the current study.

It is important to note that there may be differences regarding how long after starting opioid-substitution medication there are noticeable improvement in QOL. One study showed that among individuals using methadone the improvements on QOL were noticeable within one month, whereas for individuals using buprenorphine it took longer for improvements to emerge (Ponizovsky & Grinshpoon, 2007). For both individuals using methadone and buprenorphine, improvement can be seen after six months using MAR. Therefore, individuals using methadone may demonstrate improvements in QOL earlier than those using buprenorphine. Therefore, time abstinent will be accounted for in the current study. Notably, in the current study individuals must have been abstinent for at least one month to be eligible, which may be the minimal amount of time necessary to see improvement in QOL and other recovery indicators.

Overall, there are no expected differences between the effect of methadone and buprenorphine treatment on health pathology. Individuals using methadone are expected to have higher quality of life compared to individuals using buprenorphine, given that it is expected that individuals will be taking high dosages of opioid substitution medication (Dwee Shion et al., 2014) and that individuals using methadone demonstrate improvement in QOL earlier than those using buprenorphine (Ponizovsky & Grinshpoon, 2007). It will be important to assess the

dosage of medication individuals in the current study are prescribed. If the current study's sample shows on average low medication dosage prescriptions, then these hypotheses will have to be re-evaluated.

There is limited research comparing the health (health pathology and quality of life) of individuals using medications to aid in their recovery to those who aren't currently using medication. The Australian Treatment Outcome Study (ATOS) compared 825 individuals upon entrance to different types of treatment or at the beginning of early recovery (Teesson et al., 2015). The group of individuals who were not seeking medication treatment had less psychological distress compared to those who were seeking medication treatment (Ross et al., 2015). In clinical practice, determining the dosage of medication depends on the severity the individuals' presentation, determined by drug use history, current drug use and related problems, and other health-related factors (Trafton, Minkel, & Humphreys, 2006). Individuals with more severe (worse) health profiles are recommended to take medications and are prescribed higher dosages of medications and similarly those with less severe health profiles are prescribed lower dosages of medications (Trafton et al., 2006). It follows that individuals who do not use medications may have less severe health profiles, which is consistent with the findings from ATOS. These findings document differences between groups at treatment entry or at the beginning of recovery. While it has been demonstrated that as individuals seek medication or begin their recovery their health improves, there is no evidence to suggest that the rate of improvement would differ between individuals in recovery not using medication compared to those using medications. Therefore, it is expected that the health (both health pathology and quality of life) among individuals not using medications will be better than those using medications.

Community integration.

Social recovery capital. There is no literature comparing recovery capital among individuals who use different types of MAR. However, Granfield and Cloud (2001) did assert after their analysis of 46 semi-structured interviews of individuals who were formerly alcohol or drug dependent, that those who attained success in recovery without treatment or self-help groups may have higher levels of recovery capital. Authors were purporting that individuals who attain success in recovery without treatment probably have higher levels of recovery capital from which to draw. Therefore, there may be a bias among the recovery capital of individuals who seek the three pathways to recovery investigated in the current study, such that individuals with higher recovery capital may be more likely to choose the no medication pathway. There is no evidence to suggest that there would be differences between the two medication groups on recovery capital. Therefore, it is expected that there will be no difference between individuals using methadone and buprenorphine on social recovery capital but individuals not using medication will demonstrate higher levels of social recovery capital.

Substance-related problems. There have been studies investigating the problems associated with addiction by type of opioid-substitution medication used. In Feelemyer and colleagues' (2014) review of studies in middle- and low-income countries, investigating individuals who use opioid-substitution therapy (methadone or buprenorphine), the results of various studies were compared. Seven studies included information on medication dosage levels and investigated QOL and problems associated with addiction using the Addiction Severity Index. Investigators examined the changes in scores for both the quality of life and addiction problems and found no significant difference for either between samples using buprenorphine and methadone or between different doses of medication. Additionally, there were no

differences found between addiction problem scores at follow-up between 6-month and 12-month follow-ups. Therefore, it is expected that substance-related problems will not differ significantly between individuals using methadone and buprenorphine. Consistent with the literature on health and recovery capital, there is reason to believe that individuals with less substance-related problems would require lower dosages of medications or no medications in their recovery. Therefore, it is expected that individuals using methadone compared to those taking buprenorphine will not differ but will have substance-related problems compared to individuals not using medication.

Overall, based on the literature on the contextual factors of recovery, it is expected that there will be no differences between individuals using methadone and buprenorphine on health pathology, recovery capital, and substance-related problems, assuming a high dosage of medication. It is expected that individuals using methadone will demonstrate higher quality of life compared to individuals using buprenorphine. It is expected that individuals not using medication will demonstrate better health pathology and QOL, more social recovery capital, and less substance-related problems compared to the two medication groups.

Chapter 2: Study Rationale, Aims, & Hypotheses

Study Rationale

The central aim of the proposed study is to investigate different aspects of the process of change involved in recovery and some additional components of recovery among individuals who demonstrate initial success in the early stages of recovery from Opiate Use Disorder (OUD), such that they have achieved at least one month and less than six months of essential abstinence (i.e., abstinence with the possibility of a slip). Recovery is a process (Laudet, 2008) for which there are multiple pathways (Kaskutus et al., 2014). The various pathways to success are not

well understood and, specifically, how these pathways to initial success impact the multidimensional process of recovery. The current study focuses on the experiences of opiate addicted individuals who use medications to aid in their recovery (i.e., methadone and buprenorphine) and individuals who do not. Specifically, three unique groups will be explored: opiate addicted individuals who are currently using methadone to aid in their recovery, those who are currently using buprenorphine to aid in their recovery, and those who are not currently using medication assistance. Individuals in the aforementioned groups will be characterized and compared across the following dimensions: 1) the change process involved in the action stage of recovery (stages of change, markers of change, and processes/mechanisms of change) and 2) multiple multidimensional contextual variables involved in recovery (e.g., health pathology, quality of life, social recovery capital, and substance-related problems). It is expected that the profile of these different dimensions of recovery will vary between the three groups. The overall goal of the study is to characterize and compare the recovery change process and recovery contextual variables among individuals who attained early success achieving opiate abstinence three different ways. Understanding differences between the groups will enable researchers and practitioners to better meet the needs of these groups of individuals in the early stages of recovery. For example, if individuals in the medication groups have lower behavioral process use then recommendations about promoting involvement in the change process for the medication group might be appropriate especially if they attempt to achieve total abstinence.

Proposed Aims

1: To compare the change process variables among individuals in the early stages of recovery, between one month and six months of essential abstinence, who are using methadone, buprenorphine, or no medication in their pathway to recovery.

- a. To compare the three aforementioned groups of individuals on their relative endorsement (profile of means) of the five indicators of the change process including the following:
 - i. Two indicators of the action stage of change, including measures of 1) the attitudes and activities of the action stage and 2) the attitudes and activities of struggling to maintain abstinence (action and maintenance subscales of the University of Rhode Island Change Assessment measure)
 - ii. The behavioral processes of change from the TTM (one subscale of the processes of change measure)
 - iii. Two indicators related to self-efficacy, using measures of 1) confidence to not use opiates and 2) temptation to use (two related scales of the self-efficacy measure)
 - b. *Exploratory aim:* If change process measures demonstrate levels of endorsement that are significantly different between the groups (results of aim 1), further exploratory analyses will be conducted. For example, if there is higher behavioral process use in the no-medication group compared to the medication group, then follow-up exploratory analyses would be conducted on the individual behavioral processes of change. Specifically, the five subscales of the behavioral processes would be compared between the groups to explore differences on the different types of behavioral processes.
- 2: To compare recovery contextual variables among individuals in the early stages of recovery, between one month and six months of essential abstinence, who are using methadone, buprenorphine, or no medication in their pathway to recovery.

- a. To compare the three aforementioned groups on the relative endorsement (profile of means) of four contextual variables involved in recovery including the following
 - i. Health Pathology
 - ii. Quality of Life
 - iii. Social Recovery Capital
 - iv. Substance Related Problems
 - b. *Exploratory aim:* If any of these comparisons are significantly different between the groups (results of aim 2), further exploratory analyses will be conducted. For example, if there were higher quality of life in the no medication group compared to the two medication groups, then follow-up exploratory analyses would be conducted. Specifically, the four QOL of life subscales would be compared between the groups to explore differences on the different domains of QOL.
- 3: *Exploratory Aim:* To describe the reasons for and experience of the various pathways of recovery.
- b. To identify reasons that a subsample of individuals from each of these groups choose to use or not use various medications to aid in their recovery.
 - c. To describe the recovery experiences of opiate addicted individuals who choose to use or not use medications to aid in their recovery
 - d. To investigate the impact the medication has on the change process variables of an individual's recovery (e.g., stage of change, processes of change, confidence, temptation) and on the contextual variables involved in an individual's recovery

(health pathology, quality of life, community integration – consequences & recovery capital).

- e. To describe each groups perception of stigma related to Opioid Use Disorder and opioid medications for recovery.

Proposed Hypotheses

1: It is predicted that the profile of means of the process of change measures will differ significantly among the groups representing the various pathways of recovery, co-varying for length of time essentially abstinent. Specifically, in the following ways:

- a. Stage of change

- a. Action: There is no hypothesized difference (relative direction of means) among the three groups for the action subscale; individuals in all groups will be in the action stage of change and there is no evidence to suggest one group would endorse more or less highly the attitudes and activities associated with the action stage.

- b. Maintenance (struggling to maintain): There is no hypothesized difference (relative direction of means) between the methadone and buprenorphine group for the maintenance subscale. This is based on evidence showing similar retention rates between these groups in past research (Fareed et al., 2010; 2011). There is some evidence suggesting that methadone is more effective at promoting retention but only when compared to flexible or low dose buprenorphine (Mattick et al, 2014); the recruited sample is expected to be receiving high doses of buprenorphine given that this is the current common prescribing practice (D'Aunno, Pollack, Frimpong, & Wuchiett, 2014). It is also hypothesized that the

no medication group will have significantly higher scores on the maintenance subscale (struggling to maintain) compared to the two medication groups. This is based on the extensive literature indicating that the use of opioid-substitution medications improve retention (Bart, 2012), blunt the effects of withdraw, and reduce craving (Fareed et al., 2010; 2011). Therefore, it is expected that the individuals not using medications will demonstrate more struggle to maintain their abstinence.

- i. Maintenance (struggling to maintain): Methadone = Buprenorphine < No medication

b. Processes of change:

- a. Behavioral Processes: It is hypothesized that the no medication group will demonstrate significantly higher endorsement of the behavioral processes of change compared to both medication groups. This is based on the perspective that medication use interferes with engagement in the behavioral processes (NIDA, 2012) and is substantiated by literature suggesting that after a period of sustained abstinence using opioid substitution medications there is a high rate of return to problematic use when those medications are stopped (Bart, 2012), suggesting a possible lack of engagement in the behavioral processes. There is no hypothesized difference (relative direction of means) between the two medication groups for the behavioral processes, as there is no literature suggesting one medication would interfere with engagement in the behavioral processes more or less than the other.

- i. Behavioral: Buprenorphine = Methadone < No medication

c. Markers of change:

- a. Temptation: It is hypothesized that the no medication group will demonstrate significantly higher temptation to use heroin compared to the two medication groups, given the substantial literature documenting the opioid-substitution medications curb withdrawal symptoms and craving (Bart, 2012). There is no hypothesized difference (relative direction of means) between the two medication groups for temptation, as there is no evidence suggesting that one medication is more or less effective at reducing withdrawal and craving.

- i. Temptation: Methadone = Buprenorphine < No Medication

- b. Confidence: It is hypothesized that the no medication group will demonstrate significantly lower confidence to abstain from heroin compared to the two medication groups. There is no hypothesized difference (relative direction of means) between the two medication groups for confidence. These follow from the temptation hypotheses and are based on the literature suggesting that there is a negative relation between temptation and confidence (DiClemente, Prochaska, & Gibertini, 1985).

- i. Confidence: Methadone = Buprenorphine > No Medication

2: It is predicted that the profile of means of the recovery contextual measures will differ between the various pathways of recovery, co-varying for time essentially abtinent.

Specifically, in the following ways:

- a. Health Pathology: It is hypothesized that the medication groups will demonstrate significantly greater health pathology compared to the no medication group. This is based on evidence that medication and a higher dose of medication is recommended for

individuals with more severe presentations (e.g., more severe dependence and worse health profiles) (Trafton et al., 2006) and that individuals who do not seek medication treatment have less distress upon entry to treatment (Ross et al., 2015). There is no hypothesized difference (relative direction of means) between the two medication groups for health pathology as there is substantial literature showing that there is no significant difference between those groups (O'Brien et al, 2006; Maremmani et al., 2007).

- a. Health pathology: Methadone = Buprenorphine > No Medication
- b. Quality of Life (QOL): It is hypothesized that the no medication group will demonstrate significantly higher QOL than both medication groups. This is based on evidence that medication and a higher dose of medication is recommended for individuals with more severe presentations (e.g., more severe dependence and worse health profiles) (Trafton et al., 2006) and that individuals who do not seek medication treatment have less distress upon entry to treatment (Ross et al., 2015). It is hypothesized that the methadone group will demonstrate significantly higher QOL compared to buprenorphine group. This is based on the literature indicating that individuals using methadone demonstrate improvement in QOL earlier in the recovery process compared to those using buprenorphine (Ponizovsky & Grinshpoon, 2007), as well as literature documenting that among individuals on high dosages of opioid substitution medications, those using methadone have higher quality of life (Dwee Shion et al., 2014).

- a. QOL: Buprenorphine < Methadone < No Medication
- c. Social Recovery Capital: It is hypothesized that individuals in the no medication group will have significantly higher social recovery capital than both medication groups. There is limited research on social recovery capital as this is a new construct in addiction

research, but it has been asserted that individuals who attain success in recovery without treatment most likely have higher recovery capital from which to draw (Granfield & Cloud, 2001). While no medication is not equivalent to no treatment, the general assumption that the less treatment resources utilized the higher the recovery capital is used to extrapolate the hypothesis herein. There is no hypothesized difference (relative direction of means) between the two medication groups for social recovery capital, as there is no evidence to suggest that individuals using one type of medication would have higher or lower recovery capital.

- a. Social Recovery Capital: Methadone = Buprenorphine < No Medication
- d. Substance-Related Problems: It is hypothesized that individuals in the medication groups will have significantly higher substance-related problems compared to the no medication group. Similar to the hypotheses for health status, quality of life, and recovery capital, this is based on the evidence that medication and a higher dose of medication is recommended for individuals with more severe presentations (e.g., more severe dependence) (Trafton et al., 2006). There is no hypothesized difference (relative direction of means) between the two medication groups for substance-related problems, as there is no evidence to suggest that individuals using one type of medication would report more or less substance-related problems.

- a. Substance related problems: Methadone = Buprenorphine > No medication

3: *Exploratory Aim*: There are no predicted hypotheses for the exploratory aim.

Chapter 3: Methods

Measures

Descriptive characteristics. Below are the measures used to characterize the sample in the current study, as well as the characteristics of each group.

Socio-demographics. Participants will be asked to report their age, sex, gender, race, ethnicity, highest level of education attained, employment status, disability status, living/residence situation, marital status, primary source of income, average amount of income, health insurance, and prison history. See Appendix B for the specific questions to be asked.

Substance use-related variables. Participants will be asked to report their current substance use and history of substance use, self-reported diagnosable SUDs, and their history of treatment for their SUD(s).

Substance use and history will be measured by the Drug History Questionnaire (DHQ). This questionnaire asks about ever use, total years used, IV use, year last used, and frequency of use in the last 6 months. For frequency in the last six months, response options include no use (0), less than one time per month (1), one time per month (2), 2 to 3 times per month (3), one time per week (4), 2 to 3 times per week (5), 4 to 6 times per week (6), and daily (7). These questions are asked for the following substances: alcohol, cannabis, stimulants-cocaine/crack/blow, stimulants-methamphetamines), amphetamines/other stimulants (e.g., Ritalin, speed), Benzodiazepines, sedatives, heroin, street or illicit methadone, other opioids, hallucinogens, inhalants, steroids, illegal use of prescription medications. For the purposes of the current study frequency of use in the last month will be added to the DHQ; therefore, an additional question was added for frequency in the last month with the same response options as described above for frequency in last six months (no use (0), less than one time per month (1),

one time per month (2), 2 to 3 times per month (3), one time per week (4), 2 to 3 times per week (5), 4 to 6 times per week (6), and daily (7). See appendix B for this measure.

The DHQ has demonstrated adequate psychometrics. The DHQ has demonstrated adequate reliability and validity for self-report assessment of pre-treatment drug use (Sobell, Kwan, Sobell, 1995) and has been used to measure drug history in multiple groups of drug users, specifically cannabis users only, polydrug users, and ecstasy users only (recreational and heavy users) (Butler & Montgomery, 2004).

In addition to the substance use history and current use, diagnoses and treatment history will be assessed. Participants will be asked to identify SUDs for which they have a diagnosis. To assess treatment history, participants will be asked which of various types of treatment they are currently participating, have ever participated, and how many treatment encounters they have had of each type, including inpatient, residential rehabilitation, intensive outpatient, outpatient, opioid-substitution therapy, detoxification only, and other. See appendix B for these questions.

Mental health-related variables. Participants will be asked to report on their psychiatric diagnoses, as well as current treatment and history of treatment for mental health conditions.

Other mental health-related variables. Participants will be asked to identify psychiatric diagnoses for which they have ever been diagnosed. To assess current treatment and treatment history, participants will be asked which of various types of mental health treatments they are currently participating, have participated in, and how many treatment encounters they have had of each type, including inpatient, residential rehabilitation, intensive outpatient, outpatient, pharmacotherapy, and other. See Appendix B for these items.

Physical health-related variables. Participants will be asked to report on their history of chronic health conditions and treatment for those conditions. Specifically, participants will be

asked to identify health conditions for which they have been diagnosed or they have experienced, as well as a series of questions relating to possible treatments for medical conditions. See Appendix B for these items.

Change process variables.

Stages of change. The Stages of Change will be assessed using University of Rhode Island Change Assessment (URICA), a 32-item measure, which assesses attitudes and tasks related to the stages of change. The URICA measures how much an individual's responses correspond with each stage and creates a profile for each person (instead of assigning a person to a particular stage). It is important to note that factor analytic studies have shown that this measure does not identify the preparation stage of change, instead reveals a four-factor structure of the measure capturing profiles relating to pre-contemplation, contemplation, action, and maintenance (McConaughy, Prochaska, & Velicer, 1983; McConaughy, DiClemente, Prochaska, & Velicer, 1989). The maintenance subscale of the URICA represents the concept of struggling to maintain, such that individuals having difficulty with their behavior change will endorse items on this subscale. In the current study, only the action and maintenance (struggling to maintain) subscale will be investigated, as these are the most relevant for the action stage of change (which all participants will be in). See appendix B for this measure.

There are several versions of the URICA assessing stage profiles for alcohol (both abstinence and reduced drinking), psychotherapy, drugs and smoking (this is not an exhaustive list). The URICA was originally developed as a 32-item measure (McConaughy et al., 1983; McConaughy et al., 1989); only 28 of those items are used for scoring for the alcohol and drug use versions. For the current study, the illicit drug use URICA will be adapted for non-prescription use of opioids specifically. The instructions will read: "Each statement below

describes how a person might feel when starting therapy or approaching problems in their lives. Please indicate the extent to which you tend to agree or disagree with each statement. In each case, make a choice in terms of how you feel right now, not what you felt in the past or would like to feel. For all statements that refer to your “problem,” answer in terms of problems related to your illegal or non-prescribed opioid use.” The response options for each item are Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The reliability (internal consistency) of the URICA has been demonstrated for several behaviors, with α s for each of the four subscales for alcohol ranging from $\alpha = .69 - .86$ (Carney et al., 1995; Carbonari et al., 2000; DiClemente & Hughes, 1990; Carbonari, DiClemente, Zweben, 1994), for psychotherapy ranging from $\alpha = .67 - .86$, and for drugs ranging from $\alpha = .35 - .85$ (most of which were above $\alpha = .70$) (Nidecker et al., 2008; Belding et al., 1996; Siegal et al., 2001). The URICA in individuals with SUD and a serious mental illness demonstrated internal consistency ($\alpha = .73$ precontemplation, $\alpha = .72$ contemplation, $\alpha = .81$ action, $\alpha = .67$ maintenance), measurement consistency and stability over time, and construct validity (Nidecker et al., 2008). The research investigating the psychometrics of the URICA for opioid use is limited. However, there is some evidence of reliability for samples of individuals who are presenting to treatment for opioid use, specifically for Precontemplation $\alpha = .71$, Contemplation $\alpha = .71$, Action $\alpha = .69$, and Maintenance $\alpha = .52$ (Belding et al., 1996). The URICA has demonstrated a four-factor structure (McConaughy et al., 1983; McConaughy et al., 1989; Von Sternberg, 2005).

Processes of change. The Processes of Change Questionnaire (PoCQ) will be used to assess how frequently an individual endorses the 10 processes of change explicated in the Transtheoretical Model of intentional behavior change (TTM): consciousness raising, dramatic

relief, self-evaluation, environmental reevaluation, social liberation, reinforcement management, helping relationships, stimulus control, counter-conditioning, and self-liberation. This measure was originally developed for use with smoking (Prochaska, Velicer, DiClemente, & Fava, 1988) and was adapted for measuring alcohol (Von Sternberg, 2005) and illicit drugs (Tejero et al., 1997; Nidecker et al., 2008). There are several versions of the (PoCQ); the 40-item questionnaire for illicit drug use will be modified for the current study to assess the processes for non-prescription use of opioids. The instructions for the questionnaire will read, “Each statement describes a situation or thought that a person might use to help them not to use illegal or non-prescribed opioids. Please indicate how often you make use of a particular situation or thought to help you not use illegal or non-prescribed opioids at the present time.” The response options range from 0 (never) to 5 (repeatedly) for each of the 40 items. See appendix B for this measure.

For several behaviors the PoCQ has demonstrated adequate internal consistency: for alcohol use demonstrating $\alpha = .65 - .85$ (Snow, Prochaska, & Rossi, 1994), $\alpha = .82 - .85$ for the 40-item (Von Sternberg, 2005), and $\alpha = .72-.85$ for the 20-item (Von Sternberg, 2005); and for smoking demonstrating $\alpha = .69 - .92$ each of the 10 subscales (Prochaska et al., 1988). The PoCQ has demonstrated predictive validity for alcohol use for individuals in restricted and unrestricted settings (Von Sternberg, 2005), as well as for illicit drug use among individuals on methadone maintenance (Belding, Iguchi, and Lamb, 1997). Specifically, for illicit drug use, the 40-item PoCQ for “illegal drugs” has demonstrated adequate internal consistency, $\alpha = .87$ for the whole total scale and $\alpha = .34 - .79$ for each of the 10 subscales; for most of the 10 subscales $\alpha = .60 - .70$ (Tejero et al., 1997). Similarly, an adapted version of the PoCQ for individuals with a SUD and serious mental illness revealed adequate internal consistency, $\alpha = .76$ for experiential

processes and $\alpha = .83$ for behavioral processes (Nidecker et al., 2008). Construct validity for the illicit drug use version has been demonstrated among individuals who use opioids (Belding et al., 1995; Tejero et al., 1997). The PoCQ among individuals with SUD and a serious mental illness demonstrated measurement consistency and stability over time, as well as construct validity (Nidecker et al., 2008). There has been inconsistency in the documented factor structure of the PoCQ yet it has consistently demonstrated a distinction between the behavioral and cognitive processes (DiClemente et al., 1996; Von Sternberg, 2005; Belding et al., 1995; 1997).

Self-efficacy (temptation & confidence). The Drug Abstinence Self-Efficacy Scale (DASE) was adapted from the Alcohol Abstinence Self-Efficacy Scale (AASE), a 20-item measure that asks individuals to estimate their confidence in their ability to abstain from drinking in several high-risk situations, accompanied by a measure asking their temptation to use in each situation (DiClemente, Carbonari, Montgomery, & Hughes, 1994). There is a shortened 12 – item version that will be used for the current study. In both the 20-item and 12-item versions, there are 4 categories of high-risk situations assessed: negative affect, the social/positive, physical and other concerns, and urges. For the current study, these measures will be adapted to specifically ask about self-efficacy regarding illegal or non-prescribed opioids. Therefore, the measure will ask participants to rate their confidence to abstain from use of non-prescribed opioids and their temptation to use non-prescribed opioid across 12 high-risk situations. For the confidence portion, participants will be prompted as follows: “Listed below are a number of situations that lead some people to use illegal or non-prescribed opioids. We would like to know how confident you are that you would not use illegal or non-prescribed opioids in each situation.” Response options are Likert scales ranging from 1(not at all confident) to 5(extremely confident). For the temptation portion, participants will be prompted as follows:

“Listed below are a number of situations that lead some people to use illegal or non-prescribed opioids. We would like to know how tempted you may be to use illegal drugs in each situation.” The response options range from 1(not at all tempted) to 5(extremely tempted). See appendix B for this measure.

The AASE has demonstrated adequate internal consistency (DiClemente et al., 2001), as well as construct validity (DiClemente, Carbonari, Montgomery, & Hughes, 1994). The DASE has demonstrated adequate reliability for confidence and temptation for the 20-item versions (Hiller et al., 2000; Nidecker et al., 2008), as well as consistency and stability over time for the 12-item versions (Nidecker et al., 2008). Nidecker and colleagues (2008), in a sample of individuals with SUD and serious mental illness, demonstrated adequate reliability for the 12-item version: $\alpha = .91$ for confidence and $\alpha = .91$ for temptation. Hiller and colleagues (2000) assessed internal consistency for each of the four subscales for confidence and temptation for the 20-item measures. Specifically, for confidence, the subscales α 's ranged from .87 - .92 and for temptation the subscales α 's ranged from .72 - .90 (Hiller et al., 2000). The AASE has consistently demonstrated the existence of four subscales for confidence and temptation (negative affect, social/positive, physical, and other) (DiClemente et al., 1994; Von Sternberg, 2005).

Recovery contextual variables.

Health. Below are the measures to be used to assess the multi-dimensional concept of health. Quality of life is an individuals' subjective satisfaction with various aspects of their life whereas health status is the absence of pathology or wellness (De Maeyer et al., 2010). These two concepts are distinct (De Maeyer et al., 2010) and will, therefore, be measured separately.

Health pathology. The Duke Health Profile (DHP) will be used to measure health pathology in the current study. This is a 17-item self-report measure of generic health derived from the Duke-UNC Health Profile, which is a 63-item measure of health (Parkerson, Broadhead, & Tse, 1990). The DHP assesses the following health status domains: physical, mental, social, general, perceived, and self-esteem. Additionally, there are four dysfunction domains covered on the DHP, including anxiety, depression, pain, and disability. For the purposes of the study, the general health score will be used, which combines physical health, mental health, and social health (with a maximum of 100). See appendix B for this measure.

The psychometric properties of the DHP were initially substantiated in a sample of 683 primary care adult patients, specifically test-retest reliability, convergent validity, and discriminant validity (Parkerson, Broadhead, & Tse, 1990). There has been limited research on using the DHP with samples of individuals who use drugs, however since its initial validation study the DHP has been used in a number of diverse samples and has demonstrated adequate reliability and validity (Vo, Guillemin, & Deschamps, 2005; Parkerson et al., 1999; Hanh et al., 2005; Schuntermann, 1997), in samples ranging from adults with erectile dysfunction to adolescents. Notably, the DHP has shown discriminant validity; in Parkerson and colleagues' (1990) study, differences between the health scores were found among patients with clinically different health problems as well as those with mental health concerns, demonstrating its discriminant validity. Additionally, Schuntermann's (1997) study also showed evidence of discriminant validity, such that different patient groups had different health profiles as would be expected.

Quality of life. The World Health Organization's Quality of Life (WHOQOL) measure assesses 24 dimensions of quality of life related to several areas of health. For the current study,

the brief version of this measure, WHOQOL-BREF, will be used. The WHOQOL-BREF is a 26-item measure developed from the 100-item full version; one item was selected from each of the 24 dimensions of quality of life on the full version, plus two items that capture perception of overall quality of life and health. Each item is answered on a likert scale ranging from not at all (1) to an extreme amount (5), with 5 indicating higher QOL. See appendix B for this measure.

The WHOQOL-BREF measures an individual's perceptions of their quality of life in the past two weeks as it relates to four domains: 1) physical, 2) mental, 3) social, and 4) environmental health. Physical health related quality of life includes activities of daily living, dependence on medicinal substances, energy and fatigue, mobility, pain and discomfort, sleep, and work capacity. Psychological health related quality of life includes bodily image, negative feelings, positive feelings, self-esteem, spirituality, cognitive functioning (thinking, learning, memory, and concentration). Social relationship health related quality of life includes personal relationships, social support, and sexual activity. Environmental health related quality of life includes independence and physical safety, health care accessibility and quality, home quality, opportunities for new information and skills, recreation and leisure participation, physical environment, and transport. Scoring of the WHOQOL-BREF yields four domain scales, each capturing an individual's perception of their quality of life across each of the aforementioned health domains, and two additional items capturing an individual's overall perception of quality of life and perception of their health. Domain scores (mean of items for each domain category) are scaled in the positive direction, such that higher scores denote higher quality of life, and are transformed to be on a scale of 100. The four domain scores are averaged to create a single score (with a maximum of 100) encompassing physical health, psychological, social relationships, and environment. Per the scoring recommendations for the WHOQOL-BREF, in the instance that

more than two items are missing from a particular domain, the domain score will not be calculated (with the exception of domain 3, where the domain will be calculated if <1 item is missing).

The WHOQOL-BREF has shown adequate reliability and validity. Skevington and colleagues (2004) conducted a survey of 11,380 adults from 12 countries to investigate the psychometric properties of the WHOQOL-BREF. Individuals were sampled from the general population as well as those in hospital, rehabilitation, and primary care settings. Individuals were sampled to ensure inclusion of individuals who were “healthy” and who had physical and mental disorders. The WHOQOL-BREF demonstrate adequate internal consistency, specifically for the whole sample for domains 1, 2, and 4 internal consistency was good ($\alpha > .80$) and marginal for domain 3 ($\alpha = .68$). Domain 3 is only composed of three items, whereas the other two domains are composed of six to eight, and therefore a lower value on domain 3 would not be unexpected. The internal consistency for each of the 24 countries followed a similar pattern for the 4 domains; specifically for the US sample, domain 1 ($\alpha = .87$), domain 2 ($\alpha = .87$), and domain 4 ($\alpha = .84$) had good internal consistency and domain 3 ($\alpha = .69$) showed marginal internal consistency.

In addition to adequate reliability, the WHOQOL-BREF demonstrated adequate discriminate validity, such that the mean score for each domain differed between “healthy” and “ill” groups in the total sample, as well as in the majority of individual country samples. To assess construct validity, researchers correlated single-item, face valid measures of an individual’s perception of their overall quality of life and their health and each domain on the WHOQOL-BREF. The single-item measure of overall quality of life was most highly correlated with the psychological and environmental domains whereas the single-item measure of overall

health was most strongly correlated with the physical domain. When the single item measures were summed and correlated with each domain, this yielded a strong relation with all four domains.

Confirmatory factor analyses were conducted to evaluate the fit of the four-factor model validated in the WHOQOL full measure (WHOQOL Group, 1998). The first analysis conducted on two random, split-half samples of the total sample showed an acceptable fit which were almost identical for each half. Additionally, separate confirmatory factor analyses were conducted on the “healthy” (n=3862) and “ill” (n=3313) samples and both demonstrated acceptable fit for the four-factor model.

The WHOQOL-BREF has been used in several studies investigating quality of life among opioid-dependent individuals (De Maeyer et al., 2010; Lawrinson et al., 2008; Padaiga et al., 2007; Bizarri et al., 2005; Dunaj & Kovac, 2003).

Community integration.

Recovery capital. The Assessment of Recovery Capital (ARC) will be used to assess recovery capital. The ARC is a 50-item self-report measure of recovery that assesses overall recovery capital and two major components of recovery capital (i.e., personal recovery capital and social recovery capital). Groshkova and colleagues (2013) reported strong sensitivity and specificity, as well as concurrent validity with other measures of quality of life. There are 10 subscales on the Recovery Capital Scale that cluster with overall measure of social capital and personal resources. Each of the 50 items is scored dichotomously and therefore each domain (with 25-items) has a range from 0 to 25 per domain, such that higher scores indicate higher capital. There are three scores calculated from the ARC: total recovery capital, personal recovery capital, and social recovery capital. The social recovery capital score was assessed in

the current study. The social recovery capital score is calculated by summing the items endorsed as true (scores ranging from 0-25). The social recovery capital scores are transformed to be on a scale of 0-100. See appendix B for this measure.

The single factor of recovery capital has been shown to have strong inter-class correlation coefficients ($ICC = 0.50 - 0.73$) between the items (Groshkova, Best, & White, 2013). The internal consistency has been shown to be sufficient for the overall score as well as the personal and social domain scores ($\alpha = .89-.96$) (Mawson et al., 2015).

Substance-related problems. Short Inventory of Problems for Drugs (SIP-D) will be used in the current study to assess problems related to drug use, specifically. The SIP is adapted from the Drinker Inventory of Consequences (DRinC), which was designed to measure negative consequences of alcohol use. The SIP-D was adapted from the SIP by adapting the items to relate to drugs instead of alcohol. The SIP-D assesses consequences relating to use over the past three months. Specifically, the SIP-D asks about the frequency of 15 consequences associated with drug use and response options range from never (0) to daily or almost daily (3). For the current study, the time frame will be changed to ask about the past month instead of the past 3 months and it will be adapted to address consequences from the participants' illegal and non-prescribed opioid use. Each response is summed for a total score. See appendix B for this measure.

The SIP and modifications of the SIP have demonstrated adequate psychometrics (Alterman, Cacciola, Ivey, Habing, & Lynch, 2009; Feinn, Tennen, & Kranzler, 2003) in a variety of diverse samples, specifically using the SIP in dually diagnosed (Carey et al., 2004; Bender, Griffin, Gallop, & Weiss, 2007), SIP in an emergency department sample (Kenna, et al., 2005), SIP for alcohol and drugs in non-treatment seeking men who have sex with men

(Hagman, Kuerbis, Morgenstern, Bux, Parsons, & Heidenger, 2009), SIP for alcohol and drugs in college students (Gillespie, Holt, & Blackwell, 2007), and SIP for alcohol and drugs in individuals in outpatient treatment for SUD (Kiluk, Weiss, Morgenstern, & Carroll, 2013). The SIP for drug use only (SIP-D) has also been validated. Allensworth-Davies and colleagues (2012) sought to validate the SIP-D in a sample of individuals recruited from a primary care. The SIP-D had internal consistency that was comparable to that found in studies with other versions of the SIP in other samples. Specifically, the SIP-D showed good internal consistency overall ($\alpha = .95$) as well as on all the subscales: physical ($\alpha = .72$), social ($\alpha = .90$), interpersonal ($\alpha = .85$), intrapersonal ($\alpha = .87$), and impulse ($\alpha = .82$). The SIP-D showed evidence of convergent validity such that it was highly correlated (Spearman's $\rho = .71$) with an instrument that is conceptually related (the Drug Abuse Screening Test -10). Finally, construct validity was demonstrated by analyzing the factor structure of the SIP-D. A single factor model fit the SIP-D, such that the single-factor model explained 82% of the variance.

Other.

Stigma. The measure selected for the current study was the Perceived Devaluation & Discrimination (PDD) Scale (Link, Cullen, Struening, Shrout, & Dohrenwend, 1989). In a review of mental illness stigma measures, the PDD scale was the most commonly used (Brohan, Slade, Clement, & Thornicroft, 2010). This measure assesses how “most other people” perceive individuals with mental illness. There are two subscales – Devaluation (6-items) and Discrimination (6-items), each item rated on a six-point Likert scales from 1 (strongly disagree) to 6 (strongly agree). The reported internal consistency of the entire scale ranges from $\alpha = 0.86$ to $\alpha = 0.88$ (Brohan et al., 2010).

The PDD has been adapted for substance use in the past. In one particular study, researchers created an alcohol-adapted PDD to assess perceived alcohol stigma and examined its psychometric properties (i.e., factor structure and validity) (Glass, Kristjansson, & Bucholz, 2013). To do so, researchers utilized confirmatory factor analysis and structural equation modeling in a sample of 34,386 respondents to the National Epidemiologic Survey on Alcohol and Related Conditions. Results revealed the both a one factor (perceived stigma) and two factor (perceived devaluation & perceived discrimination) solution fit the data well (CFI=0.958, TLI=0.942, RMSEA=0.056; CFI=0.962, TLI=0.946, RMSEA=0.054; respectively). The two factors were also shown to be highly correlated.

For the purposes of the current study, perceived stigma for three groups were assessed. Therefore, the reference group of the PDD was changed to be individuals with an Opioid Use Disorder, individuals who are using methadone to aid in their recovery, and individuals who are using buprenorphine to aid in their recovery. Additionally, only 5 items were selected from the perceived devaluation subscale and were assessed for each of the three aforementioned reference groups. The items were selected as the most relevant to the question of interest (i.e., exploratory aim 3).

Covariates. Time essentially abstinent will be used as a covariate in both of the analyses to test the primary hypotheses, as it has been shown that this relates to the process of change and the components of recovery (De Maeyers et al. 2010; DiClemente, 2003). During screening, individuals are asked two items to capture time essentially abstinent: “Are you currently abstinent from illegal or non-prescribed opioids (e.g., heroin, street or illicit methadone, and illegal use of prescription opioid medications)?” and “If yes, for how many weeks have you been abstinent from illegal or non-prescribed opioids? (Note: For the current study, you can be

abstinent if you have used on one day per month.” The number of weeks specified will be used as the covariate measure in the current study.

Study Approval

Prior to implementation of study activities, the current study proposal was submitted for approval to the University of Maryland Baltimore County’s (UMBC’s) Institutional Review Board (IRB). Upon receipt of approval from UMBC’s IRB, the current study methods were initiated. Approval of the IRB at the recruitment agency was not necessary as none of the agency staff were involved in the research activities.

Participants

Individuals aged 18 or older who were classified as in “early recovery” (between one month and six months of essential abstinence) were targeted for recruitment in this study. Individuals were recruited who are using methadone, buprenorphine, or no medication in recovery from Opiate Use Disorder (OUD) from different treatment groups.

Inclusion criteria. The following are the inclusion criteria for the current study as well as the rationale for each of the criteria.

- English speaking individuals with a diagnosis of a moderate or severe Opioid Use Disorder (OUD) within the last year

White (2007) reiterates that recovery is reserved for individuals who have had a SUD and does not apply to less severe or transient alcohol or other drug use, such as college problematic alcohol use. Therefore, individuals must meet criteria for an OUD, specifically moderate or severe. A mild OUD only requires that an individual endorse two diagnostic symptoms, which could be achieved with less severe or transient opioid use.

- Individuals who have been essentially abstinent from opioids of abuse for at least one month

and less than six months (“early recovery”) will be targeted.

Individuals who are essentially abstinent are those who have achieved abstinence but have experienced a slip in the last month (described in detail in the next bullet). Researchers have identified the temporal benchmark of early recovery to be at least 6 months (Laudet & White, 2008) or one year (White, 2007) abstinent. The six-month maximum cut-off was selected for the current study to include only those in the action stage of change (DiClemente, 2003). Additionally, the one-month minimum cutoff was selected because after one month it is expected that individuals have achieved some stability, such that they have achieved essential abstinence and have progressed past the detoxification stage of recovery (McLellan, 2006). There are multiple methods of detoxification from opioids (e.g., rapid detoxification, tapered detoxification, outpatient detoxification), but the longest amount of time for which detoxification lasts is 21 days (Sees et al., 2000). Additionally, it has been shown that the majority of individuals (95%) working on their recovery from opioid addiction relapse within one month (Gossop et al., 2002). Therefore, for the purposes of the current study individuals will be required to be essentially abstinent (i.e. abstinent with the possibility of one slip) for at least one month (see below for further detail on essential abstinence).

- Individuals can have experienced one slip in the last month, still having achieved essential abstinence.

It is common for addiction researchers to define recovery from alcohol and drug problems in gradations including complete abstinence, essential abstinence, shifted from clinical (diagnosable) to subclinical use, clinical use (diagnosable) but lower problem severity, and maintained clinical use with no change. Essential abstinence is defined as a

“low volume of consumption on rare occasions that result in no measurable problems” (White, 2007, p.231). Therefore, individuals who have experienced a slip in the last month will be included in the current study as essentially abstinent, given that a slip is a single, brief event. Those who have experienced a lapse or relapse will be excluded, as these are more substantial periods of use. Therefore, in an effort to capture only individuals securely in the action stage, individuals who have experienced a lapse or relapse in the last month will be excluded.

Operationalizing a relapse, lapse, and slip is complicated. While conceptually a relapse is a return to a problematic pattern of use, traditionally, researchers have defined and measured relapse as any use. However, this equates a relapse with both a lapse and a slip (Brandon et al., 2007). More recently, researchers have conceptualized relapse as a process that is dynamic, of which the end result is a return to the previous pattern of problematic behavior (Witkiewitz & Marlatt, 2007), which further complicates identification of behavioral definitions of slip, lapse, and relapse. There have been efforts to standardize the behavioral definitions however there is limited empirical support or theoretical basis (Brandon et al., 2007). The behavioral definition of relapse for opioid addiction has ranged from any use (Darke et al., 2005) to use on more than 1/3 of the days in the past month (Gossop et al., 2002). Gossop and colleagues (2007) defined a relapse liberally: taking non-prescribed opioids or prescribed opioids in a way that was not prescribed more than 1/3 of the days in the past month; whereas a lapse was defined as taking non-prescribed opioids less than 1/3 of the days in the past month. This suggests that individuals who use up to 10 days (e.g., use on every weekend day) in the last month would be considered as having lapsed. Even using this most liberal definition, a slip would have to be behaviorally defined as use on fewer days per

month than a lapse. For the current study, use on one day in the past month will be used to define a slip. Use on more than one day per month will be considered a lapse or a relapse. This was decided to capture “consumption on rare occasions” (White, 2007, p.231) and distinguish this from a lapse or relapse as it has been defined in prior literature.

- Individuals can be using other substances of abuse.

While there is evidence to suggest that abstinence from all substances of abuse is most effective for long-term outcomes (McLellan et al., 2005; Ilgen et al., 2008) and the majority of individuals in recovery indicate that total abstinence is necessary to their definition of recovery (Laudet, 2008), this is not true for all individuals. Some individuals in recovery indicated that partial abstinence (i.e., abstinence from drug of choice but not all illicit drugs) was their definition of recovery (Laudet, 2008) and there is growing evidence to suggest that gradual removal of drugs of abuse, as compared to all drugs at one time, is a recovery pathway (White & Kurtz, 2006; White, 2007), such as continuing to use alcohol and marijuana during the first year of heroin cessation (Bacchus, Strang, & Watson, 2000). So, in an effort to capture the heterogeneity of individuals using methadone, buprenorphine, and no medication to aid in their recovery, individuals will not be excluded for using other substances of abuse besides opioids.

- Individuals must be in the action stage of change based on self-reported behavior

Individuals that have been essentially abstinent for less than six months will be classified as in the action stage, whereas those who have not been using for six months or more will be classified in the Maintenance stage of change and will be excluded from the current study.

Exclusion criteria. The following individuals were excluded from the current study:

- Individuals younger than 18 years of age

The use of medication to aid in recovery has become increasingly more common among adults and there is substantial literature documenting the effectiveness of MAR for adults (Fishman, Winstanley, Curran, Garrett, & Subramanian, 2010). However, there is little evidence regarding the use of MAR and its effectiveness for opioid dependent adolescents or young adults (Fishman et al., 2010; Sharma, Bruner, Barnett, & Fishman, 2016).

Additionally, adolescents do not have easy access to methadone; many methadone clinics will not distribute methadone to adolescents (Fishman et al., 2010). Therefore, adolescents will not be included in the current sample as the evidence for its efficacy and use of these medications is not as well founded.

- Individuals who are currently in inpatient substance use disorder treatment

The American Society of Addiction Medicine (ASAM) criteria detail levels of care for addiction treatment. According to ASAM criteria, inpatient services (level 3 – residential/inpatient and level 4 – medically-managed intensive inpatient services) are the highest level of care (Mee-Lee, 2013). Level three (residential/inpatient) includes clinically managed low-intensity residential (e.g., halfway house), clinically managed medium-intensity residential (e.g., therapeutic rehabilitation facility), clinically managed high-intensity residential (e.g., substance abuse non-medical community residential treatment), and medically monitored inpatient (e.g., substance abuse medically monitored, non-hospital community residential treatment) services (Mee-Lee, 2013). Level four includes medically-managed intensive inpatient services (e.g., acute care general hospital, psychiatric hospital, psychiatric unit in an acute care hospital) (Mee-Lee, 2013). Individuals in residential services (low, medium, and high-intensity) will be included in the current study and those enrolled in inpatient services, medically monitored (level 3.7) and medically managed (level

4) will be excluded. Both these types of inpatient services have 24-hour/day nursing care and are the most restrictive for the residents (Mee-Lee, 2013). Additionally, in inpatient the main priorities for treatment are detoxification and the management of accompanying withdrawal (Mee-Lee, 2013). As previously mentioned, detoxification is the first stage of recovery from opioid use disorder (McClellan, 2006) and is a period of instability marked by high rates of relapse (Belding et al., 1995). Therefore, to further ensure stability of the participants and to control for various levels of severity, those in inpatient services and seeking detoxification will be excluded.

- Individuals who are using opioid medications to assist in their recovery in a way that is not prescribed

There is a potential for abuse of opioid medications; there is a lower abuse potential for Suboxone as it combines naloxone with buprenorphine, which negates the effects of the buprenorphine if Suboxone is injected or used intra-nasally (Douiahhy et al., 2013; Wesson & Smith, 2010). The current study will include questions regarding misuse of prescription medications in order to assess for abuse of recovery medications. Individuals who took less medication than was prescribed were not be excluded from the current study. Individuals who took more medication than was prescribed once a week or more were excluded from the current study.

- Individuals who present as overmedicated or “nodding out” during the screening and/or completion of the self-report survey

When determining the appropriate dose of recovery medication, it can often take several attempts during which the individual may be slightly high (Fishman, 2014). There is also the potential for an individual to never find the appropriate dosage as too high of a dose is

needed to decrease craving and curb withdrawal (Fishman, 2014). Therefore, it is possible for individuals to be overmedicate/appear high/be “nodding out when on recovery medications. It is expected there will be low likelihood of over-medication, as participants in the current study will be post-detoxification and have one month of essential abstinence. However, should this occur, it would preclude individuals from having the necessary attention and focus for the 60-minute survey.

Screening. Those interested in participating in the study completed several screening questions to determine eligibility for the current study. Specifically, the goal of the screening questionnaire was to ensure that individuals met the following eligibility criteria prior to participating in the current study: were 18 years of age, achieved essential abstinence for at least one month but less than six months, met criteria for a moderate or severe Opioid Use Disorder, and were not currently in inpatient treatment or in a detoxification program. Therefore, participants were asked to report on the following: age, illegal or non-prescribed opioid use in the last six months, criteria of Opioid Use Disorder, current substance use disorder treatment services, and use of legal, prescribed opioid-substitution medications. Additional questions regarding the type of treatment program in which the potential participant is enrolled were included. See below for a description of the screening questions and see appendix A for the screening questionnaire to be administered.

Age. Participants were asked to identify their age to ensure that they are 18 years of age or older.

Opioid use in last year. First, participants were asked to identify the number of weeks during which they have been essentially abstinent. To do so, participants were asked the following questions: “Are you currently abstinent from illegal or non-prescribed opioids (e.g.,

heroin, street or illicit methadone, and illegal use of prescription opioid medications)?” and “If yes, for how many weeks have you been abstinent from illegal or non-prescribed opioids? (Note: For the current study, you can be abstinent if you have used on one day per month).” Individuals who responded that they have been abstinent for less than one month or more than six months were excluded from the current study. To clarify the responses to the aforementioned questions, the following question was asked: “In the past month, how frequently have you used illegal or non-prescribed opioids?” For this question the response options include no use (0), less than one time per month (1), one time per month (2), 2 to 3 times per month (3), one time per week (4), two – three times per week (5), four to six times per week (6), and daily (7). Individuals who indicated that they had used 2 to 3 times per month or more were excluded from the current study.

Opioid Use Disorder. Those individuals interested in participating were asked to indicate which of the 11 possible symptoms of Opioid Use Disorder they have experienced in the past year. Specifically, individuals were presented with the list of symptoms for which they indicated yes or no to experiencing them in the past year. Those individuals that reported at least four in the last year were included in the current study as they were classified as having at least a moderate Opioid Use Disorder.

Psychosocial services. Individuals were not recruited from inpatient for the current study and therefore will be unlikely to be deemed ineligible based on this category. Individuals interested in participating were asked, “Which of the following psychosocial treatment services for opioid use are you currently receiving?” The response options for this question were: outpatient, intensive outpatient, partial hospitalization, residential, or inpatient? Additionally, individuals will be asked, “Are you currently in the detoxification phase of recovery?” Taken

together, the answers to these questions ensured that individuals are not currently in inpatient or receiving detoxification services.

Use of opioid-substitution medications. At screening, the recovery pathways of the interested individuals were identified by asking a series of questions: “are you currently using prescribed medications to aid in your recovery,” “if yes, which of the following are you taking: methadone, buprenorphine (Suboxone), naltrexone, other,” and “if yes, what dosage of medication are your prescribed.”

Recruitment. Multiple recruitment methods were utilized for the current study in order to reach all three groups of interest. Individuals were recruited from multiple SUD treatment facilities and recovery homes. Each recruitment site required slight variation in recruitment strategies, such as in person recruitment in treatment activities or meetings, flyers, etc. The current study was conducted at the various recruitment sites described below. Study researcher traveled to the recruitment sites (or another agreed upon public location) to administer the surveys to study participants.

Recruitment Sites. Participants were recruited from a variety of sites that provide addiction services: substance use disorder treatment agencies and transitional housing programs. There were several programs discussed as potential recruitment sites at the time of proposal from which participants were not recruited, including Total Health Care, Park West, Johns Hopkins and Gaudenzia. Agency staff at these recruitment sites indicated that recruitment would not be feasible at their site.

Participants were recruited from a variety of SUD treatment agencies that have a range of services. Specifically, agencies were selected that had services including outpatient, intensive outpatient, partial hospitalization, and residential (Mee-Lee, 2013). Additionally, multiple

recruitment sites were transitional housing programs that were affiliated with outpatient treatment programs (intensive outpatient, general outpatient). At each of the recruitment sites, there was an agency contact that served as a liaison to agency staff. See below for the specific agencies from which recruitment was conducted.

Mountain Manor Treatment Centers (MMTC). MMTC is a collection of substance use disorder treatment programs. There are programs specialized to treat adolescent, young adults, and adults. Within the MMTC programs there are residential programs, detoxification inpatient programs, intensive and standard outpatient, dual diagnosis, and special education, assessment, and prevention services. MMTC provides Suboxone and Vivitrol. For the current study, participants were recruited from Mountain Manor – Recovery Services Center in Sykesville, MD. This program is a transitional housing program affiliated with several outpatient treatment programs. The agency contacts are Dr. Marc Fishman, Dr. Hoa Vo, and Meghan Graves.

University of Maryland (MD). The University of MD (UMD) hospital and Institute of Psychiatry and Human Behavior have substance use disorder services. The Institute of Psychiatry and Human Behavior has a methadone maintenance program. Within the UMD hospital system there are multiple programs. For the current study, participants were recruited from the Outpatient Addiction Treatment Services (OATS). The OATS program provides a wide range of services including outpatient treatment, intensive outpatient treatment, Suboxone treatment, 6-month methadone treatment, dual diagnosis services, individual counseling, case management, and several others. The agency contact is Dr. Christopher Welsh.

Kolmac Clinics. The Kolmac clinics are alcohol treatment and drug rehabilitation centers in the DC/MD area. The Kolmac clinics provide detoxification, rehabilitation, continuing care, and medication services. The two primary contacts at the Kolmac clinics are the two regional

directors: Jim McGreevey and Jen Dorsey. For the current study, recruitment was conducted from the Baltimore (yielding no participants) and Towson locations.

Gale Recovery of Frederick, MD. This is a substance abuse treatment program offering intensive outpatient services that is affiliated with several transitional housing programs from which participants were recruited. The two primary contacts at Gale Recovery are Christina Trenton and Estelle Dupree.

Overall, the distribution of eligible participants from each of the recruitment sites is detailed in table 2 below. It is clear that majority of participants came from Mountain Manor – Recovery Service Center (RSS) and Gale recovery. These two programs were comparable in the services they provided and in what they required of their participants. RSS is a transitional housing program that requires its residents to be enrolled in an affiliated intensive outpatient treatment program for substance use. There were multiple affiliated intensive outpatient programs in which residents enrolled, ranging in intensity from 12 hours – 15 hours per week. Study participants spoke about a step-down approach to outpatient treatment such that after certain periods of sobriety individuals could be transitioned to less intensive outpatient treatment although the specific protocols for this were not specified. In addition to outpatient treatment, RSS residents were required to abide by the rules of the transitional housing program which included attending at least three outside meetings per week, attending internal meetings, completing multiple urine drug screens each week, obtaining a sponsor, working or volunteering (after 90 days in the program), maintaining a clean room, completing household chores, and refraining from violating rules of house (e.g., no smoking inside).

Similarly, Gale Recovery is a group of transitional houses that requires its residents to be enrolled in an affiliated intensive outpatient program for substance use that is 12 hours per week.

Again, study participants spoke about a reduction in the required number of hours in outpatient treatment as they progressed in their recovery although the specific protocol for stepping down in care was not clear. In addition to attending the IOP, residents of the transitional houses are required to attend life skills groups 2-3 times per week, attend NA/AA meetings 7 days per week, complete random urine drug screens each week, attend women's group one time per week (if in women's house), work (schedule permitting) and comply with house rules (e.g., 10pm curfew, cleanliness, check-ins). Study participants also spoke about a step-down approach to the housing component; different houses had varying amounts of rules and therefore individuals later in their recovery would move into houses with less strict rules. There were additional services that both programs made available, such as mental health counseling and psychiatric services, of which some residents took advantage. Therefore, individuals recruited from these programs were receiving housing, participating in an IOP level of care for substance use, attending NA/AA meetings, completing urine drug screens, complying with basic self-care (i.e., maintaining living space), and preparing to work or working. Additionally, both programs were flexible in their approach, such that they provided scaffolding and structure to all participants but had options for varying levels of care.

Table 2. *Recruitment Site Distribution*

Recruitment Site	Frequency	Percent
Mountain Manor – RSS	54	56.3%
Kolmac	3	3.1%
UMD – OATS	2	2.1%
Gale Recovery	37	38.5%
Total	96	

Procedure for eligible participants. There was one individual that was screened and consented for the study that was deemed ineligible. One additional person was screened and consented for the study and never completed the survey. The remainder of the participants that were screened and consented were enrolled in the study (n=96). Data were collected via self-report surveys completed by study participants either in paper and pencil or in an interview format, depending on the needs of the participant. After interested participants are deemed eligible for the current study, based on their responses to the screening questionnaire described above, eligible participants were asked to complete 45-minute survey assessing the primary variables of interest related to the process of change and components of recovery, as well as other descriptive characteristics. Participants were compensated \$20 for their participation. The primary investigator administered the surveys. Every two months the primary investigator assessed the representativeness of agency type for eligible participants that enroll in the study.

Select participants were asked to participate in an additional component of the current study: a semi-structured interview. During this interview, a subsample of participants was asked open-ended questions about their recovery process, specifically their use of medication or no medication. See appendix M for open-ended questions to be asked. Every 5th person that was eligible and enrolled in the study from each group (i.e., methadone, buprenorphine, or no medication) was invited to participate in the interview portion of the study. When the 5th person refused to participate then the next eligible participant enrolled in the study was invited to participate. Participants were compensated an additional \$5 for their participation.

Recruitment Barriers. An unexpected percentage of recruited participants were not using medications to aid in their recovery. This could be explained by the composition of

recruitment sites; the majority of the sample (91 of 96, 94.8%) was recruited from outpatient treatment programs affiliated with transitional housing, specifically Mountain Manor and Gale Recovery (see table 1 above). However, it proved challenging to find participants that were using opiate medications to aid in their recovery, particularly methadone. Study investigator attempted to seek alternative recruitment sites, particularly medication-based programs (e.g., methadone programs). However, only one of the programs that agreed to host recruitment was a medication-based program (UMD), with limited eligible participants (not enough time abstinent). Additionally, an additional medication subtype emerged: naltrexone or Vivitrol. A clinically relevant subsample of the study participants was using naltrexone or Vivitrol to aid in their recovery. Based on these unanticipated barriers, several changes were made to the original proposed project (see section below).

Changes to Proposed Study

The a priori power analysis yielded a range of sample sizes: at the least 75 participants (minimum needed to run the analyses) and at the most 160 (based on the conservation power analysis). The goal was also to have relatively equal participants in each of the three groups proposed – methadone, buprenorphine, and no opioid medications. Given the recruitment barriers, reviewed above, the recruitment distribution by medication status is seen in Table 3.

Table 3. *Recruitment Distribution by Medication Status*

Group	N
Methadone	9
Buprenorphine/Suboxone	24
Naltrexone/Vivitrol	17
No meds	46
TOTAL	96

Therefore, the proposed study was adapted. The medications were collapsed into one group and the proposed comparisons were updated to between two groups (medication versus no medication) as compared to between 3 groups (methadone, buprenorphine, no opioid medication).

There is a strong rationale for combining the methadone and buprenorphine groups, as they are both opiate medications and the literature reviewed in the introduction indicates that there are not many expected differences on the variables of interest. The majority of original hypotheses predicted no difference between methadone and buprenorphine, except for one measurement (in aim 2): QOL.

The naltrexone/Vivitrol group was not discussed as part of the original proposal and turned out to be more robust than expected. This group was collapsed into the medication group, along with the other opiate medications. The sociodemographics and severity of Opiate Use Disorder (OUD) were compared between the naltrexone/Vivitrol group and the two opiate medication groups combined, prior to collapsing into a single group for analysis purposes. Variables that were related to the outcomes of interest in the current study (change process variables and/or contextual factors of recovery) and differed between these groups were co-

varied in the primary analyses. These comparisons are reviewed in the results (“Comparison between medication groups” section).

Updated Aims & Hypotheses

Updated aims.

1: To compare the change process variables among individuals in the early stages of recovery, between one month and six months of essential abstinence, who are using medications (methadone, buprenorphine, or naltrexone) and who are not using medication in their pathway to recovery.

- a. To compare the two aforementioned groups of individuals on their relative endorsement (profile of means) of the five indicators of the change process including the following:
 - i. Two indicators of the action stage of change, including measures of 1) the attitudes and activities of the action stage and 2) the attitudes and activities of struggling to maintain abstinence (action and maintenance subscales of the University of Rhode Island Change Assessment measure)
 - ii. One type of processes of change using measures of 1) the behavioral processes (one subscale of the processes of change measure)
 - iii. Two indicators related to self-efficacy, using measures of 1) confidence and 2) temptation (two related scales of the self-efficacy measure)
- b. *Exploratory aim:* For the change process measures that show significantly different levels of endorsement between the groups (results of aim 1), further exploratory analyses was conducted. Specifically, the five subscales of the

behavioral processes would be compared between the groups to explore differences on the different types of behavioral processes.

2: To compare contextual variables related to recovery among individuals in the early stages of recovery, between one month and six months of essential abstinence, who are using medications (methadone, buprenorphine, or naltrexone) and who are not using medication in their pathway to recovery.

a. To compare the aforementioned groups on the relative endorsement (profile of means) of the four recovery contextual variables including the following

- i. Health Pathology
- ii. Quality of Life
- iii. Social Recovery Capital
- iv. Substance Related Problems

a. *Exploratory aim:* For those contextual variables related to recovery that showed significantly different levels of endorsement between the groups (results of aim 2), further exploratory analyses were conducted. Specifically, the four QOL of life subscales would be compared between the groups to explore differences on the different domains of QOL.

3: *Exploratory aim:* To describe the reasons for and experience of the various pathways of recovery.

- a. To identify reasons that a subsample of individuals from each of these groups choose to use or not use various medications to aid in their recovery.
- b. To describe the recovery experiences of opiate addicted individuals who choose to use or not use medications to aid in their recovery

- c. To investigate the impact the medication has on the change process variables of an individual's recovery (e.g., stage of change, processes of change, confidence, temptation) and on the contextual variables involved in an individual's recovery (health pathology, quality of life, community integration – consequences & recovery capital).
- d. To describe each groups perception of stigma related to Opioid Use Disorder and opioid medications for recovery.

Updated hypotheses. The hypotheses were updated to reflect the changes described above – specifically, the methadone and buprenorphine group were collapsed into one medication group and therefore all hypotheses were updated to only compare the medication and no-medication group.

1: It is predicted that the profile of means of the change process measures will differ significantly between the groups representing the two pathways of recovery, co-varying for time essentially abstinent. Specifically, in the following ways:

- a. Stage of change
 - i. Maintenance (struggling to maintain): Medication < No medication
- b. Processes of change:
 - i. Behavioral: Medication < No medication
- c. Markers of change:
 - i. Temptation: Medication < No Medication
 - ii. Confidence: Medication > No Medication

2: It is predicted that the profile of means of the recovery contextual measures will differ between the two pathways of recovery, co-varying for time essentially abstinent. Specifically, in the following ways:

- a. Health Pathology: Medication > No Medication
- b. Quality of Life (QOL): Medication < No Medication
- c. Social Recovery Capital: Medication < No Medication
- d. Substance-Related Problems: Medication > No medication

3. Exploratory aim: There are no predicted hypotheses for the exploratory aim.

Data Analysis

Both quantitative and qualitative methods were used in the current study to address the primary aims. The quantitative data was collected in the self-report studies described above and the qualitative data was collected from the interviews conducted with a subsample of participants, also described above. Quantitative methods were primarily used to address aim 1 and aim 2 and qualitative methods were primarily used to address aim 3 (exploratory). The data analytic methods were described for both the quantitative and qualitative below.

Quantitative analyses. Quantitative analyses were conducted using SPSS version 23.0.

Medication group comparisons. Each medication group was characterized on sociodemographic and severity of Opiate Use Disorder. Each group was described using means, standard deviations, and frequencies (where applicable) for the aforementioned variables. Comparisons were conducted using chi-squares and ANOVAs to compare between the 3 groups where appropriate.

Descriptive statistics. Each group was characterized on descriptive characteristics of interest using means, standard deviations, and frequencies (where applicable).

Profile analysis. To conduct the tests of the primary aims, comparing the relative endorsement (means of the measures) of the change process variables and the recovery contextual variables, a special case of Multiple Analysis of Variance (MANOVA) was used: Profile Analysis. This analysis will also be used for the exploratory aims. Profile analysis (Harris, 1985; Tabachnick & Fidell, 1996; 2013) allows for investigation of the possibility that groups of participants exhibit different patterns of means across multiple measures or outcomes. For the purposes of the current study, two profile analyses will be conducted to test the two primary aims, specifically one for comparing the relevant measures of the process of change between groups and the second for comparing the relevant measures of the components of recovery between groups. (Tabachnick & Fidell, 2013). Prior to conducting these analyses, the measures within each aim were transformed to ensure they were on the same scale, as suggested by Tabachnick & Fidell (2013, p. 317).

Overall, profile analysis, tests three hypotheses:

1) Do different groups have parallel profiles? “Parallelisms hypothesis” states that the profiles or patterns of mean values over the variables are the same for each group. Rejection of this hypothesis indicates that the shape of the profile for at least one group is significantly different from the others. This requires a multivariate test and is the primary test of interest in Profile Analysis.

2) Do all the outcomes elicit the same average response? “Flatness hypothesis” states that across the various measures being compared there is a slope of zero. Rejection of this hypothesis indicates that the slope created from the mean of one measure to the mean of another is significantly different from zero.

3) Do the groups have the same average score on all measures combined? "Levels

hypothesis” states that regardless of whether the profiles differ, the group averages are the same. Rejection implies that the profile of at least one group is elevated or depressed and provided evidence that there are differences in the average elevation of the overall profile. This is the most straightforward of the tests, as it is essentially equivalent to a between groups main effect, comparing the overall average scores across measures between groups.

The profile of means was plotted to demonstrate the pattern of results. Given significant omnibus F-tests for any of the three above hypotheses, then the appropriate post-hoc tests were conducted using Bonferroni corrections. The appropriate post-hoc tests would be a series of t-tests comparing between groups for specific measures within each aim. Effect sizes will be calculated for all statistics.

Post-hoc power analysis. The power analysis herein was post-hoc, based on the number of participants recruited and the updated aims, hypotheses, and methods. There is no research directly comparing the process use between medication and no medication groups of interest in the current study. However, researchers who compared the profile of change process-related variables among other groups found moderate to large effects sizes for the parallelism test (Carbonari & DiClemente, 2000; DiClemente & Hughes, 1990). Specifically, Carbonari and DiClemente (2000) conducted similar analysis of the profiles of process of change variables (precontemplation, contemplation, action, maintenance, confidence, & temptation, cognitive, and behavioral) between three groups based on drinking status at one-year post-treatment (abstinent, moderate, and heavy). Profile analysis was conducted on the change process variables pre- and three-months post-treatment. For the test of parallelism, medium effects ($f = .22 - .28$) were found when comparing groups at baseline and large effects were found when comparing groups three months post-treatment ($f = .60 - .61$).

There is no research comparing the contextual variables related to recovery (i.e., health status or community integration). There is previous literature comparing methadone and buprenorphine groups for QOL and health status, reporting medium effects (Dwee Shion et al., 2014; Maremmanni et al., 2006). There is one study comparing psychological distress among individuals recruited from a methadone agency, detox facility, residential rehab facility, and heroin users not currently in or seeking treatment (Ross et al., 2005). This revealed a large effect size overall, with the non-treatment seeking individuals showing the highest level of distress, the methadone group next, then detox, and finally residential rehab.

Post hoc power analyses were conducted, using G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2009). Specifically, power analyses were conducted to determine the detectable effect size based on the sample size collected. Overall, given the acquired sample size, an alpha of .05, anticipated power of .80, and 2 groups with 4-5 measurements/dependent variables there is power to detect an effect between .34 - .36. Since we have limited knowledge about the actual size of the effect sizes are presented herein.

Qualitative data analysis. For the current study, qualitative data analysis is utilized to describe the experience of individuals in recovery from OUD. The goal is to identify common threads throughout the interviews conducted with individuals who have chosen to use and not to use medications to aid in their recovery. Given this purpose, thematic analysis was chosen as a qualitative data analytic approach. In this approach the content and themes are pulled directly from the data; it is an inductive approach that is best utilized when there is little knowledge about the topic of interest (Vaismoradi, Turunen, & Bondas, 2013). Primarily, thematic analysis is “a method for identifying, analyzing, organizing, describing, and reporting themes found within a data set” (Braun & Clarke, 2006). The six steps of thematic data analytic are outlined below in

table 4 (Braun & Clark, 2006; Nowell, Norris, White, & Moules, 2017; Vaismoradi, Turunen, & Bondas, 2013). These steps will be generally followed in analyzing the interviews conducted with the subsample of study participants.

Table 4. *Steps of Thematic Data Analysis*

Step	Components
Familiarization with data	Data transcription Reading transcribed data multiple times Taking notes on preliminary ideas
Generation of initial codes	Identifying and labeling initial codes Categorizing data relevant to each code
Searching for themes	Gathering and categorizing codes into potential themes Gathering and categorizing all relevant data into potential themes
Reviewing themes	Checking if the themes work in relation to data Creating thematic map to describe relation between themes
Defining & naming themes	Refining details of each theme Refining thematic map and story of analysis Creating definition and labels for each theme
Producing the report	Selecting examples that are compelling examples of themes Relating analysis and results to original research question

Chapter 4: Results

Quantitative Results

Missing data analysis. A missing data analysis was conducted and revealed a small subsample of participants with missing data on the primary variables of interest in the current study (i.e., process of recovery variables and recovery component variables). The missingness of the data was examined to identify which participants were to be excluded from the primary analyses.

Initial inspection and cleaning of data revealed one participant that met eligibility criteria at screening but in the self-report interview reported no history of opioid use. She had been screened into the medication group, reporting that she had been taking Suboxone for four weeks. This person was excluded from the final sample and all analyses reported herein. Therefore, the total sample therefore included 95 participants.

Item-level missing data. The missingness of the item-level data was examined prior to creation of the scale scores for each of the variables of interest. The Quality of Life measure (WHOQOL-BREF) had the most missing item-level data, specifically 86% ($n = 83$) had complete data on all items used to create the WHOQOL-BREF scale score. The WHOQOL-BREF scoring manual indicates that an individual case should not be included if more than 20% of the items are missing. One participant had missing data on five items and, based on the 20% criterion, the scale score for the WHOQOL-BREF was not calculated. For the remainder of the measures, the 20% criterion was established as an indicator of general tolerance for missingness within each scale. Based on this criterion, one participant's scale score was not calculated for the measure of Maintenance/Struggling to Maintain and the measure of temptation.

For those participants that had less than 20% item-level missing data, available item analysis was conducted to calculate the scale scores accounting for the missing data (Parent, 2013). This analysis was chosen as it is computationally simple and functionally equivalent to participant mean substitution, and there is evidence to suggest that it is as effective as multiple imputation (Parent, 2013). Therefore, for the remainder of participants the scale score was calculated with the number of items available for each scale score.

Scale-level missing data. After the creation of the necessary scale scores – pairwise deletion was used given the low number of missing data. Specifically, one participant was excluded from the profile analysis conducted for aim 1 and two participants were excluded from the profile analysis conducted for aim 2. Altogether, two participants were excluded from the main analyses as one of the participants was excluded from both profile analyses – both these participants were in the no-medication group.

Comparison between medication groups. Sociodemographic information and severity of Opiate Use Disorder [OUD] were compared between the naltrexone/Vivitrol group and the opiate medication group. This was done prior to collapsing the three medication subgroups into one medication group. To compare the continuous items (i.e., age, severity of Opioid Use Disorder), t-test analyses were conducted. To compare the categorical items (i.e., sex, race, education status, employment, marital status, source of income, average income, lifetime prison/jail, health insurance, and health insurance type) a series of Chi-Square analyses were conducted. Results revealed a significant difference on age ($t(47) = 2.69, p = .010$), such that individuals using opioid medications were on average significantly older ($M = 36.22, SD = 8.37$) than individuals using naltrexone/Vivitrol ($M = 29.53, SD = 8.08$). There were no significant differences between the opioid medication group and the naltrexone/Vivitrol group on any of the

other sociodemographic variables. There was no significant difference between the number of OUD symptoms in the opioid medication group and the Naltrexone/Vivitrol group ($t(47) = .331$, $p = .742$). Age was the only variable that was significantly different between individuals taking opioid medication and naltrexone/Vivitrol. There is some evidence to suggest that age relates to recovery outcomes, such that being older is predictive of better treatment outcomes (i.e., increased treatment retention and less follow up opioid use) (Marsch et al., 2005; Linton, Celentano, Kirk, & Mehta, 2013). Therefore, age was added as a covariate in the primary quantitative analyses. For the remainder of the analyses, individuals taking opioid medications and naltrexone/Vivitrol were collapsed into one group. The means and frequencies for all sociodemographic variables compared are presented in table 5 below.

Table 5. *Sociodemographic comparisons*

Characteristic	Opioid Medication (n=32)	Naltrexone/Vivitrol (n=17)
Age*	36.22 (8.37)	29.53 (8.09)
# OUD symptoms	10.53 (1.22)	10.41 (1.18)
Sex		
Female	8 (25.0%)	6 (35.3%)
Race		
White/Caucasian	27 (87.1%)	17 (100%)
Black/African American	3 (9.7%)	0
Other	1 (3.2%)	0
Education		
Less than HS	3 (9.4%)	0
HS/GED	19 (59.4%)	7 (41.2%)
Higher Education	10 (31.3%)	10 (58.8%)
Employment		
Unemployed	20 (62.5%)	13 (76.5%)
Part-time	4 (12.5%)	2 (11.8%)
Full-time	5 (15.6%)	1 (5.9%)
Other	3 (9.4%)	1 (5.9%)
Marital Status		
Single	19 (59.4%)	14 (82.3%)
Married	1 (3.1%)	0
Sep/Div/Wid	12 (37.5%)	3 (17.6%)
Source of Income		
Employment	20 (62.5%)	13 (76.5%)
Unreported employment	4	2 (11.8%)
welfare	5 (33.3%)	1 (5.9%)
Other	3 (44.4%)	1 (5.9%)
Average Income		
\$0 - \$10,999	17 (53.1%)	9 (52.9%)
\$11,000 +	15 (46.9%)	8 (47.1%)
Lifetime Jail or Prison		
Yes	23 (71.8%)	15 (88.2%)
Health Insurance		
Yes	31 (96.9%)	17 (100%)
Health Insurance Type		
Medicaid	23 (71.9%)	11 (64.7%)
Medicare	2 (6.3%)	2 (11.8%)
Health Care Exchange	1 (3.1%)	2 (11.8%)
Private	4 (12.5%)	1 (5.9%)
Multiple	2 (6.3%)	1 (5.9%)

* comparison between the opioid medication and naltrexone/Vivitrol group is significant at $p < .05$

Medication dosage. The medication dosage was evaluated given that the study hypotheses were based on the assumption that individuals were going to be receiving high dosages of Methadone (> 60mg) and Suboxone (12 – 16mg). The average dosages reported in the current study were high for individuals taking methadone ($M = 63.60$, $s = 18.31$, $n = 10$) and Suboxone ($M = 13.23$, $s = 5.84$, $n = 23$).

Descriptive analyses. Descriptive analyses were utilized to characterize the composition of each group, specifically sociodemographic, substance-related, and mental and physical health-related variables. The descriptive analyses are presented in the tables below, outlining the summary statistics for the medication group, no medication group, and the total sample.

Sociodemographic variables. The sample herein was primarily male, white/Caucasian, HS educated, unemployed, and single. The primary sources of income ranged from less than \$10,999 to over \$71,000 annually but the majority of participants made less than \$10,999 per year. Nearly all participants had health insurance, most commonly Medicaid. Most participants had a history of being in jail or prison.

Table 6. *Sociodemographic Data by Group*

Group				
Characteristic		Medication (n= 49)	No Medication (n= 46)	Total (n=95)
<i>Continuous Items: Mean (SD)</i>				
Age		33.90 (8.80)	34.43 (9.47)	34.16 (9.09)
<i>Categorical Items: N (%)</i>				
Sex				
	Female	14 (28.6%)	15 (32.6%)	29 (30.5%)
Race				
	White/Caucasian	44 (89.8%)	36 (78.3%)	80 (84.4%)
	Black/African American	3 (6.1%)	5 (10.9%)	8 (8.4%)
	Other	1 (2.0%)	4 (8.7%)	5 (5.3%)
Education				
	Less than HS	3 (6.1%)	2 (4.3%)	5 (5.3%)
	HS/GED	26 (53.1%)	27 (58.7%)	53 (55.8%)
	Higher Education	20 (40.8%)	17 (37.0%)	37 (38.9%)
Employment				
	Unemployed	33 (67.3%)	35 (76.1%)	68 (71.6%)
	Part-time	6 (12.2%)	6 (13.0%)	12 (12.6%)
	Full-time	6 (12.2%)	3 (6.5%)	9 (9.5%)
	Other	4 (8.2%)	2 (4.3%)	6 (6.3%)
Marital Status				
	Single	33 (67.3%)	30 (65.2%)	63 (66.3%)
	Married	1 (2.0%)	2 (4.3%)	3 (3.2%)
	Sep/Div/Wid	15 (30.6%)	14 (30.4%)	29 (30.5%)
Source of Income ⁺				
	Employment	13 (26.5%)	7 (15.2%)	20 (21.1%)
	Unreported employment	6 (12.2%)	5 (10.9%)	11 (11.6%)
	welfare	6 (12.2%)	9 (19.6%)	15 (15.8%)
	Other	23 (46.9%)	24 (52.2%)	47 (49.5%)
	missing	1 (2.0%)	1 (2.2%)	2 (2.1%)
Average Income				
	\$0 - \$10,999	26 (53.1%)	34 (73.9%)	60 (63.2%)
	\$11,000 +	23 (46.9%)	12 (26.1%)	35 (36.8%)
Lifetime Jail or Prison				
	Yes	38 (77.6%)	41 (89.1%)	79 (83.2%)
Health Insurance				
	Yes	48 (98.0%)	46 (100%)	94 (98.9%)
Health Insurance Type ⁺				
	Medicaid	34 (69.4%)	41(89.1%)	75 (78.9%)
	Medicare	4 (8.2%)	4 (8.7%)	8 (8.4%)
	Health Care Exchange	3 (6.1%)	1 (2.2%)	4 (4.2%)
	Private	5 (10.2%)	0	5 (5.3%)
	Multiple	3 (6.1%)	0	3 (3.2%)

Substance-related variables. The substance-related variables summarized below include substance-related use variables (table 7) and past and current treatment variables (table 8). Participants report of lifetime, six-month use, and one-month use of drugs other than opioids are discussed in text but presented in appendix D.

Substance-related use. The substance-related variables reviewed in table 5 characterize the participants' current and past substance use. Variables are presented to describe participants' opioid use and other substance use. Participants in both the medication group and no-medication group presented with a severe Opioid Use Disorder, endorsing on average over 10 of the 11 possible symptoms. The majority of the sample endorsed using heroin and other opioids (e.g., pills), whereas under 50% endorsed using street methadone. Typically, participants endorsed using two to three types of opioids in their lifetime. In the past 6 months, the most frequently endorsed opioid was heroin and participants most commonly indicated that they used it daily. A small percentage endorsed using illegal or non-prescribed opioids in the last month; participants could have slipped one time in the past month and still be eligible for the study.

Participants endorsed a history of using many substances; participants reported using on average five different types of drugs in their lifetime and having a diagnosable problem with between two and three different types of drugs (in addition to opioids). The majority of the sample indicated that they have used alcohol, cannabis, stimulant type 1 (i.e., cocaine, crack, blow), benzodiazepines, and hallucinogens in their lifetime. Of those participants that endorsed a lifetime history of the various substances, most reported recent use (i.e., in the past 6 months) but not past month use.

Table 7. *Substance-Related Use by Group*

Group			
Characteristic	Medication (n= 49)	No Medication (n= 46)	Total (n=96)
<i>Continuous Items: Mean (SD)</i>			
# OUD symptoms	10.49 (1.19)	10.48 (1.05)	10.48 (1.12)
# Opioids Used	2.27 (0.70)	2.28 (0.69)	2.27 (0.69)
# Drugs Used	5.96 (2.14)	6.20 (2.15)	6.07 (2.14)
# of SUD	2.38 (1.48)	3.07 (1.86)	2.71 (1.70)
<i>Categorical Items: N (%)</i>			
Ever Opioid Use (Y)			
Heroin	47 (95.9%)	44 (95.7%)	91 (95.8%)
Street Methadone	22 (44.9%)	21 (45.7%)	43 (45.3%)
Other Opioids	42 (85.7%)	40 (87.0%)	82 (86.3%)
# Opioid Used			
Zero	0	0	0
One	7 (14.3%)	6 (13.0%)	13 (13.7%)
Two	22 (44.9%)	21(45.7%)	43 (45.3%)
Three	20 (40.8%)	19 (41.3%)	39 (41.1%)
Past Mo Opioid Use (Y)			
Heroin	2 (4.1%)	1 (2.2%)	3 (3.2%)
Street Methadone	1 (2.0%)	0	1 (1.1%)
Other Opioids	0	1 (2.2%)	1 (1.1%)
Past 6mo Opioid Use (Y)			
Heroin (n=88)	41 (91.1%)	40 (93.0%)	81(92.0%)
Street Methadone (n=40)	11 (52.4%)	10 (52.6%)	21 (52.5%)
Other Opioids (n=79)	27 (67.5%)	29 (74.4%)	56 (63.6%)
Freq Past 6mo Heroin (n=88)			
daily	33 (73.3%)	28 (65.1%)	61 (69.3%)
SUD			
Alcohol	23 (46.9%)	27 (58.7%)	50 (52.6%)
Cannabis	16 (32.7%)	19 (41.3%)	35 (36.8%)
Hallucinogens	2 (4.1%)	10 (21.7%)	12 (12.6%)
Sedatives	16 (32.7%)	17 (37.0%)	33 (34.7%)
Stimulants	25 (51.0%)	29 (63.0%)	54 (56.8%)
Tobacco	32 (65.3%)	33 (71.7%)	65 (68.4%)

Substance-related treatment. Overall, the endorsement of past and current substance use treatment demonstrated that participants' labeling of treatment type was inconsistent with the American Society of Addiction Medicine (ASAM) identification, such that the majority of participants currently endorsed being in inpatient (37.9%) or residential treatment (77.9%); participants were recruited most commonly from transitional housing programs that were affiliated with IOPs and it is assumed that participants labeled their transitional housing programs as inpatient or residential. Therefore, participants account of their past treatment history is interpreted with caution. Over 80% of participants endorsed a history of inpatient (3-4 times), residential (2-3 times), and IOP treatment (2-3 times). It was less common that participants endorsed a history of general outpatient treatment, with around half of the sample endorsing past outpatient treatment (individual and group). In the past 30 days, some participants endorsed attending NA/12 steps meetings approximately daily, 4-5 group counseling sessions per week, and around one individual counseling session per week. See table 6 below for a descriptive summary of the substance-related treatment endorsed.

For the medication group, descriptive analyses regarding prescribed recovery medication use were conducted (see table 6). Variables summarizing recovery medication use were taken from the screening measure. There was a wide range (one day to 52 weeks) of number of weeks individuals had been taking their prescribed recovery medications at the time of screening. The majority of individuals in the medication group were taking their medication as prescribed every day in the last 30 days. There were four individuals who did not take their medication as prescribed over the last 30 days (one individual taking methadone and 3 individuals taking suboxone). The number of days during which they did not take their medication as prescribed ranged from three to five days. One individual taking Suboxone endorsed not taking his

medication as prescribed five out of the last 30 days but indicated that on one day he took more than prescribed and on four days he took less (forgetting his medication or not needing his medication). The two other individuals taking Suboxone endorsed taking less medication than prescribed on three and four days in the last 30. There was one individual taking Methadone that took more medication than prescribed on three days out of the last 30, describing that he took both his weekend take-home dose in one day.

Table 8. *Substance-Related Treatment by Group*

Characteristic	Group		
	Medication (n= 49)	No Medication (n= 46)	Total (n=95)
Continuous Items: Mean (SD)			
Screening Medication Use			
# weeks on med (n=47)	14.39 (13.62)	--	14.39 (13.62)
# days not as rx (n=49)	.31 (1.06)	--	.31 (1.06)
# days in past 30			
NA/12step	25.82 (15.64)	32.72 (30.81)	29.16 (24.32)
Group Counseling	18.27 (12.67)	16.83 (11.04)	17.57 (11.89)
Ind Counseling	6.00 (7.84)	6.83 (8.18)	6.40 (7.98)
# times ever			
Inpatient	3.58 (3.24)	4.31 (2.94)	3.95 (3.09)
Residential	2.23 (2.25)	2.67 (2.02)	2.46 (2.13)
IOP	2.65 (2.40)	2.62 (1.97)	2.64 (2.19)
OP-Ind	2.35 (2.35)	1.69 (0.79)	2.10 (1.92)
OP-Grp	3.07 (5.45)	7.32 (22.5)	4.75 (14.71)
Categorical Items: N (%)			
Ever Treatment (Y)			
Inpatient	41 (83.7%)	42 (91.3%)	83 (87.4%)
Residential	39 (79.6%)	41 (89.1%)	80 (84.2%)
IOP	42 (85.7%)	42 (91.3%)	84 (88.4%)
OP-Ind	26 (53.1%)	16 (34.8%)	42 (44.2%)
OP-Grp	28 (57.1%)	19 (41.3%)	47 (49.5%)

Mental health-related variables. The mental health-related variables summarized below include diagnoses endorsed (table 9) and past and current treatment (table 10).

Mental health-related diagnoses. The mental health diagnoses are categorized by the DSM-V terminology and were presented to participants using this language with examples of specific disorders within each category as follows: Neurodevelopmental (e.g., intellectual disabilities, autism, ADHD, learning disability), Schizophrenia Spectrum (e.g., Schizophrenia, Schizoaffective, Substance-Induced Psychosis), Bipolar (Bipolar I, Bipolar II), Depressive (Major Depression, Dysthymia), Anxiety (Generalized Anxiety, Panic, Agoraphobia), Trauma and Stressor-Related (PTSD, Adjustment), Dissociative (Dissociative Identity), and Personality (Borderline Personality, Antisocial Personality) Disorder. Slightly less than 80% of participants endorsed a history of at least one mental health diagnosis, with a range of between zero and seven diagnoses endorsed. The most commonly endorsed mental health diagnoses were Depressive Disorders and Anxiety Disorders.

Table 9. *Mental Health Diagnosis by Group*

Group			
Characteristic	Medication (n= 49)	No Medication (n= 46)	Total (n=95)
<i>Continuous Items: Mean (SD)</i>			
# of MH Diagnoses	2.49 (1.83)	2.33 (1.87)	2.41 (1.84)
<i>Categorical Items: N (%)</i>			
MH Diagnosis (Y)	38 (77.6%)	35 (76.1%)	73 (76.8%)
MH Diagnosis			
Neurodevelopmental	17 (34.7%)	12 (26.1%)	29 (30.5%)
Schizophrenia Spectrum	3 (6.1%)	5 (10.9%)	8 (8.4%)
Bipolar	15 (30.6%)	14 (30.4%)	29 (30.5%)
Depressive	31 (63.2%)	28 (60.9%)	59 (62.1%)
Anxiety	31 (63.2%)	27 (58.7%)	58 (61.1%)
Trauma and Stressor	14 (28.6%)	15 (32.6%)	29 (30.5%)
Dissociative	1 (2.0%)	0	1 (1.1%)
Personality	5 (10.2%)	6 (13.0%)	11 (11.6%)

Mental health-related treatment. There were questions regarding the pattern of responding on mental health-related treatment variables. For example, between one-quarter and one-third of participants indicated that they were currently in inpatient (23.2%), residential (18.9%), or IOP (34.7%) mental health treatment at the time of survey completion. This suggests that participants were conflating their substance use treatment with mental health treatment and that they interpreted their transitional housing programs as inpatient or residential treatment. Consistent with participants' report of substance use-related treatment, participants' endorsement of past and current mental health treatment is to be interpreted with caution. Participants endorsed a less frequent history and current utilization of mental health treatment compared to substance use treatment. Currently, participants indicated that they were attending about one group per week with significant discussion of emotional problems and between one and two groups per week with significant discussion of wellbeing. Participants endorsed slightly less frequent individual counseling focused on emotional problems (less than one time per week) and/or well-being (about one time per week). Around one-third of participants reported past and current use of psychiatric medications.

Notably, there was high variability in indicators of lifetime (number of times ever in inpatient, residential, IOP, OP, meds) and current mental health treatment involvement (number of days in past 30 involved in group or individual for emotional problems and group or individual for wellbeing), as evidence by high standard deviations (in table 8). The variability was particularly high for the number of times individuals tried mental health medications, with a range of zero to 90. This suggests that while most participants have some experience with mental health treatment their quantity of past and current treatment is highly variable.

Table 10. *MH Treatment by Group*

Group			
Characteristic	Medication (n= 49)	No Medication (n= 46)	Total (n=95)
Continuous Items: Mean (SD)			
# days in past 30			
Group – Emotional Probs	6.62 (9.27)	3.82 (6.59)	5.23 (8.18)
Ind – Emotional Probs	3.40 (6.28)	3.91 (6.26)	3.65 (6.24)
Group – Wellbeing	9.36 (12.09)	8.13 (9.91)	8.77 (11.06)
Ind - Wellbeing	5.58 (8.66)	5.04 (7.41)	5.32 (8.05)
# times ever			
Inpatient	4.00 (4.38)	4.00 (3.55)	4.00 (3.89)
Residential	3.00 (3.00)	2.93 (2.55)	2.96 (2.71)
IOP	2.53 (1.77)	2.41 (1.23)	2.47 (1.50)
OP	3.56 (4.80)	3.06 (2.99)	3.31 (3.98)
Meds	9.56 (21.96)	8.92 (9.24)	9.28 (17.18)
Categorical Items: N (%)			
Ever Treatment (Y)			
Inpatient	21 (42.9%)	28 (60.9%)	49 (51.6%)
Residential	13 (26.5%)	15 (32.6%)	28 (29.5%)
IOP	19 (38.8%)	19 (41.3%)	38 (40.0%)
OP	21 (42.9%)	21 (45.7%)	42 (44.2%)
Meds	19 (38.8%)	17 (37.0%)	36 (37.9%)

Physical health-related variables. The physical health-related variables summarized below include diagnoses endorsed (table 11) and past and current treatment (table 12).

Physical health diagnosis. The majority, nearly 80%, of participants endorsed having at least one physical health problem. Most commonly people endorsed one (21.9%), two (20.8%), or three (15.6%) diagnoses, however the number endorsed ranged from zero to ten. The most commonly endorsed physical health problems were chronic pain and insomnia – all the physical health diagnoses assessed are listed in table 11 in order of most commonly endorsed to least commonly endorsed.

Table 11. *Physical Health Diagnosis by Group*

Group			
Characteristic	Medication (n= 49)	No Medication (n= 46)	Total (n=95)
<i>Continuous Items: Mean (SD)</i>			
# of PH Diagnoses	2.37 (2.39)	2.78 (2.44)	2.57 (2.41)
<i>Categorical Items: N (%)</i>			
PH Diagnosis			
Insomnia	15 (30.6%)	21 (45.7%)	36 (37.9%)
Chronic Pain	16 (32.7%)	16 (34.8%)	32 (33.7%)
Accident/Head Injury	11 (22.4%)	15 (32.6%)	26 (27.4%)
Asthma	15 (30.6%)	6 (13.0%)	21 (22.1%)
Chronic Headache	10 (20.4%)	10 (21.7%)	20 (21.1%)
Hep C	8 (16.3%)	11 (23.9%)	19 (20.0%)
Arthritis	9 (18.4%)	9 (19.6%)	18 (18.9%)
Respiratory Problems	8 (16.3%)	9 (19.6%)	17 (17.9%)
Heart Condition	5 (10.2%)	9 (19.6%)	14 (14.7%)
Gastrointestinal	6 (12.2%)	7 (15.2%)	13 (13.7%)
Seizures	6 (12.2%)	6 (13.0%)	12 (12.6%)
Diabetes	2 (4.1%)	5 (10.9%)	7 (7.4%)
Endocrine	3 (6.1%)	2 (4.3%)	5 (5.3%)
Cancer	2 (4.1%)	2 (4.3%)	4 (4.2%)
HIV	0	0	0

Physical health treatment. Nearly half of the participants endorsed a history of hospitalization and over half indicated a history of medication for an endorsed health condition. Nearly half were currently taking medications for an endorsed health condition. Participants were also asked the number of times in the past 30 days that they attended group or individual counseling during which there was significant discussion of medical problems. In the past 30 days, participants reported attending approximately one individual counseling session and two group counseling sessions with significant discussion of medical problems.

Table 12. *Physical Health Treatment by Group*

Group			
Characteristic	Medication (n= 49)	No Medication (n= 46)	Total (n=95)
Continuous Items: Mean (SD)			
# times in past 30 days			
Group Counseling	2.18 (5.33)	2.04 (5.02)	2.11 (5.16)
Ind Counseling	0.94 (2.02)	1.59 (3.99)	1.25 (3.12)
Categorical Items: N (%)			
Hospitalized	20 (40.8%)	23 (50.0%)	43 (45.3%)
Outpatient Rehab	14 (28.6%)	13 (28.2%)	27 (28.4%)
Medications – Ever	28 (57.1%)	28 (60.9%)	56 (58.9%)
Medications - Current	22 (44.9%)	19 (41.3%)	41 (43.2%)

Quantitative Main Analyses

Evaluation of assumptions. Prior to analyses, the assumptions of Profile Analysis were evaluated and are reviewed below: multivariate normality, homogeneity of variance-covariance matrix, and linearity.

Multivariate normality. Violation of this assumption is only expected if there are fewer cases than Dependent Variables (DVs) in the smallest group and/or a highly unequal sample size between groups (Tabachnik & Fidell, 2013). In the current sample, there was no group with less than five participants and the two groups samples were nearly equal ($n_{\text{nomeds}} = 46$, $n_{\text{meds}} = 49$). Therefore, violation of this assumption was not expected. Nonetheless, the distributions of the DVs for each group were examined for skewness and kurtosis and all the DVs were checked for univariate and multivariate outliers.

All of the change process variables (aim 1) were slightly skewed to the left (negative skewness statistic), but only one of which the Z score was greater than 1.96: Maintenance/Struggling to maintain (Skewness = -0.50, $SE = .25$). None of the kurtosis statistics for the process of change variables had a Z-score greater than 1.96. All but one (recovery capital) of the

recovery contextual variables (aim 2) were skewed to the right (i.e., positive skewness statistic); only one recovery contextual variable had a skewness statistic with a Z-score greater than 1.96: Recovery Capital (Skewness = -0.85, $SE = .25$). One of the recovery contextual variables had a significant kurtosis score, with a corresponding Z-score greater than 1.96, indicating that there were light tails in the distribution: consequences (kurtosis = -1.12, $SE = .49$). Given that limited DVs showed significant skewness and kurtosis and that the violations were relatively minor, as well as considering the importance of interpretability, normalizing transformations were not pursued. There were no univariate or multivariate outliers identified that were deemed significant enough to be deleted from the dataset.

Homogeneity of variance-covariance matrix. Only if the sample sizes are notably unequal is it necessary to evaluate this assumption (Tabachnik & Fidell, 2013). Given that the sample sizes in the current sample are relatively equal, violation of this assumption is not expected. However, the test for homogeneity was evaluated (i.e., Box's M), even though it is highly sensitive (Tabachnick & Fidell, 2013). In the profile analysis for aim 1 (process of recovery), Box's M was significant (Box's $M_1 = 36.9$, $F = 2.32$, $p = .003$). Therefore, Pillai's Trace was the test statistic examined for the multivariate tests, as it is considered the most powerful and robust when there are violations of assumptions. In the profile analysis for aim 2 (recovery components), Box's M was not significant (Box's $M_2 = 8.92$, $F = .85$, $p = .580$) and therefore the assumption was not violated.

Linearity. It is assumed that the relationship among the DVs are linear for the profile analysis' tests of parallelism and flatness (Tabachnick & Fidell, 2013). Given that the DVs are generally normal and the sample size is adequate this assumption is not a concern. Scatterplots of all the DV pairs were examined to evaluate this assumption. Scatterplots revealed plots

approximating linear relationships between the DVs, some more pronounced than others.

Correlations between each of the DVs were estimated for change process variables (see table 13 below) and recovery contextual variables (see table 14 below), revealing that around half of the DV pairs were significantly linearly correlated with one another. While we might expect stronger relations between each of the DVs, the change process variables and the recovery contextual variables were correlated in the direction that would be expected.

Table 13. *Correlations Among Change Process Variables*

	URICA ACTION	URICA MAINT	BEHAVIORAL PROCESSES	CONFIDENCE	TEMPTATION
URICA ACTION		-0.022	0.483**	0.361**	-0.182
URICA MAINTENANCE			-0.128	-0.194	0.240*
BEHAVIORAL PROCESSES				0.297**	-0.234*
CONFIDENCE					-0.104
TEMPTATION					

**Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

Table 14. *Correlations Among Recovery Contextual Variables*

	DUKE GENERAL HEALTH	BREF QOL	CONSEQUENCES	RECOVERY CAPITAL
DUKE GENERAL HEALTH		-0.222*	0.094	-0.106
BREF QOL			-0.424**	.616**
CONSEQUENCES				-0.296**
RECOVERY CAPITAL				

**Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

Profile analysis results. The results of the profile analyses for the two primary aims/hypotheses are reviewed below: 1) change process variables; 2) recovery contextual variables. For each of the profile analyses the parallelism, flatness, and levels sub-hypotheses' results will be summarized. The profile of means will be presented and plotted and for any significant F-tests for any of the sub-hypotheses, the appropriate post-hoc analyses will be presented.

Aim/hypothesis 1. Regarding the flatness hypothesis, there is evidence to suggest that the slope of the profile of the change process variables is significantly different from zero ($F(4, 86) = 7.20, p < .001, \text{partial } \eta^2 = .251$). This suggests that the participants' mean response on each of the change process variables was different from each other (i.e., the means of action, maintenance, behavioral processes, confidence, and temptation were different from each other). There were no a priori hypotheses regarding the relative mean levels of the change process variables.

Regarding the parallelism hypothesis, there is no evidence to suggest that the shape of the profile of the medication group is significantly different from the shape of the profile of the no-medication group ($F(4, 86) = .346, p = .846, \text{partial } \eta^2 = .016$). The effect size estimate is small, which was contrary to expected moderate to large effect size based on the literature reviewed in the current study's power analysis. This is the primary test of the profile analysis. No post-hoc analyses were conducted as there was an insignificant F-test. The interaction of the change process measures with the two covariates were not significant: screening weeks abstinent ($F(4, 86) = .956, p = .436, \text{partial } \eta^2 = .043$) and age ($F(4, 86) = .098, p = .983, \text{partial } \eta^2 = .005$).

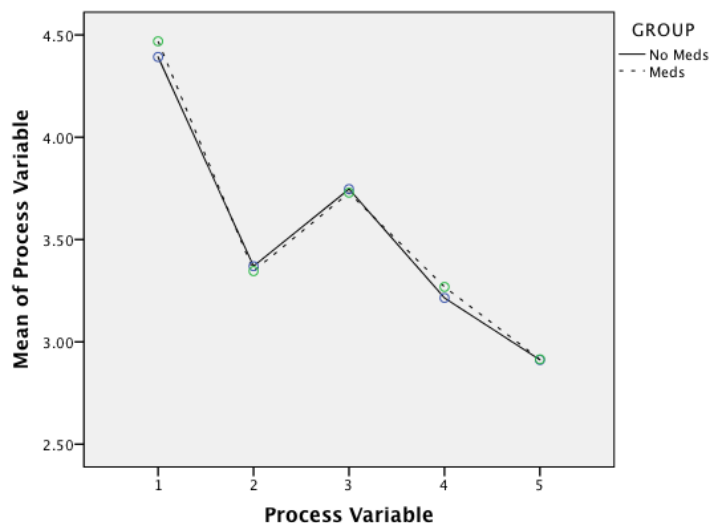
Finally, regarding the levels hypothesis, there is no evidence to suggest there is a difference between the group averages across the change process variables ($F(1, 89) = .053, p =$

.818, partial $\eta^2 = .001$). This indicates that the within-group average of the change process variables was not significantly different between groups. The covariates were examined for significance in the between group comparison for the levels hypothesis: number of screening weeks abstinent was not significant ($F(1, 89) = 1.387, p = .242$, partial $\eta^2 = .015$) whereas age was significant ($F(1, 89) = 4.181, p = .044$, partial $\eta^2 = .045$). To summarize the findings of this profile analysis the change process variable means by group are presented in table 15 and charted in figure 2.

Table 15: *Change Process Variable Means (Standard Deviations) by Group*

	Action	Maintenance	Behavioral Processes	Confidence	Temptation
Meds	4.48 (.06)	3.33 (.10)	3.72 (.09)	3.29 (.12)	2.90 (.13)
No Meds	4.39 (.06)	3.37 (.11)	3.75 (.09)	3.21 (.13)	2.91 (.14)

Figure 2. *Change Process Variable Profile by Group*



Note: Change Process Measure 1 = Action; Change Process Measure 2 = Maintenance; Change Process Measure 3 = Behavioral Processes; Change Process Measure 4 = Confidence; Change Process Measure 5 = Temptation.

Covariates appearing in the model are evaluated at the following values: Weeks abstinent = 10.6, Age = 34.0

Aim/hypothesis 2. Regarding the flatness hypothesis, there is evidence to suggest that the slope of the profile of the recovery contextual variables is significantly different from zero ($F(3, 88) = 5.161, p = .002$, partial $\eta^2 = .150$). This suggests that the participants' responses on each of the recovery contextual variables were different from each other (i.e., the means of health status, QOL, consequences, and recovery capital were different from each other). There were no a priori hypotheses regarding the relative mean levels of the recovery contextual variables.

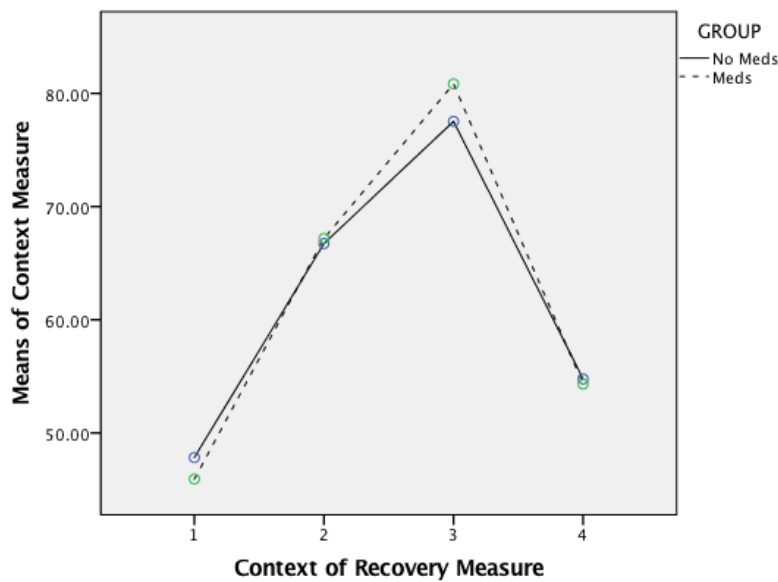
Regarding the parallelism hypothesis, there is no evidence to suggest that the shape of the profile of the medication group is significantly different from the shape of the profile of the no-medication group for the recovery components ($F(3,88) = .690, p = .560$, partial $\eta^2 = .023$). The effect size estimate is small, which was contrary to expected large effect size based on the literature reviewed in the current study's power analysis. This is the primary test of the profile analysis. No post-hoc analyses were conducted as there was an insignificant F-test. The interaction of the recovery contextual variables with the two covariates were not significant: screening weeks abstinent ($F(3,88) = .370, p = .775$, partial $\eta^2 = .012$) and age ($F(3,88) = 1.901, p = .135$, partial $\eta^2 = .061$).

Finally, regarding the levels hypothesis, there is no evidence to suggest there is a difference between the group averages across the process variables ($F(1, 90) = .061, p = .805$, partial $\eta^2 = .001$). This indicates that the within-group average of the recovery contextual variables was not significantly different between groups. Neither of the covariates were significant in this between groups comparison: screening weeks abstinent ($F(1, 90) = .014, p = .906$, partial $\eta^2 = .000$) and age ($F(1, 90) = .198, p = .658$, partial $\eta^2 = .002$). To summarize the findings of this profile analysis the recovery contextual variable means by group are presented in table 16 and they are charted in figure 3.

Table 16: *Recovery Contextual Variable Means (Standard Deviations) by Group*

	General Health	Quality of Life	Consequences	Recovery Capital
Meds	45.9 (1.57)	67.2 (1.76)	80.8 (2.18)	54.3 (3.15)
No Meds	47.8 (1.64)	66.7 (1.84)	77.5 (2.28)	54.8 (3.29)

Figure 3. *Recovery Contextual Variable Profile by Group*



Note: Recovery Contextual Measure 1 = General Health; Recovery Contextual Measure 2 = Quality of Life; Recovery Contextual Measure 3 = Consequences; Recovery Contextual Measure 4 = Recovery Capital.

Covariates appearing in the model are evaluated at the following values: Weeks abstinent = 10.61, Age = 33.9

Observed power. The observed power for all the multivariate tests is reported herein.

Despite all the steps taken in the planning and implementation of the current study to ensure adequate power, the analyses were underpowered. For the first profile analysis, the observed power for the parallelism and levels hypothesis multivariate statistics were .097 and .058,

respectively. For the second profile analysis, the observed power for the parallelism and levels hypothesis multivariate statistics were .208 and .050, respectively. These observed power estimates indicate that based on the effect sizes of the current study, there was limited power to find significant differences between the groups. The effect sizes for the parallelism hypotheses for both aims/hypotheses were lower than what was expected based on the literature reviewed in the power analysis. This could suggest that there are true differences between the groups that were unable to be detected with the current study because the effect sizes were so much smaller than anticipated.

Qualitative Results

Interview participants. There were 14 interviews conducted. The 14 interview participants were randomly selected as a subsample of the 96 total study participants. These participants were representative of the medication and no medication groups: methadone (n=2), buprenorphine/Suboxone (n=3), naltrexone/Vivitrol (n = 4), and no medication (n=5). On average these participants were 32.36 years old. The majority were white (85.7%), male (71.4%), single (78.5%), and unemployed (71.4%).

Initial codes and themes. After familiarization with the data, several initial codes were identified throughout the 14 interviews. These codes were organized into initial themes. The initial themes and codes are detailed in table 17.

Table 17. *Initial Codes and Themes*

Initial Themes	Associated Codes
Reasons for program choice	Legal, housing, women only services, geography, limited options, insurance/money, program reputation, long-term, prior experience
Helpful components of program	balance of independence and structure, sober living community, housing plus IOP combination, staff
Self-identified reasons for methadone (n=2)	Pain management, structure, clinic accessibility, urgency to stop heroin, limited options
Self-identified reasons for buprenorphine/Suboxone (n=3)	Past success, early in recovery, blocker/safeguard, decrease opioid use motivation, reduce craving, psychosocial stressors, counselor recommended, wanted a buzz
Self-identified reasons for naltrexone/Vivitrol (n=4)	Reduced craving, decrease opioid use motivation, blocker/safeguard, past negative experiences with other meds, aversion to opioid meds, legal, need something
Self-identified reasons for pathway choice – no medication (n=5)	“Clean,” not offered, free mind, other strategies more important, reasons against meds (past negative experience, physical dependence, interfere with recovery, abuse potential, fear of withdraw)
Other people’s reasons for pathway choice (perceived) - methadone	Reservations about recovery, abuse potential (to get high, use other drugs), less consequences, pain management, physical dependence, mental dependence, fear, consequences of withdraw, clinic accessibility, structure, limited availability of other meds, addiction mindset, safety net/crutch
Other people’s reasons for pathway choice (perceived) - buprenorphine	Reservations about recovery, abuse potential (to get high, use other drugs), less consequences, physical dependence, mental dependence, manage craving, in early recovery, consequences of withdraw, negatives of methadone, safety net/crutch
Other people’s reasons for pathway choice (perceived) – vivitrol	Manage craving, decrease opioid use motivation, abuse potential (use other drugs alongside), safety net/crutch
Other people’s reasons for pathway choice (perceived) – no meds	Stigma of medication, self-esteem, approach underlying problem, readiness for recovery, confidence for recovery
Reasons against methadone	No blocker, abuse potential (used heroin with it, used other drugs with it, or misused methadone), past inefficacy, past use for drug-seeking, highly addictive, increasing dosage, inconvenient, stigma, interferes with recovery, too young, health consequences, withdraw

Reasons against buprenorphine/Suboxone	Abuse potential, past inefficacy, past use for drug-seeking, withdraw, stigma eventually interferes with recovery
Reasons against naltrexone/Vivitrol	Expensive, needle involved, limited insurance coverage, new drug
Reasons against no-medication pathway	Withdraw, high severity
Differences between the medication types	Addictiveness, abuse potential, number of pros, number of cons, way medication used, stigma
Ways to use medications	Pro-recovery, drug-seeking, based on reservations/ambivalence
Impact of medication on recovery	Facilitative, hindering
Stigma related to medication use	Internalized, perceived (in-group), perceived (out-group)
Recommendations regarding medications	Detox meds, early recovery medications, long-term medications, person-dependent
Recommendations other than medications	12-step involvement, individual counseling, MH treatment, recovery network, therapeutic living community, basic needs, patience, readiness, person-dependent

Final themes. After identification of initial themes, they were checked against the raw data. The data-extracts that align with each theme were re-reviewed and evaluated for consistency – themes were adjusted as needed if data did not fit into theme. Initial themes and codes were evaluated and further combined to elucidate the final themes. Final themes are described below, using codes and raw data.

Multilevel reasons for program choice. Participants spoke about individual-level factors related to their program choice, including that the program fit their basic needs (housing, safety, geography) and recovery-related needs (long-term program, women-only services, in a new geographic location). Participants spoke about the community factors that impacted their choice. Specifically, participants detailed the limited options available in their community for desirable programming, such as affordable programming, long-term programming, programming that includes housing, or programming that meets their particular needs (e.g., women-only). Finally,

participants spoke about larger system factors such as insurance coverage and legal mandates that impacted their decision.

Multilevel reasons for pathway choice. Participants spoke about their own personal reasons for choosing medication or no-medication and identified multi-level factors that impacted their decision. First, participants spoke about their own past history with various pathways, their unique needs (e.g., pain, urgency to stop heroin, internalized stigma), and common reasons related to medication use (e.g., management of craving, blocker/safeguard, decrease opioid use motivation, abuse potential, fear of withdraw). Second, participants spoke about their immediate program factors (i.e., counselor recommendations, restricted options in program), and community factors (e.g., limited access to certain medications, other psychosocial stressors). Finally, participants spoke about larger system factors or cultural considerations such as the regulations for various medications, stigma associated with certain medications, and options offered by larger systems such as prison/jail and drug courts.

Personal reasons differ by pathway. Although, participants in both pathways (i.e., medication or no-medication) spoke about multi-level reasons for choosing their pathway, there were differences between the various medication groups and no-medication group on the specific reasons discussed. Participants who chose to use methadone spoke about their urgency to stop heroin and co-occurring pain management needs as individual-level reasons for methadone use. Additionally, they spoke about several program-level reasons, including the structure built into the methadone clinics (i.e., visiting the clinic daily, limited takes homes, regular urine analysis, stricter dosing protocols), the accessibility of methadone clinics (i.e., it is easy to access methadone clinics), and the limited availability of other options (i.e., harder to access Suboxone or Vivitrol).

Participants who chose to use buprenorphine/Suboxone spoke about several individual level reasons for their choice - their history successfully using the medication and multiple medication effects that are supportive of recovery (i.e., blocker mechanism, decrease motivation for using, reduction in craving, getting a buzz). Participants also indicated that program-level factors influenced their decision, particularly that their counselor recommended the medication. Finally, these participants discussed the larger system factors that influenced their decision, specifically the importance of using a medication given the psychosocial stressors they were experiencing.

Participants who chose to use Vivitrol described several individual-level reasons for their choice - multiple effects of medication that were supportive of their recovery (i.e., reduced craving, decreased opioid use motivation, blocker) as well as their past negative experiences with the opioid medications or their negative evaluation of the opioid medications. Coupled with the reasons cited for not using opioid medications, these participants discussed their perceived need for a medication to support their recovery. Finally, participants discussed legal mandates as a systems-level reason for their vivitrol use.

Participants who chose to not use any medications cited several individual level reasons for their choice. These individual-level reasons included several positive consequences of not using any medications: the perception that they were “clean” if they were taking no medication, the positive effects of having a “free mind”/“clear head,” and the importance/focus on other strategies to maintain their recovery (e.g., changing thinking and behavior patterns, treatment, NA/AA). Other individual-level reasons highlighted by the no-medication group were related to the negative effects of medications (past negative experience, physical dependence, interference

with recovery, abuse potential, fear of withdraw). Finally, participants who chose to not use medications discussed one program-level reason - they were not offered any medication options.

Several negative consequences of medications. Participants discussed the reasons why they did not choose the various medications or no-medication pathway. These themes elucidated the negative consequences of the various pathways. Participants spoke about the abuse potential of methadone (i.e., used heroin with it, used other drugs with it, misused methadone) and buprenorphine/Suboxone (used other drugs with it, misused Suboxone); this was highlighted more in the discussion of methadone. For both opioid medications, participants described the following reasons to not use methadone or buprenorphine/Suboxone: their past experience with the medication when it did not support their recovery, describing its inefficacy and/or their past use of it for drug-seeking reasons (i.e., wanting to get high), withdraw associated with coming off the medication, and the stigma associated with the medication. In addition, participants described methadone as highly addictive, inconvenient to use (i.e., have to go to clinic everyday), interfering with recovery (i.e., can't function or engage in recovery), being associated with negative health consequences, being for older people, and not having a blocker to aid in recovery. There were more cited reasons against using Methadone compared to buprenorphine/Suboxone.

The reasons participants cited for not using Vivitrol were different than the opioid medications. The following reasons were discussed: Vivitrol is expensive, involves a needle, isn't always covered by insurance, and is a new drug with unknown consequences. The reasons against not using any medications were simply the fear of withdrawal and that medication may be indicated for someone with a high level of OUD severity. Overall, participants described less negative consequences associated with the Vivitrol and no-medication pathway.

Reasons for and against various pathways are person-dependent. Several participants discussed that the reasons in support of or against various pathways is dependent on the person.

“I think the advantage, or the different advantages would be really dependent on the person, their history or were they a chronic user, were they a social user, were they...you know, what their situation is. And I think the advantages, those options out there either non-buprenorphine or methadone or Vivitrol. Something, one of those four have to work for you.” *[Participant 17- Suboxone]*

“I'd only recommend [medication] if I knew the person. If someone told me their story and told me...like chronic relapsers, yes. But someone who's, like, kinda new to it, maybe not.” *[Participant 4 - Suboxone]*

Reasons for and against various medications can be informed by recovery-intent, drug-seeking goals, or based on reservations/ambivalence about recovery. Many participants discussed a wide variety of reasons for choosing or not choosing various medications. Importantly, the various reasons that they listed often included reasons informed by recovery-intent, drug-seeking, or reservations/ambivalence related to recovery. This highlights that the medications can each be used with different intent.

Recovery-intent.

“And don't get me wrong, there are those people that do [Suboxone] for the right reasons because, you know, some people aren't strong enough to go without anything and really don't wanna relapse. And so Suboxone does have a blocker and stuff like that which is great.” *[Participant 2 – no medication]*

Drug seeking goals.

“Other than not being ready, the only people that I really see are just people that have been just addicted for so long and they just can't get out of that mindset. Like, they're just kind of stuck in their ways and they know that they wanna keep getting high but they're trying to get rid of some of the consequences for dealing with drug dealers, and doing it illegally, and everything. So I mean, honestly, with methadone that's really all I see.” *[Participant 4 - Suboxone]*

Context: In discussion of Vivitrol

“I know people that switch from opiates to stimulants so they can use [stimulants] on it” *[Participant 5 – no medication]*

“There was no reason for me to be on it. I mean, the one thing that I would say that there was truth to was I'd be like, "Whoa, I know that it'll keep me...so it'll make being sober easier." But other than that, I was pretty much on it for the wrong reasons, just looking for something that I might be able to get a buzz off or something... I was just still in that mindset.” *[Participant 4 – Suboxone]*

“Well, the methadone when I was on that, I had never really stopped using. I just would switch to coke or maybe use heroin less. It was more like a crutch. So, I would guarantee not be sick in the morning but if I had money I could go and cop and get what I really wanted.” *[Participant 2 – no medication]*

Reservations/Ambivalence about recovery.

“Because they still have reservations about getting high. They still wanna have that feeling, that out-of-body experience. They don't like feeling their own emotions, which is...I can't blame them” *[Participant 9 – no medication]*

“And when I was getting out of jail, I still had that [bad] mindset, you know, I was just telling you about but, like, there was a little bit in me that wanted...I knew I needed to do better. I just wasn't really ready yet.” *[Participant 4 - Suboxone]*

“Because unfortunately, through all of the channels, whether it be pain medication, maintenance program, Suboxone, methadone, that's a way for you to continue being addicted to something, not mentally but your body, at least.” *[Participant 9 - Suboxone]*

Various medication pathways can facilitate or hinder recovery. Participants spoke about various medication types and how the medications can be used in a way that facilitates or hinders recovery. Participants spoke of a hierarchy of abuse potential and a higher likelihood of certain medications to hinder recovery. Most participants spoke about the opiate medications being the most likely to be hindering to the recovery process, with methadone being the most likely. However, several people also described that if the medication is used in the way it is intended then it can be facilitative of recovery.

Methadone.

“[Methadone] is helping in my recovery. It makes me be able to get up every single day and face the pain that I'm in. I mean this morning, I had to roll out of bed. I worked overnight. You know, I came home and got to take a little bit of nap. And the pain was so from standing on my feet all night. And then, I had to roll out of bed to come down here. I mean that's how bad the pain is.” *[Participant 15 - Methadone]*

“A lot of people do use it as a permanent Band-Aid.” [*Participant 5 – no medication*]

“For me, it completely numbs me. I don't work a program when I'm on it. I just use it in place of other substances...you know, of the heroin. And I actually wanted to work a program this time and try to do it right. I have schooling in this field, I have a college education in addictions that I haven't put to use. So, I have plans to come. Like, I have some support of people that work here, like, to come back here and work.” [*Participant 14 - Vivitrol*]

Suboxone.

“[Suboxone] doesn't make me high but it's just the fact that I wanna get better and I know that as long as I'm taking something I'm not gonna get better. You know, it's gonna just prolong it basically. Yeah, I might take Suboxone for six, seven months and not use heroin but eventually it's like inevitable. It's like I'm going to. So I'd rather... I know that the only way that I can treat my disease is to stay abstinent and healthy repetitive cognitive exercises basically. So that's what I'm doing.” [*Participant 2 – no medication*]

Context: Discussing the impact of Suboxone on recovery

“Be in a full type of recovery, meaning that I'm actually working on my mind and my body rather than focus on, "Oh, my God, I can't use this." You know, I feel a little bit safe. I feel safe from myself because I know what I could easily go back on and do.” [*Participant 17 - Suboxone*]

Context: Discussing why participant chose not to use suboxone in his recovery

“I mean, it still binds to your opioid receptors, it doesn't allow you to heal. Like, you need to heal. You know, it takes a while being clean to heal. And clearly, last time, like, I got on [Suboxone] to prevent a relapse. And truthfully, I ended up being found in the upstairs bathroom here by the worker. I was blue, aspirated, and almost dead.” *[Participant 14 - Vivitrol]*

Context: Discussing why not using suboxone anymore

“Yeah. It made me laugh, put me to sleep, and stuff. But it still gave the withdrawal, the same as heroin so I didn't... It was like a lose-lose.” *[Participant 13 – no medication]*

Current recovery decisions situated in recovery process. None of the interviewees indicated that this was their first recovery attempt. Most of the interviewees spoke about their history of multiple recovery attempts from which they learned what worked and what did not work. Several participants spoke about their past experiences with various medications informing their current decision to use or not use certain medications. Many participants had the experience of medication hindering their recovery in the past or using the medication in a way that was a hindrance to their recovery (see section above). Several participants also spoke about their trial and error process related to medication, that some medications have been helpful strategies and others have not. Participants all shared about using their past experience to inform their current recovery decisions. Several participants discussed their current readiness and their process of change thus far impacting their current decisions.

“I don't know. I really think that you need to be ready. I don't think you can...you can't force...I mean, you can bring a horse to water, but you can't make it drink. And like, as

sad as it is, I don't think you can force anybody to get clean.” [Participant 9 – no medication]

Context: In discussing why didn’t choose a residential program

“I've been through this process a lot so I know what works for me and what doesn't. And I've been down that road already, so. Yeah. I mean, it may have, whatever, but that's not what I need because I'm further along. As I kept doing it, I kept getting closer and closer to wanting really to put everything into this and stop using. So I know being confined and restricted and told, "You can't do this, you can't do that," like I'm a child or something, it's not gonna work me. Yeah, to work, go to school, but not to have too much that...I need structure but a lot of structure. Structure is good but not being constricted.”

[Participant 13 – no medication]

There can be change in motivation for medication use over time. One participant in particular spoke about the shift in his motivation over time related to his use of Suboxone for his recovery. He described initially wanting to use Suboxone because of his reservations or ambivalence about recovery and for drug-seeking reasons and then over time deciding to use the medication in support of his recovery.

“There was no reason for me to be on it. I mean, the one thing that I would say that there was truth to was I'd be like, "Whoa, I know that it'll keep me...so it'll make being sober easier." But other than that, I was pretty much on it for the wrong reasons, just looking for something that I might be able to get a buzz off or something... I was just still in that mindset.” [Participant 4 - Suboxone]

“And when I was getting out of jail, I still had that [bad] mindset, you know, I was just telling you about but, like, there was a little bit in me that wanted...I knew I needed to do

better. I just wasn't really ready yet. So, I just... And, you know, it was like that for a couple months. I mean, I don't really think like that anymore. My mindset's changed a lot since then. I've been here for a while. But yeah, it's definitely been very helpful. Now, I'm finally to the point where it's, like, I'm starting... I don't wanna say I feel guilty for being on it, but it's just, like, I don't know, I notice the things that I don't like about it. Like, if I work late and I'm not here to get it, then, like, I start to feel like crap and I get a lot of anxiety, and just generally just don't feel good. And I don't like that. I feel, like, it's probably time for me to start tapering down. But then at the same time, my six months was up. It's a six to nine-month program here, and my six months was up a month ago. And I had just bought a car and was all ready to go, but now I'm still waiting on my license. Maybe it takes forever. So, I'm waiting until I get settled to wherever I'm going. I think I'm moving in brother's house. I mean, his wife's house. And once I get there, I'm gonna start tapering down.” [Participant 4 - Suboxone]

A multi-component recovery plan is recommended. When asked about their recommendations for recovery, all participants spoke about multiple components. These included medications, 12-step involvement, individual drug counseling, mental health treatment, a recovery network, and therapeutic living communities. Participants spoke about the need for one’s basic needs to be met first and the importance of programs with a housing component. In addition to this, participants highlighted the importance of a person-specific recovery plan and individuals knowing what is helpful or unhelpful for them.

Components of recovery plan is person-dependent.

“Every little thing with recovery is not for everybody...some people might need medication or antidepressants, and some people just might need to do talk therapy

or, you know, whatever. So, it's important to talk to somebody and to let them know everything. Because, to me, recovery is on an individual basis.” [Participant 13 – no medication]

“It's just so much different. I mean, everyone is just unique. It just has so much to do with how your attitude is, what you really want. Not what you think we want though, what you deep down want, you know.” [Participant 4 - Suboxone]

Nuanced medication recommendations. Participants discussed the nuances of their medication recommendations, specifically the particular medications that they would recommend, for whom, and at what time in recovery.

“Depending on how bad their habit is that I would put them on the maintenance program, but they would be tapered off and it wouldn't be for no more than three months. Because that's just, for me, unrealistically...just putting somebody on it for that amount of time is just maintaining their high.” [Participant 13 – no medication]

Medication is recommended for detox and early in recovery. Participants discussed their perspectives on medications for detoxification and for maintenance. Participants did not identify any negatives to using medications for detoxification purposes. The negative perspectives presented previously in these results related to the use of maintenance medications. Participants also described that there are fewer negatives to using medication if medications use is limited to early in the recovery process.

“I mean, I would guess if someone was serious about their recovery, they wouldn't want any maintenance of something that's gonna continue. Unless you really need it and you're

withdrawing, but you have to do it as prescribed and taper off of it eventually. But to continue on taking it and taking it, it's not right.” [Participant 13 – no medication]

Context: discussing the use of medications

“If you're not withdrawing, you shouldn't be taking it... Yeah, when you're first coming off, of course. But should nobody be on it for years. I'm sorry, that's my opinion.”

[Participant 13 – no medication]

“Depending on how bad their habit is that I would put them on the maintenance program, but they would be tapered off and it wouldn't be for no more than three months. Because that's just, for me, unrealistically...just putting somebody on it for that amount of time is just maintaining their high.” [Participant 13 – no medication]

“it should be a band-aid or a crutch. You know, it shouldn't be something that's a permanent thing” [Participant 5 – no medication]

Stigma is prevalent. Most participants spoke about stigma related to medications. They identified both perceived stigma of their in-group (i.e., AA/NA, their peers) and out-group (i.e., general community). Several interview participants shared their own negative beliefs about individuals who use certain medications; several participants spoke about being “clean” and demonstrated that they had internalized the belief that recovery on medications is not “clean” or is “less than” recovery without medications. Additionally, several participants discussed their internalized stigma associated with medication use. There was a hierarchy of stigmatized medications elucidated, with methadone being the most stigmatized followed by buprenorphine/Suboxone and then naltrexone/Vivitrol.

Context: discussing stigma and its origin

“Other people, other people in recovery because that's the only people I'm around. Like, I had a sponsor who wouldn't be my sponsor because I was on methadone and that was just recently. I just asked. And she said that she can't sponsor me being on methadone, which is fine because I have another sponsor.” *[Participant 15 - Methadone]*

“When you go into meetings, people don't think that you're...you know, a lot of people don't agree with being on a maintenance drug to keep you from using, they think that you're living dirty. And it probably just makes you feel better altogether, you know, not being on anything.” *[Participant 12 - Suboxone]*

Context: Discussing participants reasons for not using methadone

“Methadone just always seemed...I just always had a bad taste in my mouth about methadone. It just always seemed bad. I don't know...Well, anyone I've ever seen on methadone is usually not the type of person that I think is doing good in recovery. And I mean, you know, just like typically what people think about methadone, because, you know, like, you pass a methadone clinic at 4:30 in the morning, and there's just a line of shady-ass people, like, waiting for the door to open. And, I mean, I've heard you get really high off of it. And pretty much what someone told me once was that...it was actually my neighbor last year in Westminster, he was like, "Hey..." because I live right across the street from one... And he was like, "Hey, I got on this methadone clinic. It's awesome." He's like, "I can still get high on it, but I have this every day. So if I can't get something one day, and I still feel fine." He's like, "It's great." And just hearing that it's, like...” *[Participant 4 - Suboxone]*

Context: Discussion related to why people choose naltrexone/Vivitrol

“So that they're not on anything. Because a lot of people say that when you're on methadone and suboxone, that you're not truly clean. So to be truly clean off of any substance, I think that people choose Vivitrol.” [Participant 15 - Methadone]

Quantitative Perceived Stigma Measure. The perceived stigma for the following three reference groups was assessed quantitatively in the current study: individuals with OUD, individuals who use methadone to aid in their recovery, and individuals who use buprenorphine to aid in their recovery. For each of these three reference groups, five items were used to quantify perceived stigma. Study participants indicated their level of agreement (1-strongly disagree to 6-strongly agree) with the following five items for each reference group: 1) most people believe that (reference group) are just as intelligent as the average person, 2) most people believe that (reference group) are just as trustworthy as the average person, 3) most people feel that (reference group) is a sign of personal failure, 4) most people think less of (reference group), 5) most people will not take the opinions seriously of (reference group). Below are the charted means for each of the stigma items delineated by medication group or no-medication group. The means are presented for each of the reference groups assessed (figures 4 - 6).

The group means for individuals with OUD, individuals who use methadone to aid in their recovery, and individuals who use buprenorphine all revealed a pattern consistent with high levels of perceive stigma. For individuals with OUD there was no significant difference between the profile of item responses for respondents who were using or not using medications ($F(4, 72) = .249, p = .909, \text{partial } \eta^2 = .014$). The within-group average of the stigma items were significantly different between the medication and no-medication group for perceived stigma towards individuals who use methadone to aid in their recovery ($F(1, 75) = 3.98, p = .050, \text{partial } \eta^2 = .050$) and individuals who use buprenorphine ($F(1, 75) = 4.30, p = .042, \text{partial } \eta^2 = .054$).

This points to slightly higher levels of perceived stigma for using opioid medications among individuals using medications to aid in their recovery. Consistent with the qualitative themes, there are high levels of perceived stigma associated with opioid medication use; the qualitative themes revealed that this stigma was a factor in deciding whether or not to use opioid medications.

Figure 4. *SUD Perceived Stigma Profile by Group*

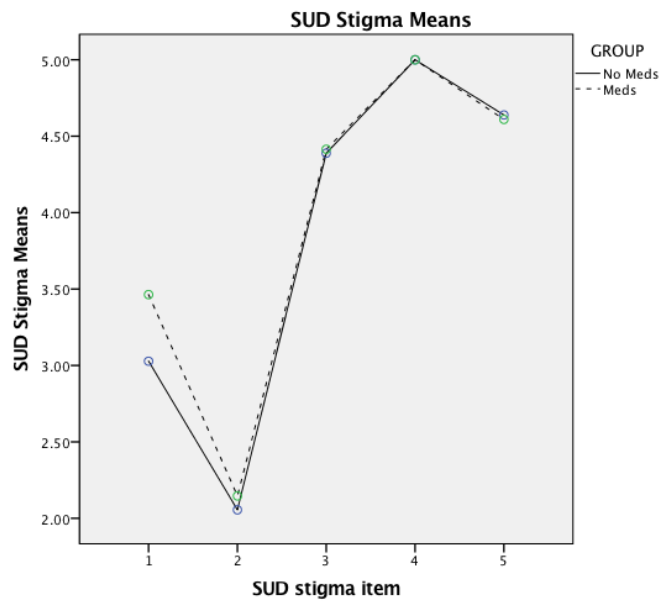


Figure 5. *Methadone Perceived Stigma Profile by Group*

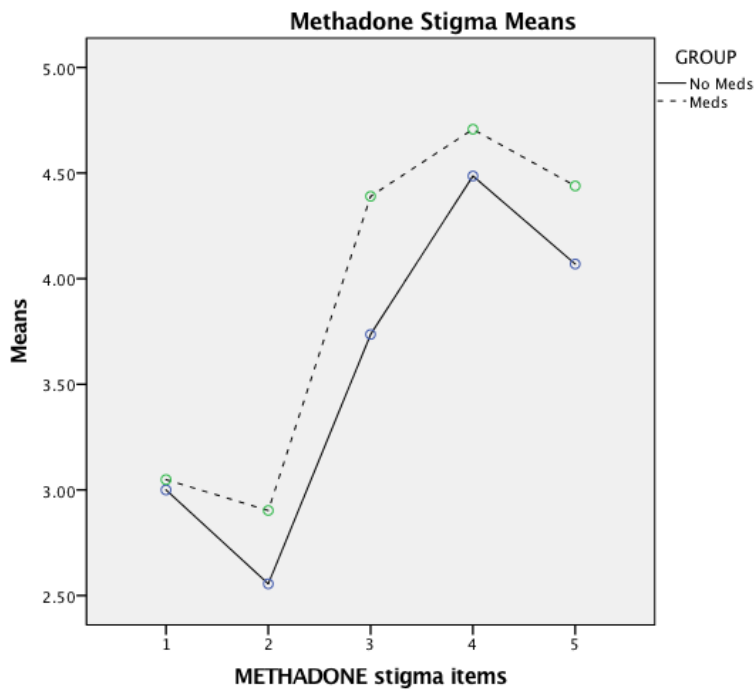
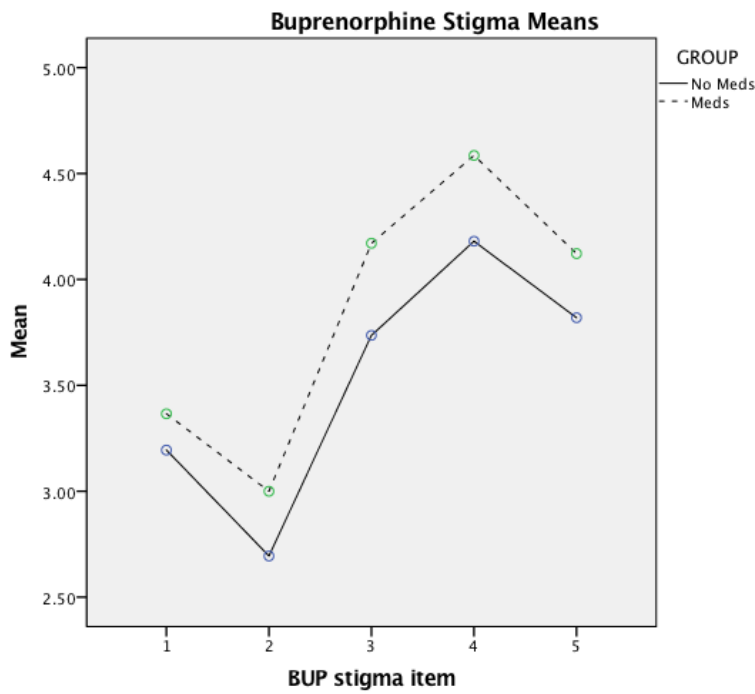


Figure 6. *Buprenorphine Perceived Stigma Profile by Group*



Chapter 5 Discussion

Promoting recovery among individuals with Opioid Use Disorder is urgent given the increasing morbidity and mortality associated with opioid use. However, recovery is a complex change process with multidimensional contextual variables involved (health, community integration) and multiple pathways. The current study sought to compare the change process and the contextual variables of recovery between specific pathways of recovery (medication versus no medication) among individuals in early recovery. The goal of the current study was to characterize the relative engagement in and experience of recovery by chosen pathway.

Conclusions

The sample recruited for the current study was similar to other samples of individuals in recovery from Opioid Use Disorder (Ross et al., 2005, Maremni et al., 2007), such that the sample was primarily between 20-40 years old, male, high school educated, unemployed, single, with a history of being in jail or prison, and with low annual income. Additionally, like other samples (Ross et al., 2005, Maremni et al., 2007), the majority of individuals in the sample had Polysubstance Use Disorder with severe Opioid Use Disorder, co-occurring mental health diagnoses, and at least one physical health diagnosis.

Null findings. The primary quantitative analyses of the current study revealed that there were no significant differences between individuals who chose to take recovery medications (methadone, buprenorphine, naltrexone) compared to those who chose to not take medications across indicators of engagement in the change process or the experience of the multidimensional contextual recovery variables. The original hypotheses were not supported for the process of change variables: it was originally expected that the no medication group would demonstrate more struggle to maintain their abstinence, higher engagement in the behavioral processes of

change, show higher temptation and lower confidence. The original hypotheses were not supported for the contextual factors of recovery: it was originally expected that the no medication group would have a healthier profile such that they would report lower health pathology, higher quality of life, higher social recovery capital, and less substance-related problems. It is important to highlight that not only were the original hypotheses not supported but no differences were found, such that both groups reported comparable engagement in the process of change and levels of health (health pathology and quality of life) and community integration (social recovery capital and substance-related problems). This suggests that neither group is “out-performing” the other. The specific means and the profile of those means are compared below to prior research to better understand the implications of these null findings.

Aim 1 – change process. The current study used the Transtheoretical Model of Change as the model for the change process involved in the action stage of change and the related measures to assess engagement in that process: stage of change indicators (action, maintenance/struggling to maintain subscales of the URICA), behavioral processes of change, confidence, and temptation. All of these measures have a range from one to five. Prior research investigating these variables in relevant samples is reviewed here to compare to the results of the current study.

The means of the recovery change process variables are indicative of engagement in the action stage of change. The change process means reported were consistent with those reported in comparable samples of individuals in early recovery from opioid use. Specifically, Belding and colleagues (1996) presented the mean URICA subscale scores for 262 participants that were classified into the action stage using the behavioral algorithm, which was used as the basis for the screening measure in the current study. The current study’s reported means for the action

subscale for both the medication ($M_{\text{action}} = 4.47$) and no-medication group ($M_{\text{action}} = 4.39$) were comparable to, yet slightly higher than, Belding and colleagues' reported mean ($M_{\text{action}} = 4.0$). Whereas, the current study's reported means for the maintenance subscale for both the medication ($M_{\text{maintenance}} = 3.37$) and no-medication ($M_{\text{maintenance}} = 3.37$) group were comparable to, yet slightly lower than, Belding and colleagues' reported mean ($M = 4.20$). One study reported the mean for the behavioral processes measure for a sample in early recovery from opioid use (Tejero et al., 1997); in a sample of abstinent patients, recruited 3-12 weeks into methadone maintenance treatment the mean behavioral processes score ($M = 2.69$) was less than the behavioral processes means reported in the current study for the medication group ($M = 3.73$) or the no-medication group ($M = 3.75$) suggesting higher engagement in the current sample. Therefore, the current sample is certainly in the action stage with potentially less struggle to maintain (Belding et al., 1996) and more behavioral process use (Tejero et al., 1997) than other comparable samples.

Studies investigating the change process variables among individuals in early recovery from other substances, particularly alcohol use, can help shed light on the current study. DiClemente and Hughes (1990) identified five profiles of URICA subscales, the stage of change measure used in the current study, among a group of 224 individuals entering outpatient treatment for alcohol use. The pattern of T-scores of the URICA subscales assessed in the current study (action, maintenance/struggling to maintain) were most consistent with a profile identified by DiClemente and Hughes of individuals invested and engaged in alcohol-related behavior change ("participation profile"): high action T-score and comparatively lower maintenance/struggling to maintain T-score. Specifically, the URICA subscale T-scores in the current study for the medication group and no-medication groups are the same ($T_{\text{action}} = 60$;

$T_{\text{maintenance}} = 45$) and are comparable to the “participation” profile ($T_{\text{action}} = 62$; $T_{\text{maintenance}} = 57$).

The current sample shows a lower average maintenance T-score, indicating that the current sample is experiencing less struggle to maintain their abstinence than those in the comparison study; this may be expected given that individuals in the current study were perhaps further along in the change process - in recovery for at least one month abstinent up to 6 months.

Not only are the means of the change process variables indicative of a group that is engaged in the action stage of change but of a group that is able to sustain their abstinence. Carbonari and DiClemente (2000) utilized data from Project MATCH (673 outpatients and 510 aftercare clients) to compare profiles of recovery process variables pre- and post-alcohol treatment (12 weeks) between individuals who were abstinent, drinking moderately, or drinking heavily at one-year post treatment. This study assessed all the change process variables of interest from the current study: action subscale, maintenance/struggling to maintain subscale, behavioral processes, confidence, and temptation. The current study’s profile of change process variables was most consistent with the one-year abstinent profile: high action subscale with comparatively lower maintenance subscales; higher confidence and lower temptation; high behavioral process engagement. The reported median values for both the outpatient and aftercare sample at the end of the 12-week alcohol treatment were similar to the means reported for both the medication and no-medication group of the current study (see table 18 below).

Comparatively, the action, maintenance, and behavioral process means were similar. The current study participants reported lower confidence and higher temptation than the medians reported in the Carbonari and DiClemente study at the end of treatment. This could be attributable to many factors, one of which is that the Carbonari and DiClemente study medians were assessed at the end of 3 months of treatment compared to this sample who may have been earlier in recovery.

We would expect confidence to increase and temptation to decrease as individuals progress in their recovery (DiClemente, Prochaska, & Gibertini, 1985). Another possible explanation is that majority of the current sample was recruited from transitional housing in which they were living in a structured, sober living community – perhaps moderating confidence and temptation self-assessments.

Table 18. Comparison of Study Means with Carbonari & DiClemente Medians

	Action	Maintenance	Confidence	Temptation	Behavioral processes
<i>Carbonari & DiClemente, 2000</i>					
Outpatient	4.3	3.0	4.2	1.7	3.4
Aftercare	4.3	3.1	4.3	1.7	3.6
<i>Current study</i>					
Meds	4.47	3.35	3.27	2.92	3.73
No Meds	4.39	3.37	3.22	2.91	3.75

Taken together, the results regarding the change process variables seem to indicate that both the medication and no-medication group are actively engaged in the change process of recovery, endorsing beliefs consistent with the action stage, working hard to maintain their abstinence, engaging in the behavioral tasks to maintain their recovery, and indicating that they are rather confident and moderately tempted in their efforts to maintain their abstinence. This seems to suggest that recovery medications do not interfere with process of change. This also suggests that recovery medications are not necessary to promote engagement in the process of change; individuals not using medications are able to thwart temptation and enhance confidence similarly to individuals on medication.

Aim 2 – contextual recovery variables. The profile of means for the multiple multidimensional contextual recovery variables (health pathology, quality of life, social recovery

capital, consequences) in the current study reveal scores consistent with individuals in early recovery when compared to scores documented in prior research.

Health pathology. The general health score (range 0 – 100) of the DUKE health profile was used to assess health pathology in the current study. There is no cut-off score indicating pathology for this subscale. Therefore, the general health subscale scores from studies with comparable samples are presented for comparison. Parkerson and colleagues (1990) presented general health scores for three groups: those with health maintenance problem ($M = 66.1$, $SD = 14.6$), those with mental health diagnoses only ($M = 57.1$, $SD = 17.8$), and those with physical pain syndromes (chest, abdominal, and low back pain) ($M = 77.4$, $SD = 13.1$). The current study's health pathology score is more closely aligned with the mental health diagnosed group. Given that higher levels on the DUKE Health Profile general health score indicate better health, generally these samples showed better health than reported in the current study for the medication ($M = 45.5$, $SD = 1.58$) and no-medication group ($M = 47.9$, $SD = 1.66$). This is consistent with individuals in early recovery; past research has demonstrated that at the start of and during opioid-substitution medication treatment individuals have poorer health compared to the general population and other comparison groups (Deering et al., 2004; Millson et al., 2004; O'Brien et al., 2006). It is also expected that over the course of recovery individual's health would improve (Torrens et al., 1997)

Quality of life. An overall QOL score taken from the average of the four domains of the WHO Quality of Life-BREF (WHO QOL – BREF) was used as the measure of QOL in the current study (range 0 – 100). Past studies with similar samples are presented for comparison. Dwee Shion and colleagues (2014) assessed 108 patients receiving methadone and buprenorphine medications in Malaysia. The overall scores in the methadone ($M = 73.3$) and

buprenorphine ($M = 70.7$) groups showed slightly higher QOL scores than the current study scores in the medication ($M = 67.2$, $SD = 1.73$) and no-medication ($M = 66.7$, $SD = 1.83$) groups.

Bizarri and colleagues (2005) compared the QOL between three groups of opioid-dependent patients enrolled in treatment between the ages of 18 and 55 years old: dual-diagnosis (26 methadone, 13 buprenorphine, 2 no opioid med), substance only (42 methadone, 10 buprenorphine, 5 no opioid med), and control (healthy controls, recruited from primary care facilities in Italy, with no physical or psychological problems in the last month, no regular drug use in last 15 days). The QOL scores in the current study fell between the overall QOL scores of the control ($M = 70.8$) and the other two groups – dual-diagnosis ($M = 52.2$) and substance only ($M = 56.8$).

Generally, comparison with these two studies indicates that the QOL reported in the current study is lower than individuals with no current substance use problem, consistent with prior research (De Maeyer et al., 2010), but within the range of QOL scores reported for individuals enrolled in treatment for Opioid Use Disorder. We would expect low levels of QOL at entry to treatment with improvement within the first three months (Vignau et al., 1998), six months (Padaiga et al., 2007), or one year (Dazord et al., 1998) of treatment. Therefore, it is possible that we would expect further improvement in the current sample's QOL.

Recovery capital. There is limited research on recovery capital, as this is a relatively new construct, but prior studies have documented the social recovery capital scores that are comparable to the current study. Past studies have documented average social recovery capital (range 0-100) scores for individuals enrolled in treatment: 20 youth (18-20 years old) in residential detox in Australia ($M = 57.2$) (Mawson et al., 2015) and 142 adults engaged in community alcohol and drug rehabilitation programs in Scotland ($M = 58.5$) (Groshkova et al.,

2013). One study documented the post-treatment social recovery capital scores for 176 former illicit drug users engaged in recovery groups ($M = 82.8$) (Best et al., 2012). The social recovery capital scores documented in the current study's medication group ($M = 53.7$) and no-medication ($M = 54.8$) group are most comparable to individuals enrolled in treatment (Mawuson et al., 2015, Groshkova et al., 2013) and lower than the post-treatment scores (Best et al., 2012).

Consequences. The current study modified the Short Inventory of Problems for Drugs (SIP-D) to assess consequences of opioid use. Several past studies documented comparable SIP scores (range 0 – 100) to contextualize the current study's reported score for the medication group ($M = 80.8$) and no-medication group ($M = 77.5$). In similar samples the reported score on the SIP was less than those reported in the current study: patients who used alcohol or drugs in the last 28 days enrolled in outpatient treatment ($M = 33.5$) (Kiluk et al., 2013) and individuals dually diagnosed with SUD and Bipolar in an RCT of group therapy for dual-diagnosis ($M = 48.9$) (Bender et al., 2007). These studies were not opioid use specific so might not be directly comparable to the current study, but it notable that the average consequence score was high in the current study. Opioid users could be expected to have accumulated a number of consequences because of illegality and severity of the opiate addiction.

Overall, the contextual recovery variables in the current study revealed a profile consistent with early recovery. All the contextual variables related to recovery are within the range of scores documented in prior research with similar samples, with the exception of particularly high consequences reported in the current study. Again, this suggests that use of medications does not interfere with progress toward health and community integration but use of medications also does not differentially promote such progress.

Explanations for null findings. Taken together, the profile of the recovery change process and the profile of the contextual recovery variables indicate that the sample herein is a group of individuals actively engaged in the change process of the early stages of recovery yet is still experiencing many effects of their use related to health and community integration. This is to be expected given that on average individuals in the current study were between 10 – 11 weeks abstinent. Given the null findings regarding group differences, it follows that for the current sample, medication does not interfere with individuals' engagement in the change process of recovery yet may not facilitate improvement on the multidimensional contextual components of recovery (i.e., better health and community integration). The current study's qualitative results help to explain the null findings regarding group differences; below are some hypothesized explanations for the null findings.

First, it is possible that the limited diversity in recruitment sites can explain the null findings. Specifically, the majority of the sample (94.8%) was recruited from two transitional housing programs. These transitional housing programs had multiple requirements of their residents, including but not limited to IOP attendance and participation, random urine drug screens, 12-step attendance, and house/living rules. In the qualitative interviews these programs were characterized as rare and desirable; interviewees spoke about multi-level reasons for engagement in these programs including their desire for a long-term program and housing. It is possible that individuals enrolled in these programs were particularly ready for recovery, interested in long-term stability. Many of the interviewees spoke about their multiple past trials with recovery, the lessons they had learned, and new strategies they were currently using to enhance their chances of success. Many interviewees also discussed that in their past trials of medications, the medications interfered with their engagement in the change process of recovery.

Therefore, it is possible that if this study was replicated among individuals in their first or second recovery attempt or medication trial there would be differences between the medication group and no medication group on the change process variables (i.e., individuals taking medication would show less engagement in the change process). It is also possible that the other requirements of residency in the transitional housing programs provided the scaffolding necessary to facilitate recovery for individuals taking and not taking medications that would not be available in other recruitment or treatment settings. This could impact levels of confidence and temptation.

Second, it is possible that medication is not the best delineator of recovery pathway but the reason for choosing a particular medication is more important. Perhaps it is not the medication that promotes or hinders the change process but instead the way in which the medication is used. Interviewees revealed that individuals can use medications for recovery-related reasons or for non-recovery related reasons (i.e., drug-seeking, reservations), medications can either facilitate or hinder one's recovery, and that medication decisions are situated in a long recovery process. More specifically, several interviewees spoke about past use of medications for drug-seeking or due to their ambivalence about recovery and therefore using the medication in a manner that interfered with their recovery. They also spoke about currently using medications for recovery-related reasons, using it to support their recovery (i.e., manage cravings, decrease motivation to use) and having a plan about tapering off the medication in the future. This suggests that perhaps this sample of medication users were particularly ready to engage in the recovery change process, as they were using the medication with recovery-related intent.

Third, it is possible that there is not one way to delineate a pathway of recovery because there are so many factors that constitute a recovery pathway. The qualitative results showed that there are multi-level factors that impact recovery-related decisions. Additionally, interviewees recommended a multi-component recovery plan of which medications was only one piece. Therefore, perhaps there were no differences between the medication groups because recovery pathway is too complex to characterize by one factor. There are multiple explanations for the null findings which point to uniqueness of the current study's sample and the complexity of recovery.

Fourth, it is possible that there are other variables (i.e., housing, legal status, stigma) influencing the variables of interest in the current study that are confounding the current study's findings. Highlighted in the qualitative results, many of the interviewees indicated that they chose their treatment program because of the housing provided, reporting that they had unstable housing. There is extensive literature documenting the prevalence of homelessness among individuals who use drugs (Linton et al., 2013). There is a documented link between homelessness and relapse; one study in particular showed that individuals who attained abstinence from injection drug use and experienced any length of homelessness had higher rates of subsequent injection drug use (Linton et al., 2013). There are many types of housing interventions discussed in the literature, with varying degrees of effectiveness that are beyond the scope of this paper (Kertesz, Crouch, Milby, Cusimano, & Schumacher, 2009). Generally, this wide literature suggests that access to housing may positively impact recovery outcomes or at the very least promote stability and be a confounding variable to consider in the current study.

There was no formal assessment of whether or not individuals were mandated to treatment, however during screening and interviews several participants mentioned that they

started taking their medication or attending their treatment program because they were mandated or as a condition of probation. Interestingly, one interviewee spoke about engaging in treatment (medication and treatment program) initially as a condition of his release from jail, initially not engaging in the process of change, and later experiencing a shift in motivation (i.e., towards recovery). This external motivator of legal pressure could have impacted the outcomes assessed in the current study in complex ways. While the efficacy of mandated treatment is unclear and fiercely debated (Klag, O’Callaghan, & Creed, 2009), it would be important to assess in future studies given the impact that this external motivation could have on engagement in the change process and contextual factors of recovery.

Taken together the interview and quantitative data reveal a recurring theme of the influence of stigma, both regarding the choice of recovery pathway and on the experience of recovery pathway. The interviews pointed to stigma as a large reason against choosing opioid medications, particularly methadone; the most common narrative was participants sharing their past use of opioid medications to aid in their recovery, the stigma they experienced from their in-group (i.e., other individuals with OUD in the recovery community), and their current decision not to use opioid medications for their recovery attempt. This is consistent with the quantitative stigma results demonstrating high levels of perceived stigma, with some suggestion of higher overall perceived stigma among individuals in the medication group. Generally, this points to the importance of dispelling stigmatizing myths regarding medication use in the general population but perhaps more importantly in the recovery community. It may be especially important to develop and implement interventions targeting in-group stigma for individuals using medication. These explanations point the study’s limitations and future directions detailed below.

Limitations & Future Directions

Recruitment site. There were barriers to attaining diversity of recruitment sites in the current study. This limits the generalizability of the current study, such that it would be unwise to generalize the findings of the current study to individuals enrolled in programs dissimilar to the transitional housing programs described in the current study. This elucidated the importance of replicating the current study in other types of programs, such as traditional outpatient programs, medication maintenance programs, etc. For example, it is possible that if this study was replicated among individuals in early recovery presenting to a traditional methadone maintenance clinic the results would differ greatly, as the profile of persons presenting to the clinic and the services they were receiving would likely be very different. This would allow us to understand the similarities or differences between individuals presenting to different types of programs, so we can better assess where they are in their recovery process and how to make better recommendations for their recovery pathways.

Follow-up data. The current study was cross-sectional, only assessing individuals at one point in time (on average two months of abstinence). It would be important to assess individuals later in their recovery process for several reasons. There are several questions related to prediction that were unable to be answered with the current study's methodology. First and foremost, one of the most pertinent questions that could be answered with follow-up data is what profile predicts future success in recovery. Specifically, it would be important to understand if the change process profile described in the current study was one that predicted higher likelihood of sustained abstinence. If so, it would be possible to use the change process variables as indicators of long-term success and as clinical screening instruments in the field. Relatedly, it would be helpful to see if there are changes in the change process variables over time and if

those changes relate to substance use and/or contextual recovery variables. This would help us to determine the sensitivity of the change process variables and potentially provide support for use of the change process instruments as clinical screening instruments in the field.

Sample size. There were reported barriers to recruitment that limited the sample size recruited. The observed power revealed that the two primary analyses (two profile analyses) were underpowered, indicating that there was not enough power to detect the observed effect. In future studies, a larger sample size would enable detection of effects that may be small in magnitude.

Medication sample size. In the original proposal of the current study, there were two medication groups (methadone and buprenorphine/Suboxone). However, due to the barriers to recruitment these groups were too small to compare. Therefore, all medication groups were collapsed into one medication group to compare to no medication. While this was informative, future studies should compare between various medication types to better inform clinical recommendations regarding medications. This would be particularly important given the level of stigma associated with methadone described by the participants.

Additionally, a 3rd medication emerged as clinically relevant: naltrexone/Vivitrol. In the current study, this medication subtype was collapsed with methadone and buprenorphine/Suboxone. Given that more individuals than expected were utilizing this medication to support their recovery, it will be important to investigate this group as separate from methadone and buprenorphine/Suboxone in future studies. Qualitatively, it was described differently than the other opioid medications, such that there was less likelihood of abuse and a reported likelihood that it could be used in a way that promotes recovery. It would important to

assess the intentions for using the various medications to better understand if naltrexone/Vivitrol is being used for recovery-intent more frequently.

Self-report. All the measures in the current study were self-report. There were indications in the data that some of the questions were misunderstood, specifically the treatment types for substance use and mental health. Additionally, the screening instrument relied on self-reported abstinence, which was not corroborated in any way. Self-report was selected for feasibility of study completion, but future studies could benefit from alternative methods.

Homogenous sample. The majority of the sample was male (69.5%) and white/Caucasian (84.4%). While, generally this is representative of the demographics of individuals using heroin, other demographic groups need to be targeted in research and for intervention. There is evidence to suggest that people that identify as Black/African American have a greater risk of progressing from opioid use to Opioid Use Disorder (Sartor et al., 2014), and have the highest rates of overdose deaths (Seth, Rudd, & Bacon, 2018). While there is limited research on racial disparities in OUD and treatment, there is some evidence suggesting that individuals that identify as Black/African American have less access to treatments; for example, one study documented that while access to buprenorphine has increased between 2003 and 2013, there was a higher rate of increase among neighborhoods with the lowest percentage of Black/African American, Hispanic, and low-income people (Hansen, Siegel, Wanderling, & DiRocco, 2016). Additionally, while males are more at risk of using opioids and developing an OUD, there has been a large increase in opioid use among women over the past several years (Seth, Rudd, & Bacon, 2018). Therefore, it is necessary to conduct research that is inclusive of all individuals to whom the opioid epidemic reaches.

Sample drug history. The majority of study participants had other Substance Use Disorders (SUDs), most had two to three types of SUDs in addition to opioids. Additionally, the majority of the sample indicated that they used several drugs in their lifetime, most of whom had used in the last six months but not in the past month. There were no exclusion criteria regarding other drugs besides opioids in the current study; participants could be using any substances besides opioids and be eligible for the current study. This could have obscured the results; the use of other drugs could have impacted the progress regarding the contextual recovery variables – negatively impacting an individual’s health or community integration. However, change process variables were opiate specific and may capture opiate but not be relevant for other drugs.

Past medication trials. It was revealed in the interviews, that most individuals had a history of trying medications to aid in their recovery, often various types of medications and multiple trials of medications. While this represents only a subsample of the full study sample, it is likely that study participants were not medication naïve. This is important to consider as the reasons for medication use and methods of using those medications might be different in a medication naïve sample. In the current study, the qualitative interviews highlighted that most of the interviewees had used opioid medication in past trials in a way that interfered with their recovery, suggesting that perhaps the results would be different among individuals in their first or second recovery attempt or medication trial. This could be determined by replicating this study in a sample limited to individuals early in their recovery process, in their first or second recovery attempt or medication trial. This could help providers to make more nuanced clinical recommendations based on an individual’s history with recovery attempt or medication trials.

Stage of change. To be eligible for the study all participants had to have at least one month but no more than six months of essential abstinence; this was determined to ensure that

participants were in the action stage of change (using a behavioral screening measure) and not be in the detoxification phase of recovery. Study participants responded to the URICA (measure assessing stage of change) in a manner consistent with being in the action stage of change and on average individuals had 10-11 weeks of essential abstinence when enrolled in the current study. Overall, this suggests that this was a sample in the action stage that had advanced past the early detoxification stage. Given that this group had achieved initial success in their recovery (i.e., making it past early detoxification when most relapses occur) it follows that this was a group engaged in the process of change, as was demonstrated in this study's results. If this study had been implemented among individuals earlier in the action stage, then the results may have differed.

Implications

These findings have important implications for the debate regarding the use of medications for opioid recovery. Firstly, this study highlights the decision to use or abstain from recovery medications is nuanced; not only were there multi-level reasons for individuals' choice but the reasons were personal, varied, and situated within a long recovery process. The null findings coupled with the qualitative results of the current study suggest that the function of the medication and the impact that the medication has on one's recovery is complex and dependent on many factors, which the current study has only begun to elucidate.

Secondly, the current study provides an example of a sample in which individuals taking various types of recovery medications were as engaged in the change process of recovery as those who were not taking any medications. Additionally, there were no differences in their self-reported health and community integration. This suggests that it is possible to use medication in a manner that promotes engagement in the recovery change process and does not interfere with

recovery multidimensional contextual outcomes. Results of the qualitative interviews suggest that medication can be used for multiple reasons and can therefore promote or interfere with recovery. This suggests that while the debate regarding the use of medications might be black and white, the way that medications function in recovery is not. Therefore, it will be more important for future research to focus on how to assess individual's readiness to engage in the recovery process and intent regarding the use of medication.

Thirdly, this study provides evidence to dispel some of the myths regarding opioid medication use highlighted by interview participants, such as opioid medication use means you are not "clean" or that people who use opioid medications aren't serious about their recovery. While it is possible that the medications are used for non-recovery related reasons, it is also possible that these medications are used in the manner for which they are intended. The focus should be on finding methods to identify individuals who intend to use medication to support or hinder their recovery in order to best support individuals in recovery.

Finally, it was highlighted in the interviews that individuals in recovery believe that opioid medications should be used for detoxification and short-term maintenance only. Participants discussed that long-term use is generally associated with using opioid medications in a way that is not supportive of recovery. This points to the importance of determining and planning an evidence-based taper protocol for individuals using opioid medications to support their long-term change process of recovery.

Appendices

Appendix A. Screening Questionnaire

Please read all answers before responding to each of the following questions. Select the answer that best represents your experience. There are no right or wrong answers. Some questions require you to check or circle your answer; others will require you to write in your answer.

1. How old are you?
Age: _____
2. In the **past month**, how frequently have you used illegal or non-prescribed opioids (e.g., heroin, street or illicit methadone, and illegal use of prescription opioid medications)?
 - ☐ no use
 - ☐ less than one time per month
 - ☐ one time per month
 - ☐ 2 to 3 times per month
 - ☐ one time per week
 - ☐ 2 to 3 times per week
 - ☐ 4 to 6 time per week
 - ☐ daily
3. Are you currently abstinent from illegal or non-prescribed opioids (e.g., heroin, street or illicit methadone, and illegal use of prescription opioid medications)?
 - ☐ Yes
 - ☐ No
4. If yes, for **how many weeks** have you been abstinent from illegal or non-prescribed opioids? (For the current study, you can be abstinent if you have used one day per month or less).
Number of weeks abstinent: _____
5. Are you currently in the detoxification phase of recovery?
 - ☐ Yes
 - ☐ No

6. Please indicate whether or not you have experienced the following in the **past year**. Circle yes or no for items a – l.

a. Opioids are often taken in larger amounts or over a longer period of time than intended.	Yes No
b. There is a persistent desire or unsuccessful efforts to cut down or control opioid use.	Yes No
c. A great deal of time is spent in activities necessary to obtain the opioid, use the opioid, or recover from its effects.	Yes No
d. Craving, or a strong desire to use opioids.	Yes No
e. Recurrent opioid use resulting in failure to fulfill major role obligations at work, school or home.	Yes No
g. Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids.	Yes No
h. Important social, occupational or recreational activities are given up or reduced because of opioid use.	Yes No
i. Recurrent opioid use in situations in which it is physically hazardous	Yes No
j. Continued use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by opioids.	Yes No
k. *Tolerance, as defined by either of the following: (a) a need for markedly increased amounts of opioids to achieve intoxication or desired effect (b) markedly diminished effect with continued use of the same amount of an opioid	Yes No
l. *Withdrawal, as manifested by either of the following: (a) the characteristic opioid withdrawal syndrome (b) the same (or a closely related) substance are taken to relieve or avoid withdrawal symptoms	Yes No

7. Are you currently attending a treatment program for opioid use?

☐ Yes

☐ No

→ If you answered yes to item 7, please answer items a through f below

a. What program are you currently attending? _____

b. Have you or do you stay overnight in the program?

☐ Yes

☐ No

c. What type of program is it?

☐ Outpatient (i.e., once per week)

☐ Intensive outpatient (i.e., multiple times per week)

☐ Partial hospitalization (i.e., every day of the week)

☐ Residential (i.e., long-term, overnight)

☐ Inpatient (i.e., short-term, overnight)

☐ Other - please specify: _____

d. If it is outpatient, what were the recommended number of hours per week for the program?

Number of hours/week recommended: _____

e. How many days have you attended this program?

Number of days: _____

f. Please describe the mandatory components of the program you are attending:

8. Are you currently taking prescribed medications to aid in your recovery?

☐ Yes

☐ No

→ If you answered yes to item 8, please answer items a through g below

- a. Which of the following are you taking?
- ☐ Methadone
- ☐ Buprenorphine (e.g., Suboxone)
- ☐ Naltrexone
- ☐ Other, please specify: _____
- b. What dosage of medication are you prescribed?
Dosage: _____
- c. For how many weeks have you been using this medication?
Number of weeks: _____
- d. How many days in the past 30 days have you taken this medication as prescribed? _____
- e. How many days in the past 30 days have you not taken this medication as prescribed (e.g., taken more than prescribed, taken less than prescribed)? _____
- f. Have you used this medication in the past?
- ☐ Yes
- ☐ No
- g. Have you used other medications in the past?
- ☐ Yes
- ☐ No

→ If you answered yes to item g, please specify which medications

- ☐ Methadone
- ☐ Buprenorphine (e.g., Suboxone)
- ☐ Naltrexone
- ☐ Other, please specify: _____

ELIGIBLE? _____

GROUP ASSIGNMENT? _____

STUDY ID ASSIGNMENT? _____

Appendix B. Self-report survey

Please read all answers before responding to each of the following questions. Select the answer that best represents your experience. There are no right or wrong answers. Some questions require you to check or circle your answer; others will require you to write in your answer.

9. How old are you?
Age: _____
10. What is your sex assigned at birth?
Sex: _____
11. What is your gender?
Gender: _____
12. What is your race?
Race: _____
13. What is your ethnicity?
Ethnicity: _____
14. What is the highest level of education you have completed?
- | | |
|------------------------------------------------------|---------------------------------------------------|
| <input type="checkbox"/> Less than High School | <input type="checkbox"/> Two-year college degree |
| <input type="checkbox"/> High School | <input type="checkbox"/> Four-year college degree |
| <input type="checkbox"/> GED | <input type="checkbox"/> Some graduate school |
| <input type="checkbox"/> Vocational/Technical School | <input type="checkbox"/> Graduate school |
| <input type="checkbox"/> Some College | |
15. What is your current employment status?
- | | |
|----------------------------------------|------------------------------------------------------|
| <input type="checkbox"/> Unemployed | <input type="checkbox"/> Student |
| <input type="checkbox"/> Part-time job | <input type="checkbox"/> Other; please specify _____ |
| <input type="checkbox"/> Full-time job | |
16. Are you receiving disability benefits?
- ☐ Yes
If yes, please specify which benefits: _____
- ☐ No
17. What is your current living/residence situation?
- | | |
|--------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Rent or own house/apartment | <input type="checkbox"/> Shelter |
| <input type="checkbox"/> Living with relatives/friends | <input type="checkbox"/> Transitional housing |
| <input type="checkbox"/> Renting a room/shared space | <input type="checkbox"/> Outdoors, homeless, on the streets |
| <input type="checkbox"/> Group home | <input type="checkbox"/> Other (e.g., place to place) |

18. What is your marital status?

- ☐ Married
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

- ☐ Widowed
- ☐ Living with partner
- ☐ Single

19. What is your primary source of income?

- ☐ Employment
- ☐ Unreported employment (e.g., working “under the table,” cash jobs)
- ☐ Illegal employment (e.g., drug dealing, theft)
- ☐ Welfare (e.g., Medicaid, Medicare)
- ☐ Trading sex for drugs, money, gifts
- ☐ Other – please specify: _____

20. What is your average annual income?

- ☐ \$0-\$10,999
- ☐ \$11,000-\$20,999
- ☐ \$21,000 – \$30,999
- ☐ \$31,000 - \$40,999
- ☐ \$41,000 - \$50,999
- ☐ \$51,000 - \$60,999
- ☐ \$61,000 - \$70,999
- ☐ \$71,000 or more

21. Have you been in jail or prison in your lifetime?

☐ Yes

If yes, how many times have you been in jail or prison? _____

☐ No

22. Do you have health insurance?

☐ Yes

☐ No

23. If you have health insurance, what type?

☐ Medicaid

☐ Medicare

☐ Health Care Exchange (“Obamacare”)

☐ Private (e.g., through your employer)

24. For the table below – first indicate if you have ever used each of the following drug categories. For those drugs which you have used then complete the following columns.

Drug Category	Ever Used	Total Years Used	IV Drug Use	Year Last Used (e.g., 1998)	Frequency of Use in past 6 months	Frequency of Use in past 1 month
ALCOHOL	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
CANNABIS: Marijuana, hash oil, pot, weed, blow	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
STIMULANTS: Cocaine, crack, blow	Yes No		Yes No		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
STIMULANTS: Methamphetamine — meth, ice, crank	Yes No		Yes No		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily

Drug Category	Ever Used	Total Years Used	IV Drug Use	Year Last Used (e.g., 1998)	Frequency of Use in past 6 months	Frequency of Use in past 1 month
AMPHETAMINES/OTHER STIMULANTS: Ritalin, Benzedrine, Dexedrine, speed, bennies, uppers	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
BENZODIAZEPINES/TRANQUILIZERS: Valium, Librium, Xanax, Diazepam, roofies, downers	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
SEDATIVES/HYPNOTICS/ BARBITURATES: Amytal, Seconal, Dalmane, Quaalude, Phenobarbital	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
HEROIN: smack, scat, brown sugar, dope	Yes No		Yes No		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily

Drug Category	Ever Used	Total Years Used	IV Drug Use	Year Last Used (e.g., 1998)	Frequency of Use in past 6 months	Frequency of Use in past 1 month
STREET OR ILLICIT METHADONE	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
OTHER OPIOIDS: Tylenol #2 & #3, Percodan, Percocet, Opium, Morphine, Demerol, Dilaudid	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
HALLUCINOGENS: SD, PCP, mescaline, peyote, mushrooms, ketamine, ecstasy (MDMA)	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
INHALANTS: glue, gasoline, aerosols, paint thinner, poppers, rush, whippets	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily

Drug Category	Ever Used	Total Years Used	IV Drug Use	Year Last Used (e.g., 1998)	Frequency of Use in past 6 months	Frequency of Use in past 1 month
STERIODS: <i>Deca-Durabolin, Durabolin, Equipoise, Winstrol, Anadrol, Oxandrin, roids, juice</i>	Yes No		Yes No		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily
ILLEGAL USE OF PRESCRIPTION DRUGS scribe): _____	Yes No		N/A		0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily	0 = no use 1 = <1 x/mo 2 = 1x/mo 3 = 2 to 3 x/mo 4 = 1x/wk 5 = 2 to 3x/wk 6 = 4 to 6x/wk 7 = daily

25. Below is a list of substances. Please indicate for each of the following substances if you have ever been diagnosed with a Substance Use Disorder.

Category of Substance	Diagnosis
Alcohol	Yes No Don't Know
Cannabis/Marijuana (e.g., hash oil, pot, weed)	Yes No Don't Know
Hallucinogens (e.g., LSD, mushrooms, PCP, Peyote, ketamine, ecstasy – MDMA)	Yes No Don't Know
Sedatives (e.g., benzodiazepines like Valium, Ativan, Xanax)	Yes No Don't Know
Stimulants (e.g., cocaine, amphetamines, crack, blow)	Yes No Don't Know
Tobacco	Yes No Don't Know
Other, please specify_____	Yes No Don't Know

26. Below is a list of treatment types for Substance Use Disorders. Please indicate for each if you are currently receiving the treatment, if you have ever received it, and, if so, estimate the total number of times you have received it.

Category of SUD Treatment	Current	Ever	Number of times in lifetime
Inpatient (i.e., short-term, over-night)	Yes No	Yes No	
Residential (i.e., long-term, over-night)	Yes No	Yes No	
Intensive Outpatient (i.e., multiple times per week)	Yes No	Yes No	
Outpatient (i.e., once per week) – Individual	Yes No	Yes No	
Outpatient (i.e., once per week) – Group	Yes No	Yes No	
Other medication to assist in recovery, not including opioid substitution (e.g., Naltrexone, vivitrol)	Yes No	Yes No	
Other – please specify _____	Yes No	Yes No	
Other – please specify _____	Yes No	Yes No	

27. How many times in the past 30 days have you taken prescribed medication to aid in your recovery as prescribed?

Number of times in past 30 days: _____

28. How many times in the past 30 days have you attended an NA or 12 step meeting?

Number of times in the past 30 days _____

29. How many times in the past 30 days have you had a general group counseling session where there a significant discussion regarding you drug use?

Number of times in the past 30 days _____

30. How many times in the past 30 days have you had a general individual counseling session where there a significant discussion regarding you drug use?

Number of times in past 30 days _____

31. Below is a list of mental health disorders. Please indicate for which of the following disorders you have been diagnosed.

Mental Health Disorder	Diagnosis
Neurodevelopmental Disorders (e.g., intellectual disabilities, autism, ADHD, learning disability)	Yes No Don't Know
Schizophrenia Spectrum or Other Psychotic Disorders (e.g., Schizophrenia, Schizoaffective, Substance-Induced Psychosis)	Yes No Don't Know
Bipolar and Related Disorders (e.g., Bipolar I, Bipolar II)	Yes No Don't Know
Depressive Disorder (e.g., Major Depression, Dysthymia)	Yes No Don't Know
Anxiety Disorder (e.g., Generalized Anxiety, Panic, Agoraphobia)	Yes No Don't Know
Trauma- and Stressor-Related Disorders (e.g., PTSD, Adjustment)	Yes No Don't Know
Dissociative Disorders (e.g., Dissociative Identity)	Yes No Don't Know
Personality Disorders (e.g., Borderline Personality, Antisocial Personality)	Yes No Don't Know
Other, please specify_____	Yes No Don't Know

32. Below is a list of mental health treatments. Please indicate for each if you are currently receiving the treatment, if you have ever received it, and, if so, estimate the total number of times you have received it.

Category of MH Treatment	Current	Ever	Number of times
Inpatient Treatment (i.e., long-term, over-night)	Yes No	Yes No	
Residential Treatment (i.e., short-term, over-night)	Yes No	Yes No	
Intensive Outpatient (i.e., multiple times per week)	Yes No	Yes No	
Outpatient (i.e., once per week)	Yes No	Yes No	
Pharmacotherapy	Yes No	Yes No	
Other – please specify _____	Yes No	Yes No	
Other – please specify _____	Yes No	Yes No	

33. How many times in the past 30 days have you had a general group counseling session where there was a significant discussion regarding your Psychological emotional problems?

Number of times in the past 30 days _____

34. How many times in the past 30 days have you had a general individual counseling session where there was a significant discussion regarding your Psychological emotional problems?

Number of times in the past 30 days _____

35. How many times in the past 30 days have you had a general group counseling session where there was a significant discussion regarding your well-being and/or quality of life?

Number of times in the past 30 days _____

36. How many times in the past 30 days have you had a general individual counseling session where there was a significant discussion regarding your well-being and/or quality of life?

Number of times in the past 30 days _____

37. Below is a list of health concerns. Please indicate which of the following you have been diagnosed or experienced.

Disorder/Condition/Concern	Diagnosis/ experienced
Heart condition	Yes No Don't Know
Respiratory problems	Yes No Don't Know
Asthma	Yes No Don't Know
Cancer	Yes No Don't Know
Endocrine Problems	Yes No Don't Know
Arthritis	Yes No Don't Know
Seizures	Yes No Don't Know
Diabetes	Yes No Don't Know
Chronic Headaches	Yes No Don't Know
Gastrointestinal problems	Yes No Don't Know
Chronic Pain	Yes No Don't Know

Disorder/Condition/Concern	Diagnosis/ experienced
HIV or AIDS	Yes No Don't Know
Insomnia	Yes No Don't Know
Serious accident or head injury	Yes No Don't Know
Hepatitis - C	Yes No Don't Know

38. Have you ever been hospitalized for your health condition?

☐ Yes

☐ No

If yes, please specify how many times: _____

39. Have you received outpatient rehabilitation for your health condition?

☐ Yes

☐ No

If yes, are you currently taking medication for your health conditions?

☐ Yes

☐ No

40. Have you taken medication for your health condition?

☐ Yes

☐ No

If yes, are you currently taking medication for your health conditions?

☐ Yes

☐ No

41. How many times in the past 30 days have you had a general **group** counseling session where there was a significant discussion regarding your **medical problems**?

Number of times in the past 30 days _____

42. How many times in the past 30 days have you had a general **individual** counseling session where there was a significant discussion regarding your **medical problems**?

Number of times in the past 30 days _____

43. Each statement below described **HOW A PERSON MIGHT FEEL** how a person might feel when starting therapy or approaching problems in their lives. Please indicate the extent to which you tend to agree or disagree with each statement. In each case, make your choice in terms of how you feel right now, not what you have felt in the past or would like to feel.

For all statements that refer to your “problem,” answer in terms of problems related to your illegal or non-prescribed opioid use.

The words “here” and “this place” refer to your treatment center. There are five possible responses to each of the items in the questionnaire:

1=Strongly Disagree 2=Disagree 3=Undecided 4=Agree 5=Strongly Agree

Circle the number that best describes how much you agree or disagree with each statement.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly agree
3) I am doing something about the problems that had been bothering me.	1	2	3	4	5
6) It worries me that I might slip back on a problem I have already changed, so I am looking for help.	1	2	3	4	5
7) I am finally doing some work on my problem.	1	2	3	4	5
9) I have been successful in working on my problem but I’m not sure I can keep up the effort on my own.	1	2	3	4	5
10) At times my problem is difficult, but I’m working on it.	1	2	3	4	5
14) I am really working hard to change.	1	2	3	4	5
16) I’m not following through with what I had already changed as well as I had hoped, and I want to prevent a relapse of the problem.	1	2	3	4	5
17) Even though I’m not always successful in changing, I am at least working on my problem.	1	2	3	4	5
18) I thought once I had resolved the problem I would be free of it, but sometimes I still find myself struggling with it.	1	2	3	4	5
20) I have started working on my problem but I would like help.	1	2	3	4	5
22) I may need a boost right now to help me maintain the changes I’ve already made.	1	2	3	4	5
25) Anyone can talk about changing; I’m actually doing something about it.	1	2	3	4	5
27) I’m struggling to prevent myself from having a relapse of my problem.	1	2	3	4	5

	Strongly Disagree	Disagree	Undecided	Agree	Strongly agree
28) It is frustrating, but I feel I might be having a recurrence of a problem I thought I had resolved.	1	2	3	4	5
30) I am actively working on my problem.	1	2	3	4	5
32) After all I had done to try and change my problem, every now and then it comes back to haunt me.	1	2	3	4	5

44. Each statement below described a **SITUATION OR THOUGHT THAT YOU MIGHT USE TO HELP YOU NOT USE** illegal or non-prescribed opioids during the past week.

Instructions: There are five possible responses to each of the items in the questionnaire:

1=Never 2=Seldom 3=Occasionally 4=Frequently 5=Repeatedly

Please read each statement and circle the number on the right to indicate how often you make use of a particular situation or thought to help you not use illegal or non-prescribed opioids.

Remember these statements refer to situations or thoughts you might use **during the past week.**

	Never	Seldom	Occasionally	Frequently	Repeatedly
1) I do something nice for myself for making efforts to change.	1	2	3	4	5
2) I can talk with at least one special person about my drug use experiences.	1	2	3	4	5
7) I remove things from my home or work that remind me of drugs.	1	2	3	4	5
8) I calm myself when I get the urge to use drugs.	1	2	3	4	5
9) I reward myself when I don't give in to my urge to use drugs.	1	2	3	4	5
10) I have someone to talk with who understands my problems with drugs.	1	2	3	4	5
12) I use will power to stop from using drugs.	1	2	3	4	5
16) I avoid situations that encourage me to use drugs.	1	2	3	4	5
17) I try to think about other things when I begin to think about using drugs.	1	2	3	4	5
18) I have someone who listens when I want to talk about my drug use.	1	2	3	4	5
20) I make myself aware that I can choose to overcome my drug use if I want to.	1	2	3	4	5
25) I use reminders to help me not to use drugs.	1	2	3	4	5
26) I do something else instead of using drugs when I need to deal with tension.	1	2	3	4	5
27) I don't let myself have fun when I use drugs.	1	2	3	4	5
28) I have someone whom I can count on to help me when I'm having problems with drug use.	1	2	3	4	5
30) I tell myself that if I try hard enough I can keep from using drugs.	1	2	3	4	5

	Never	Seldom	Occasionally	Frequently	Repeatedly
34) I stay away from places generally associated with my drug use.	1	2	3	4	5
35) I find that doing things is a good substitute for using drugs.	1	2	3	4	5
36) I spend time with people who reward me for not using drugs.	1	2	3	4	5
37) I make commitments to myself not to use drugs.	1	2	3	4	5

45. Listed below are a number of situations that lead some people to use illegal or non-prescribed opioids. We would like to know how **CONFIDENT** you are that you would not use illegal or non-prescribed opioids in each situation.

Circle the number that best describes your feelings of confidence to not use illegal or non-prescribed opioids in each situation during the past week according to the following scale:

1=Not at all confident 2=Not very confident 3=Moderately confident 4=Very confident
5=Extremely confident

Situation	Confident not to use illegal or non-prescribed				
	Not at all	Not very	Moderately	Very	Extremely
1) When I am feeling depressed.	1	2	3	4	5
2) When I am concerned about someone.	1	2	3	4	5
3) When I am worried.	1	2	3	4	5
4) When I have the urge to use drugs to see what happens.	1	2	3	4	5
5) When I want to test my will power over using drugs.	1	2	3	4	5
6) When I am feeling the physical need or craving for drugs.	1	2	3	4	5
7) When I am physically tired.	1	2	3	4	5
8) When I am experiencing some physical pain or injury.	1	2	3	4	5
9) When I feel like blowing up because of frustration.	1	2	3	4	5
10) When I see others using drugs at a bar or party.	1	2	3	4	5
11) When people I used to use drugs with encourage me to use drugs.	1	2	3	4	5
12) When I am excited or celebrating with others.	1	2	3	4	5

46. Listed below are a number of situations that lead some people to use illegal or non-prescribed opioids. We would like to know how **TEMPTED** you are that you would use illegal or non-prescribed opioids in each situation.

Circle the number that best describes you feelings of temptation to use illegal or non-prescribed opioids in each situation during the past week according to the following scale:

1=Not at all tempted 2=Not very tempted 3=Moderately tempted 4=Very tempted 5=Extremely tempted

Situation	Tempted to use illegal or non-prescribed				
	Not at all	Not very	Moderately	Very	Extremely
1) When I am feeling depressed.	1	2	3	4	5
2) When I am concerned about someone.	1	2	3	4	5
3) When I am worried.	1	2	3	4	5
4) When I have the urge to use drugs to see what happens.	1	2	3	4	5
5) When I want to test my will power over using drugs.	1	2	3	4	5
6) When I am feeling the physical need or craving for drugs.	1	2	3	4	5
7) When I am physically tired.	1	2	3	4	5
8) When I am experiencing some physical pain or injury.	1	2	3	4	5
9) When I feel like blowing up because of frustration.	1	2	3	4	5
10) When I see others using drugs at a bar or party.	1	2	3	4	5
11) When people I used to use drugs with encourage me to use drugs.	1	2	3	4	5
12) When I am excited or celebrating with others.	1	2	3	4	5

47. Here are some questions about your **HEALTH AND FEELINGS**.

Please read each question carefully and check (✓) your best answer. You should answer the questions in your own way. There are no right or wrong answers.

	Yes, describes me exactly	Somewhat describes me	No, doesn't describe me at all
1. I like who I am			
2. I am not an easy person to get along with			
3. I am basically a healthy person			
4. I give up too easily			
5. I have difficulty concentrating			
6. I am happy with my family relationships			
7. I am comfortable being around people			

Today would you have any physical trouble or difficulty:	None	Some	A lot
Walking up a flight of stairs			
Running the length of a football field			
During the <u>past week</u> : How much trouble have you had with:	None	Some	A lot
Sleeping			
Hurting or aching in any part of your body			
Getting tired easily			
Feeling depressed or sad			
Nervousness			
During the <u>past week</u> , how often did you:	None	Some	A lot
Socialize with other people (talk or visit with friend or relatives)?			
Take part in social, religious, or recreation activities (meetings, church, movies, sports, parties)?			
During the <u>past week</u> , how often did you	None	1-4 days	5-7 days
Stay home, in a nursing home, or in a hospital because of sickness, injury, or other health problems?			

48. This assessment asks how you feel about your **QUALITY OF LIFE, HEALTH, OR OTHER AREAS OF YOUR LIFE**.

Please answer all the questions. If you are unsure about which response to give to a question, please choose the one that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life in the **last two weeks**. For example, thinking about the last two weeks, a question might ask:

	Not at all	A little	A moderate amount	Very much	An extreme amount
How well are you able to concentrate?	1	2	3	4	5

You should circle the number that best fits how well are you able to concentrate over the last two weeks. So you would circle the number 4 if you were able to concentrate very much. You would circle number 1 if you were not able to concentrate at all in the last two weeks.

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your life	1	2	3	4	5

	Not at all	A little	A moderate amount	Very much	An extreme amount
To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
How much are you bothered by any physical problems?	1	2	3	4	5
How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
How much do you enjoy life?	1	2	3	4	5
To what extent do you feel your life to be meaningful?	1	2	3	4	5
To what extent are you bothered by people blaming you for your medical concerns?	1	2	3	4	5
How much do you fear the future?	1	2	3	4	5
How much do you worry about death?	1	2	3	4	5

	Not at all	A little	A moderate amount	Very much	An extreme amount
How well are you able to concentrate?	1	2	3	4	5
How safe do you feel in your daily life?	1	2	3	4	5
How healthy is your physical environment?	1	2	3	4	5

The following questions ask about how completely you experience or were able to do certain things in the **last two weeks.**

	Not at all	A little	A moderate amount	Very much	An extreme amount
Do you have enough energy for everyday life?	1	2	3	4	5
Are you able to accept your bodily appearance?	1	2	3	4	5
Have you enough money to meet your needs?	1	2	3	4	5
To what extent do you feel accepted by the people you know?	1	2	3	4	5
How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

	Very poor	Poor	Neither poor nor good	Good	Very good
How well are you able to get around?	1	2	3	4	5

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your sleep?	1	2	3	4	5
How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
How satisfied are you with your capacity for work?	1	2	3	4	5
How satisfied are you with yourself?	1	2	3	4	5
How satisfied are you with your personal relationships?	1	2	3	4	5
How satisfied are you with your sex life?	1	2	3	4	5
How satisfied are you with the support you get from your friends?	1	2	3	4	5
How satisfied are you with the conditions of your living place?	1	2	3	4	5
How satisfied are you with your access to health services?	1	2	3	4	5
How satisfied are you with your transport?	1	2	3	4	5

	Never	Seldom	Quite often	Very often	Always
How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

41. For the following items, please respond yes or no based on how you are **currently** feeling.

I am currently completely sober	Yes No
I feel I am in control of my substance use	Yes No
I have had no 'near things' about relapsing	Yes No
I have had no recent periods of substance intoxication	Yes No
There are more important things to me in life than using substances	Yes No
I am proud of the community I live in and feel part of it – sense of belonging	Yes No
It is important for me to contribute to society and or be involved in activities that contribute to my community	Yes No
It is important for me to do what I can to help other people	Yes No
It is important for me that I make a contribution to society	Yes No
My personal identity does not revolve around drug use or drinking	Yes No
I am happy with my personal life	Yes No
I am satisfied with my involvement with my family	Yes No
I get lots of support from friends	Yes No
I get the emotional help and support I need from my family	Yes No
I have a special person that I can share my joys and sorrows with	Yes No
I am actively involved in leisure and sport activities	Yes No
I am actively engaged in efforts to improve myself (training, education and /or self-awareness)	Yes No
I engage in activities that I find enjoyable and fulfilling	Yes No
I have access to opportunities for career development (job opportunities, volunteering or apprenticeships)	Yes No
I regard my life as challenging and fulfilling without the need for using drugs or alcohol	Yes No
I am proud of my home	Yes No
I am free of threat or harm when I am at home	Yes No
I feel safe and protected where I live	Yes No
I feel that I am free to shape my own destiny	Yes No
My living space has helped to drive my recovery journey	Yes No

42. Here are a number of events that people sometimes experience. Read each one carefully, and indicate how often each one has happened to you DURING THE PAST MONTH (0 = never, 1 = once or a few times, etc). If an item does not apply to you, circle zero (0).

During the past month, about how often has this happened to you? Circle one answer	Never	Once or a few times	Once or twice a week	Daily or almost daily
I have been unhappy because of my illegal/non-prescribed opioid use	1	2	3	4
Because of my illegal/non-prescribed opioid use, I have not eaten properly	1	2	3	4
I have failed to do what was expected of me because of my illegal/non-prescribed opioid use	1	2	3	4
I have felt guilty or ashamed because of my illegal/non-prescribed opioid use	1	2	3	4
I have taken foolish risks because of my illegal/non-prescribed opioid use	1	2	3	4
When using illegal/non-prescribed opioid use, I have done impulsive things that I regretted later	1	2	3	4

Now answer these questions about things that have happened to you. During the past month, how much has this happened to you? Circle one answer	Not at all	A little	Somewhat	Very Much
My physical health has been harmed because of my illegal/non-prescribed opioid use	1	2	3	4
I have had money problems because of my illegal/non-prescribed opioid use	1	2	3	4
My physical appearance has been harmed because of my illegal/non-prescribed opioid use	1	2	3	4
My family has been hurt by my illegal/non-prescribed opioid use	1	2	3	4
A friendship or close relationships has been damaged by my illegal/non-prescribed opioid use	1	2	3	4
My illegal/non-prescribed opioid use has gotten in the way of my growth as a person	1	2	3	4
My illegal/non-prescribed opioid use has damaged my social life, popularity, or reputation	1	2	3	4
I have spent too much or lost a lot of money because of my illegal/non-prescribed opioid use	1	2	3	4

Has this happened to you DURING THE PAST MONTH? Circle one answer	No	Almost	Yes, once	Yes, more than once
I have had an accident while using illegal/non-prescribed opioid use	1	2	3	4

Please rate the questions based on the following scale:

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6
1. Most people believe that someone with an opioid use disorder is just as intelligent as the average person.					_____
2. Most people believe that someone with an opioid use disorder is just as trustworthy as the average person.					_____
3. Most people feel that having an opioid use disorder is a sign of personal failure.					_____
4. Most people think less of someone with an opioid use disorder.					_____
5. Most people will not take the opinions seriously of someone with an opioid use disorder.					_____
6. Most people believe that someone who uses methadone to aid in recovery is just as intelligent as the average person.					_____
7. Most people believe that someone who uses methadone to aid in recovery is just as trustworthy as the average person.					_____
8. Most people feel that using methadone to aid in recovery is a sign of personal failure.					_____
9. Most people think less of someone who uses methadone to aid in recovery.					_____
10. Most people will not take the opinions seriously of someone who uses methadone to aid in recovery.					_____
11. Most people believe that someone who uses buprenorphine to aid in recovery is just as intelligent as the average person.					_____
12. Most people believe that someone who uses buprenorphine to aid in recovery is just as trustworthy as the average person.					_____
13. Most people feel that using buprenorphine to aid in recovery is a sign of personal failure.					_____
14. Most people think less of someone who uses buprenorphine to aid in recovery.					_____
15. Most people will not the opinions seriously of someone who uses buprenorphine to aid in recovery.					_____

Appendix C.

Open-ended questions

1. Why did you choose to come to (program)? What brought you to this program? Is there a particular reason you chose this program?
 - a. Wanted medications? Wanted other features?
2. What are the reasons why you chose to _____ (use methadone to aid in your recovery, use buprenorphine to aid in your recovery, not use methadone or buprenorphine to aid in your recovery)? (note: only ask about the pathway that the individual chose)
3. What are the reasons why you chose not to _____ (use methadone to aid in your recovery, use buprenorphine to aid in your recovery, not use methadone or buprenorphine to aid in your recovery) (note: ask about the two pathways that the individuals did not choose)
4. What are reasons why others in your program may chose to _____ (use methadone to aid in their recovery, use buprenorphine to aid in their recovery, not use methadone or buprenorphine to aid in their recovery) (note: only ask about the pathway that the individual chose)
5. What are reasons why others in your program may chose to not to _____ (use methadone to aid in their recovery, use buprenorphine to aid in their recovery, not use methadone or buprenorphine to aid in their recovery) (note: ask about the two pathways that the individuals did not choose)
6. What are the advantages of methadone/buprenorphine/no meds? What are the disadvantages of methadone/buprenorphine/no meds?
7. If you were to suggest to someone to get off opioids, what would you recommend to them?

Appendix D. Other Drug Use Table

Table 5. *Other Drug Use by Group*

Group			
Characteristic	Medication (n= 49)	No Medication (n= 46)	Total (n=95)
<i>Categorical Items: N (%)</i>			
Ever Use (Y/N)			
Alcohol	48 (98.0%)	45 (97.8%)	93 (97.9%)
Cannabis	46 (93.9%)	44 (95.7%)	90 (94.7%)
Stimulant1	44 (89.8%)	43 (93.5%)	87 (91.6%)
Stimulant2	13 (26.5%)	16 (34.8%)	29 (30.5%)
Amphetamine	25 (51.0%)	24 (52.2%)	49 (51.6%)
Benzodiazepine	38 (77.6%)	34 (73.9%)	72 (75.8%)
Sedative	10 (20.4%)	9 (19.6%)	19 (20.0%)
Hallucinogens	31 (63.3%)	32 (69.6%)	63 (66.3%)
Inhalants	13 (26.5%)	13 (28.3%)	26 (27.4%)
Steroids	0	5 (10.9%)	5 (5.3%)
Illegal Rx	24 (49.0%)	20 (43.5%)	44 (46.3%)
Past 6 Month Use (Y/N)			
Alcohol (n=90)	33 (70.2%)	33 (76.7%)	66 (73.3%)
Cannabis (n=87)	30 (66.7%)	30 (71.4%)	60 (69.0%)
Stimulants 1(n=81)	32 (76.2%)	30 (76.9%)	62 (76.5%)
Stimulants 2 (n=27)	6 (50.0%)	9 (60.0%)	15 (55.6%)
Amphetamine (n=45)	11 (50.0%)	11 (47.8%)	22 (48.9%)
Benzodiazepine (n=70)	24 (64.9%)	26 (78.8%)	50 (71.4%)

Sedative (n=19)	5 (55.6%)	5 (50.0%)	10 (52.6%)
Hallucinogens (n=61)	9 (30.0%)	9 (29.0%)	18 (29.5%)
Inhalants (n=25)	2 (16.7%)	4 (30.8%)	6 (24.0%)
Steroids (n=5)	0	3 (60.0%)	3 (60.0%)
Illegal Rx (n=36)	16 (76.2%)	10 (66.7%)	26 (72.2%)
Past Month Use (Y/N)			
Alcohol (n=90)	6 (12.8%)	2 (4.7%)	8 (8.9%)
Cannabis (n=89)	4 (8.9%)	2 (4.5%)	6 (6.7%)
Stimulant1 (n=82)	6 (11.9%)	2 (5.0%)	8 (9.8%)
Stimulant2 (n=28)	1 (8.3%)	1 (6.3%)	2 (7.1%)
Amphetamine (n= 48)	1 (4.2%)	2 (8.3%)	3 (6.3%)
Benzodiazepine (n=69)	2 (5.6%)	3 (9.1%)	5 (7.2%)
Sedative (n=19)	0	1 (10.0%)	1 (5.3%)
Hallucinogens (n=61)	0	1 (3.2%)	1 (1.6%)
Inhalants (n=25)	0	0	0
Steroids (n=5)	0	1 (25.0%)	1 (20.0%)
Illegal Rx (n=37)	2 (9.5%)	2 (12.5%)	4 (10.8%)

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