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Abstract

Considerable financial, technological, and human resources are currently spent on the expansion of a brain-disease model of drug addiction in humans. This model conceptualizes addiction as a disease arising from the combined effects of drug interactions with susceptible brain physiology. Psychosocial models of addiction provide an important complement to brain-disease models by addressing social, cultural, and environmental determinants of addiction. The present work describes an emergent, systematized model known as the dislocation theory of addiction, and draws on data from the Vancouver At Home trial on homelessness and mental illness to test a hypothesized relationship between psychosocial integration and drug addiction. Results from multivariate logistic regression analysis indicate that both included dimensions of psychosocial integration (physical and psychological) remain associated with addiction to drugs other than alcohol and cannabis after controlling for a variety of lifestyle and demographic factors. Increased physical integration scores were found to predict reduced odds of daily drug use, while increased psychological integration scores predicted increased odds. Findings are reconciled with existing dislocation theory literature and further opportunities for evaluating the dislocation theory are discussed.

Keywords: Addiction; Dislocation theory; Brain disease model; Psychosocial integration; Community integration
For those who learn and share
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Table of Contents

Approval....................................................................................................................... ii
Partial Copyright License ............................................................................................ iii
Ethics Statement ........................................................................................................ iv
Abstract ...................................................................................................................... v
Dedication ................................................................................................................... vi
Acknowledgements .................................................................................................... vii
Table of Contents ..................................................................................................... viii
List of Tables ............................................................................................................. x
List of Figures ............................................................................................................ xi
List of Acronyms .......................................................................................................... xii

Chapter 1. Introduction .............................................................................................. 1
1.1. Objectives and overview ...................................................................................... 2
1.2. The brain-disease model of addiction ................................................................. 5
   1.2.1. A matter of perspective .............................................................................. 5
   1.2.2. Model principles and the role of intentionality .......................................... 8
   1.2.3. Addiction as a 3-stage cycle..................................................................... 11
1.3. The dislocation theory of addiction .................................................................... 20
   1.3.1. Experimental origins .............................................................................. 20
   1.3.2. Model principles and the role of intentionality ........................................ 23
   1.3.3. Revisiting the 3-stage cycle .................................................................... 30
1.4. Community integration ....................................................................................... 40
   1.4.1. A fissure in dislocation theory evidence ................................................... 40
   1.4.2. A measure to bridge the gap ................................................................... 41
1.5. Vancouver at home ............................................................................................. 44
   1.5.1. Suitability of VAH study population ....................................................... 45
   1.5.2. Support from published VAH results ..................................................... 47
1.6. Study Hypothesis ................................................................................................. 48

Chapter 2. Methods & Analytic Strategy .................................................................. 50
2.1. Data Source ......................................................................................................... 50
2.2. Variables of interest and operationalization ...................................................... 51
   2.2.1. Dependent: Addiction status .................................................................... 51
   2.2.2. Primary independent: Psychosocial integration ...................................... 52
   2.2.3. Additional independents ........................................................................ 54
2.3. Analytic strategy ................................................................................................ 56
   2.3.1. Statistical technique .............................................................................. 56

Chapter 3. Results ..................................................................................................... 58
3.1. Descriptive statistics .......................................................................................... 58
3.2. Student’s T-tests ................................................................................................. 61
3.3. Bivariate logistic regression .............................................................................. 63
3.4. Multivariate logistic regression ............................................................... 65
  3.4.1. Visualizing multivariate results ......................................................... 67

Chapter 4. Discussion ................................................................................. 70
  4.1. Interpreting key findings ................................................................. 70
  4.2. Broader implications ................................................................. 75
  4.3. Strengths and limitations ............................................................ 77
  4.4. Future research ............................................................................... 80

References .................................................................................................. 83
Appendix A. Vancouver at home flow-through diagram ......................... 91
Appendix B. Maudsley addiction profile (MAP) sample items ............... 92
Appendix C. The modified community integration scale (CIS) ............... 93
List of Tables

Table 1. Socio-demographic, lifestyle, and select health characteristics of At Home participants at baseline (N=497) ................................................................. 58
Table 2. T-tests for community integration subscale mean differences ............ 62
Table 3. Multivariate predictors of daily drug use (no alcohol or cannabis, N=471) ............................................................................................................... 65
List of Figures

Figure 1. Percentage of respondents reporting daily drug use according to community integration physical total score .........................................................68

Figure 2. Percentage of respondents reporting daily drug use according to community integration psychological total score ...........................................69
List of Acronyms

AOR  Adjusted Odds Ratio
BDMA  Brain-disease model of addiction
CI  Confidence Interval
CSI  Colorado Symptom Index
DSM-5  Diagnostic and Statistical Manual of Mental Disorders, 5th edition
DV  Dependent Variable
IV  Independent Variable
MAP  Maudsley Addiction Profile
MDS  Mesolimbic Dopamine System
MINI  Mini International Neuropsychiatric Interview
NIAAA  National Institute on Alcohol Abuse and Alcoholism
NIDA  National Institute on Drug Abuse
NIH  National Institutes of Health
RAS  Recovery Assessment Scale
RCT  Randomized Controlled Trial
UOR  Unadjusted Odds Ratio
VAH  Vancouver At Home
WHO  World Health Organization
Chapter 1. Introduction

Among most scientists and primary care providers whose work requires engaging in some way the subjects or objects of addiction, the prevailing paradigm through which addictions-related knowledge is both interpreted and produced, and which guides thinking on the experience of addicted persons, is a substantially medical, brain disease centric one (Kushner, 2011). For the majority of these addictions professionals, whose work may fall anywhere on a continuum covering theory of addictions, laboratory and animal research, or psychiatric treatment, the causes of addiction – and so too the most relevant kinds of treatment – are found in, or acting upon, the human brain. This leading perspective on addiction, characterized by a valuation of the brain that places it as both the major cause of addiction, as well as the primary site for intervention, is known in the corresponding academic literature as the brain-disease model of addiction (BDMA) (Hall & Carter, 2013).

The human brain’s responsive and complex biological capacities, as well as a vital role in the production of consciousness (Searle, 2000), make it an appealing site in the search for causes of and treatments for addiction; particularly as it appears to be susceptible to distortion, and also repair, using a variety of technologies. Biological, micro-scale interventions like pharmaceutical medication address the neurobiological mechanisms of addiction (Vocci, Acri, & Elkashef, 2005) while occupying distinct space from those approaches that are less purposefully directed at altering brain physiology. Such biology-light alternatives generally do not rely on the introduction of synthesized chemicals into brain physiology as their primary intervention, though they still act indirectly on the brain by modifying attitudes, ideas, beliefs, and behaviors – such as is the case with psychological and behavior based addictions treatment paradigms (Ewing & Chung, 2013).

Despite ongoing, global commitment of significant resources, in both human-effort and financial currencies, to the exploration of the human brain and its role in
addiction (Vrecko, 2010), the current discipline of addictions theory and treatment is misrepresented if it is made to seem unilaterally focused on the brain as an addictions holy-grail. Established differences of opinion concerning the clearest causes of addiction, and most hopeful treatments for, exist among addictions scientists. These differences seem to be not so much a dispute over precisely which elements of human biology, psychology, and lived-experience are meaningfully related to the development and maintenance of addiction; BDMA advocates acknowledge that upbringing, culture, and environment are demonstrably related to addiction (Kushner, 2011). Advocates of alternative models of addiction do the same when they recognize that disease models bring much value to the study of addiction etiology and treatment (Khantzian & Albanese, 2008; Alexander, 2012). What is in dispute is thus not whether the identified aspects of human physiology and experience are relevant to addiction – there seems at least a marginal consensus here – but instead the degree to which they are relevant is in dispute and, subsequently, so too is the answer to how research and treatment resources should be allocated in order to maintain and hopefully increase our understanding of addiction, while reducing its associated harms.

1.1. Objectives and overview

My specific objectives with this work are twofold, and although they synergize to help meet the broader goal of contributing to the rapidly developing discipline of addictions research and treatment, individually they are distinct and are met using unique approaches.

Primarily, I would like to bring greater attention to what I see as a minority perspective in the addictions field. Although it currently receives significantly less attention than the BDMA, I believe it remains vitally important and deserving of exposure. The perspective I refer to and endeavor to highlight and expand argues, essentially, that although the human brain and its vulnerability to being activated and altered by psychoactive drugs is an indisputably relevant factor in the development and maintenance of addiction in humans, its importance has been overstated.
In the last forty years, a surge of neuroscientific research has erupted, following closely behind the discovery of neurotransmitter receptor sites in brain tissue (Vrecko, 2010). During this time, alternative models for the cause(s) of drug addiction in humans have assumed a quiet minority role, arguing for the recognition of environment, culture, and unfilled psychological needs as major determinants in the addiction process, and doing so from the shadow of a swiftly expanding neurobiological style of thought. Of these alternatives, I see the dislocation theory of addiction (Alexander, 2012) standing as the most convincing and careful formulation, and perhaps as having the most radical implications for how we address not just drug addiction in humans, but all behavioural addictions, should its arguments find widespread traction in academic and applied settings.

In order to meet my first objective of bringing attention to the dislocation theory of addiction, I spend considerable space reproducing and exploring assumptions and evidence, both behind it and the brain-disease model of addiction. I conduct this discussion in sections 1.2 and 1.3 of this work. It is my hope that a reconstruction of the major arguments from both theories will illustrate the areas of human experience that a brain-centric model of addiction fails to address when accounting for drug addiction in humans. Simultaneously, this theoretical review enables a discussion of the relevance of integrative, psychosocial models of addiction (Wallace, 1993) to the broader addictions forum. In particular, I hope to show that the dislocation theory is a needed redress to the disproportional investment in brain-based thought and experimentation currently taking place within the scientific umbrella of addictions research. In the process of exploring the assumptions and perspectives forwarded by each model, I present and discuss pre-clinical (animal studies), clinical (human studies), and historical/anthropological evidence for each addiction paradigm where those data are available. Prominent in this discussion are the themes of vulnerability to drugs of abuse, withdrawal and abstinence from drugs of abuse, and the occurrence of relapse to drug taking after extended periods of abstinence.

My second objective with this work moves beyond introducing the arguments and evidence for both the brain-disease and dislocation theories of addiction, to conducting a novel test of one of the major predictions made by the dislocation theory concerning the cause of drug addiction in humans. I attempt to meet this objective by
reporting on statistical tests of the association between key dislocation theory variables and drug addiction. Although this effort addresses correlation between variables rather than evaluating a causal relationship, it is an analysis that improves upon the methodology of past studies. In addition to introducing more rigorous hypothesis testing into the corpus of dislocation theory evidence, the statistical analyses produced by this thesis project are highly generalizable to homeless, at-risk populations; populations that arguably stand to benefit the most from insights into the etiology and treatment of addiction (Fazel et al., 2008). I make this assertion on the ground that I have had the good fortune to produce these tests by drawing on data gathered during a preeminent Canadian research demonstration project investigating homelessness and mental illness (Goering et al., 2011).

In order to establish a context for this project’s hypothesis testing, I provide commentary and review of key variable operationalization in section 1.4. Community integration, a concept originally developed in the era following the de-institutionalization of mental health consumers (Aubry & Myner, 1996), is a central concept in these sections and is dealt with exclusively in section 1.4. As will be described at greater length there, it is my belief that community integration is highly compatible at both conceptual and operational levels with dislocation theory, and I support this argument by tracing a brief history of its use within the academic literature addressing the integration-promoting capacities of community housing for mental health consumers and homeless persons.

Section 1.5 is committed to describing the broader Vancouver At Home (VAH) study which provides the primary data enabling the hypothesis testing conducted here. Also presented in section 1.5 are already published data from the VAH project that relate directly to the two guiding objectives of this work. Section 1.6 follows and is the final section of the first chapter. In it, I present the main hypothesis guiding this thesis project, including why the hypothesis is relevant, and generally making explicit the intersection of the hypothesis test with the dislocation theory of addiction.

Chapter 2 describes the analytic plan that guides and shapes this study’s hypothesis testing. Sections in this chapter provide important details about the scales from which independent (IV) and dependent (DV) variables are drawn, as well as the
specifics of each variable’s measurement and/or construction. Chapter 2 also reviews
details of specific analytic techniques used in hypothesis testing, data structure, and
study design. The latter discussion includes details specific to VAH recruitment
strategies and sample characteristics.

Chapter 3 is devoted to presenting this study’s quantitative results. Socio-
demographic statistics for the study sample begin this section and are followed by
descriptive statistics on key IVs and DVs. Exploratory t-tests follow these and provide an
early version of a hypothesis test. Subsequent to these, bivariate and multivariate results
are presented, with the latter constituting the primary hypothesis test conducted in this
study.

The thesis project concludes with Chapter 4, where the results of hypothesis
testing are summarized and discussed. Space is devoted to interpreting and providing
commentary on hypothesis test results. Broader implications of multivariate findings are
considered, and the question of the dislocation theory of addiction as a complement to
the BDMA is revisited. The strengths of this study are summarized, along with its
limitations. The chapter concludes with a look at future directions for work of this nature,
with a particular emphasis on specific analyses that would continue to expand the
academic dialogue about psychosocial theories of addiction.

1.2. The brain-disease model of addiction

1.2.1. A matter of perspective

As suggested in the introduction to this work, the field of addictions research and
practice is currently divided, though not uniformly, over the relative importance of a large
pool of factors contributing to the etiology and treatment of drug addiction. The dispute is
not, strictly speaking, over which of living environment or brain physiology is exclusively
relevant in the study of addiction. There is, however, considerable momentum behind
perspectives emphasizing the role of brain physiology in the initiation and maintenance
of addiction, and this momentum has significant institutional and governmental
connections. In the United States, the National Institute on Drug Abuse (NIDA) – the
nation’s largest institute designated as a drug control program – has an earmarked 2014
budget of approximately $1.07 billion (USD), $465 million of which has been requested for basic and clinical neuroscience research, $142 million for the development of medication for addicted persons, and various smaller allocations with addiction-related mandates that intersect with studies of brain physiology (National Institutes of Health [NIH] Office of Budget, N.D.). In comparison to NIDA, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) – the only other national institute whose mandate falls under drug control — has a total projected 2014 budget of $62 million.

Dr. Nora Volkow, the acting director of NIDA since 2003, is an outspoken proponent of the BDMA, and contributes substantially to scientific discourse on the neurobiological correlates of addiction from her leadership position in the Institute. Through her research efforts, Dr. Volkow argues unequivocally that addiction is a disease of the brain, though her commitment to this perspective does not prevent her from at times recognizing the value of addressing environmental variables alongside physiological ones (Volkow, 2005; Shetty, 2011). This is certainly not the only example of scientists recognizing the importance of non-physiological variables while arguing from a solid foundation neurobiology (Nader & Czoty, 2005; Solinas et al., 2008). It is, perhaps, the most visible, and gives considerable weight to the value of investigating non-physiological variables in the course of studying addiction, particularly given Dr. Volkow’s pre-eminence within a federal organization strongly committed to investigation of the neurobiological correlates of addiction. NIDA’s own definition of addiction demonstrates an emphasis on brain physiology quite clearly:

Addiction is defined as a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences. It is considered a brain disease because drugs change the brain – they change its structure and how it works. These brain changes can be long lasting, and can lead to the harmful behaviors seen in people who abuse drugs. (National Institute on Drug Abuse [NIDA], 2010, pg.5)

Observers within the field of addictions have noted that although addiction is often defined in terms of biological correlates, such as in the above instance and, internationally, by the World Health Organization (2004) in highly similar language, it is almost always identified in practical settings through evaluation of behavioural and social factors (Hammer et al., 2013). Specifically, it is normal diagnostic procedure among
clinicians using the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) to evaluate addiction in this way. Other observers have noted another disconnect between mechanistic explanations of addiction and practical engagement with addicted individuals. Specifically, Vrecko (2010) argues that although addiction is generally described etiologically via physiological language, treatment for addictions is generally conducted with the therapeutic goal being the restoration of normal standards of behavior, emotion, and relating, where normality is a subjective phenomenon experienced and understood by individuals in a specific location and temporally limited point in history. The message is clear: although the emphasis in addictions research is strongly in the domain of brain physiology, assessing brain physiology (for indications of medication or psychotherapeutic effectiveness, for example) is rarely part of outcome evaluations for current treatment standards addressing addicted persons.

Together these perspectives suggest a complex tension in our current understanding of addiction, in which biological explanations are often invoked in the course of illustrating causal factors, medication (and by extension, biological), cognitive, and behavioural interventions are deployed in the course of treatment, and socially constructed definitions of normality are used in evaluating whether or not treatment has been successful in curing a person of disease. This tension is demonstrable in the research literature on addictions, with ideological lines being drawn to separate those who believe addiction is a brain disease (Leshner, 1997) from those who believe it is not (Levy, 2013).

Recent work by Scott Vrecko (2010) is once again a valuable contribution to this discussion of perspectives in addiction research and practice. In his work, which focuses on the historical trajectory of addiction in the United States, Vrecko traces the development of what he describes as a neurobiological style of thought on addiction, arguing that it was the (American) state’s changing sentiments about how best to counter a rising, post-Vietnam drug crisis, rather than basic, value-free scientific discovery, that solidified and intensified the neurobiological paradigm. In support of this argument Vrecko calls attention to key laboratory discoveries, namely the discovery of neurotransmitter receptor sites in human brain tissue in 1973, which occurred nearly 10 years after scientists and policy makers had established a working alliance dictating where and how ‘facts’ about addiction might be produced; namely, valid knowledge
production regarding the cause of addictions was delegated to laboratories conducting neurobiological research. That neurotransmitter receptor cites eventually were discovered only intensified interest in the BDMA, and consolidated the prestige and expertise of that particular style of thought.

Vrecko makes clear that his analysis is not conducted for the purpose of ‘debunking’ neurobiological perspectives on addiction, or to implicate existing knowledge about brain physiology as suspicious or spurious. Rather, its purpose is to trace and reveal the precipitating social and political events that ushered in an era of strong interest in brain physiology among addictions professionals, as well as the concurrent validation of that particular style of thought and knowledge production. The message that scientific ‘fact’ production and interpretation is contingent upon social conditions is one at odds with aspirations towards value-free and unbiased knowledge production; aspirations very much built into current reductionist approaches to the study of addiction. A reminder of the influence that politics and social trends can have on the scientific mandates, gentle as it may be, may thus be interpreted as having something of a provocative tone, depending on one’s own epistemology. It is also a reminder that serves in this paper to contextualize current debate over addiction’s causes and cures, and offers some indication about where the edges of the widely endorsed BDMA lie.

1.2.2. Model principles and the role of intentionality

The brain-disease model of addiction is a well-funded, complex, and pervasive model of addiction. Scientists worldwide dedicate their careers to investigating the role of human brain physiology in drug addiction, with little indication that the significant investment of human and technological capital involved will slow. If NIDA’s yearly budget is used as a barometer of trends in addiction research, then the BDMA is in fact gaining momentum (NIH Office of Budget, N.D.).

So far in this work, an answer to the question of what the BDMA actually asserts with respect to explaining the etiology of addiction has not been discussed in depth. Preliminary comments describing a tension between the BDMA and competing, environmentally-tuned models have been made in order to situate and contextualize a
finer exploration of BDMA-specific principles and, in later sections, dislocation-theory-specific principles.

Before beginning to explore what the BDMA suggests about the cause(s) of drug addiction in humans, it is valuable to first explore how BDMA advocates define the phenomenon of addiction *per se*. That is, to what phenomena are speculations about etiology attached? I have already presented evidence that addiction is widely defined in practical settings according to behavioural criteria, whereas its etiology within the BDMA tends to be addressed using neurophysiological explanations. I argue this point more directly here, where I provide additional evidence that addiction within the BDMA is primarily defined as a disease whose most salient diagnostic features are behavioural; in particular, drug addiction as defined according to BDMA advocates involves the tendency for an individual to cycle between drug seeking, drug consumption, and drug withdrawal, and, critically, the persistence of this behavioural routine despite the presence of negative consequences.

The definition of addiction provided by NIDA, introduced in the previous section, illustrates this very point. “Addiction”, it begins, “is defined as a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences” (NIDA, 2010, pg. 5). Others writing from within the BDMA define addiction similarly, though more generally, preferring a definition that avoids aligning addiction exclusively with drug use, though acknowledging that it may often involve drugs. Goldman and colleagues (2005, pg. 521) provide this kind of generalized definition of addiction, arguing that “addictions are psychiatric disorders that are associated with maladaptive and destructive behaviours, and that have in common the persistent, compulsive and uncontrolled use of drugs or an activity”. Koob and Kreek (2007) expand upon the later part of this definition, particularly the words “compulsive” and “uncontrolled”, by describing the addictive process in terms of an individual person’s transition through behavioural routines reminiscent of both impulse control disorders and compulsive disorders.

Besides providing a clear sense of how addiction is defined within the BDMA without addressing etiology, the above formulations of addiction also address the important topic of volition and personal agency in the addiction cycle. The definitions
above suggest with varying degrees of emphasis that addiction is largely an automatic process, one that persists without the continued intentionality of an unfortunate, addicted individual, within whom a disease or disorder is residing. Leshner’s (1997) work defending addiction as a brain disease contains some careful articulation of this discussion about individual choice. His work makes explicit the various possibilities for individual will in the addiction cycle. Specifically, Leshner argues that while addiction is a process that begins with willful action, evidenced by an individual choosing to pursue psychoactive drugs and, ostensibly, other behaviours with addictive potential, it in time becomes an unintentional cycle. It is argued that the cause of this transition is malfunctioning brain physiology that, through repeated drug administration, is essentially reprogrammed and usurped. The transition in brain function is one that, with the distinction of a switch being thrown, begins with brain physiology operating as it should, supporting discriminating, willful action, and ends with the brain having been misdirected into driving a highly disruptive and harmful behavioural cycle characterized by loss of individual control. The strong association between addiction and loss of control is widely though not unconditionally supported, both within the BDMA and in other models of addiction (Griffiths, 2013).

The question of volition and agency in the addictive cycle and, importantly for this thesis, the differences between available models of addiction regarding the way that individual responsibility for drug addiction is framed, have definite connections to the issue of stigmatization of addicted persons. Depending on the model considered, the role of individual choice in the addiction cycle can vary considerably. In the case of the BDMA, addiction is generally framed as a disease with biological origins, the failings of which afflicted individuals can hardly be blamed for, much as one does not hold accountable the individual suffering from, for example, spontaneously acquired Alzheimer’s disease (Levy, 2013). In this case, some argue, the benefit of widespread public and professional acceptance of the BDMA is that arguments about the moral culpability and weakness of addicted persons are discredited, ultimately reducing the shame and stigma associated with such character assaults, while opening up the possibility for a medicalized approach to treatment, including financial coverage under national and public health insurance plans (Hammer et al., 2013). In the case of the dislocation theory of addiction, as will be shown in later sections, individual responsibility
in the addiction cycle is portrayed very differently than in the BDMA, with different implications for who, or what, bears responsibility for addiction, as well as the nature of appropriate treatment.

1.2.3. **Addiction as a 3-stage cycle**

In light of the enormity of the brain-disease model, in terms of both the human and technological resource investments that support it, as well as in terms of the complexity of the primary object of study – the mammalian brain – it ought not to be surprising that, through systematic study, many intersecting lines have been drawn between constitutional elements of mammal brains and the behavioural and sometimes cognitive (in the case of human research, where they can be more carefully scrutinized) phenomena that currently constitute addiction. Although a full review of the molecular correlates of addiction produced by neuroscientific research on the mammalian brain is beyond the objectives set for this project, as well as the expertise of its author, it is consistent with this project’s objectives to contextualize findings about the brain’s role in addiction by locating them within the main behavioural and cognitive components of addiction to which they apply. Those components are introduced during the remainder of this section, with a survey of some of the supporting pre-clinical (animal studies) and clinical (human studies) evidence.

As a preface to that discussion, it is worthwhile to note that neurophysiological research done for the purpose of understanding the role of brain physiology in addiction is not always described with elaborate reference to a structure or guiding principles. Whether or not a particular study that on the surface appears to embrace the BDMA describes itself as such, or whether it is implicit in the work and of secondary importance to the presentation of specific facts, depends not only on the goals of the study but also on the relevance of organizational, paradigmatic, and perhaps reflexive comments, as perceived by study authors. At the extremes, some authors devote entire studies to the high-level, structure oriented discussion of the BDMA (Henden, Melberg, & Rogeberg, 2013; Leshner, 1997), while others working from within the same model devote comparatively little space to commenting on the model as a whole or its contained principles (Gass & Chandler, 2013; Vengeliene et al., 2008). In the later case, this seems to be done to provide greater attention to structures or concepts that more
immediately contextualize the study in question, and, indeed, there is a great deal of knowledge imparted by these area-specific discussions, even though the emphasis is more conducive to understanding “trees” of addiction neuroscience rather than “the forest” of which they are a part.

When reviews and presentations of the BDMA do offer commentary on the model’s underlying structure and principles (as mentioned above, these principles are sometimes either not addressed or appreciated implicitly), they regularly compartmentalize addiction into a three-stage behavioural and cognitive process, or cycle, in which each stage is defined in terms of specific behavior and/or emotion, and then linked through empirical methods to neurophysiologic processes and structures (Koob & Volkow, 2010; Nader & Czoty, 2005; Solinas et al., 2008). Each stage is understood both in terms of its behavioural/cognitive elements, as well as through the neurological correlates relevant to it. It is in the course of discussing implicated brain physiology that the possibility for, and indeed the importance of, change in brain structure and function (neuroplasticity) in response to chronic drug administration (neuroadaptation) is established, allowing connections to be drawn between an organism’s place in and progress through the addiction cycle, and the nature and degree of neurophysiologic change observed.

From the perspective of BDMA researchers who choose to address addiction as an observable cycle or process (and again, not all do) the cycle is conceptualized around the following three progressive and repeating stages (signalling loss of control): 1) vulnerability and intoxication 2) withdrawal and 3) relapse. Some authors (Koob & Kreek, 2007; Koob & Volkow, 2010) describe an organism’s transition through this cycle using a psychiatric framework, arguing that, early on, the addiction cycle involves elements of impulse control disorders, wherein tension and arousal build prior to the execution of some behaviour, followed by feelings of pleasure and gratification that act as positive reinforcement (inducing repetition) for the triggering behaviour. In later stages of the addiction cycle, animals (and humans) are said to display behavioural patterns consistent with compulsive disorders, wherein existing stress and anxiety drive behaviours that are reinforcing because of the fact that they reduce stress and anxiety. In brief, these authors argue that the addiction cycle is characterized by positively reinforcing mechanisms early on and greater automaticity and negative reinforcement.
later on in the cycle; furthermore, each stage of addiction implicates specific neurocircuitry and, finally, the transition from one stage to the next involves neuroplasticity in key brain areas, which occurs in response to chronic administration of specific drugs of abuse.

Vulnerability and intoxication

According to scientists writing from within the BDMA, the mesolimbic (mid-brain) dopamine system (MDS) is a critically important area of brain physiology when addressing why animals and humans are attracted to certain drugs, and particularly those drugs that have come to be understood as regular drugs of abuse (Levy, 2013). Part of the importance attached to the MDS comes from the multiple roles it appears to have in the addiction cycle. Animal studies have shown that the MDS is a sensitive site with respect to brain reward thresholds that can be triggered by psychoactive drugs, implicating it as a primary enabling factor in the acute rewarding effects of drug taking, especially psychostimulant drugs (Koob & Volkow, 2010). Evidence collected in human studies suggests vulnerability to “liking” a drug is inversely related to dopamine receptor density within the MDS and other brain tissue (Volkow et al., 1999).

In addition to showing that the MDS is correlated with the absolute degree of liking or subjective pleasure that an organism derives from certain drugs, research also suggests that the MDS is involved in shaping cognitions about the relative importance of drugs. In particular, the MDS is thought to contribute to the perceptions that organisms form about the value and desirability of a given resource in natural environments where multiple resources are potentially available (Robinson & Berridge, 1993). The association between MDS activity and the desirability of natural resources does not end at evaluative judgment, however. In addition to enabling discriminatory judgments about desirability, the MDS has also been shown to have motivating capacities, mobilizing animals (and humans) towards obtaining said desirable resources (Salamone et al., 2007).

This brief survey of evidence is intended to introduce the major salient features of the MDS in the vulnerability and intoxication stage of the addiction process. The MDS is as a collection of brain circuitry that enables organisms to discriminate between
available resources in order to notice, select, and eventually pursue those resources – whether food, drug, or other – and presumably to achieve a degree of survival and species propagation in the process. However, this survey is only a component discussion in a fuller explanation for how it is that external chemicals (drugs of abuse) interact with the MDS, or what effects their continued administration have on the behavioural routines the MDS supports. Expanding this later issue – the effects of chronic administration of drugs on mammal brains – is central to a brain-based understanding of addiction, and further clarifies the BDMA assertion that addiction involves usurpation of normative brain functions and otherwise important, adaptive, and useful brain physiology.

In addition to delineating the various functions of the MDS, animal studies also indicate that all drugs of abuse (amphetamines, nicotine, cannabis, cocaine, alcohol, opioids, and caffeine) interact with the MDS, altering dopamine neurotransmitter activity either directly, by increasing synaptic availability of dopamine, or indirectly, by altering peripheral neuronal systems that alter dopamine levels (Koob & Volkow, 2010; Levy, 2013). Persistently increased dopamine neurotransmitter levels in brain tissue produced by chronic administration of drugs appears to have important crossover effects in terms of modifying the “normal” MDS functions described above. Levy’s (2013) work in particular offers a lucid survey of the behavioural and cognitive consequences of chronic drug administration, and builds on the evidence suggesting resource-evaluating capacities of the MDS.

In his review, Levy describes early animal studies in which monkeys were rewarded for pressing a lever following the presentation of a cue. The animals were monitored in such a way that the response of individual dopamine neurons to cue and reward could be observed, both before and after associative learning took place. During learning phases (i.e., before monkeys recognized the association between cue and reward), dopamine neurons exhibited activation when the reward (water or juice) was delivered. Once animals learned the association between cue and reward, dopamine neurons exhibited activation in response to the reward cue, but not to delivery of the reward itself. What this study and others like it suggest is consistent with the MDS evidence already presented, with one important addition: the MDS allows evaluation of resources as either important or not and, additionally, the MDS can respond differentially
based on learned cue-resource associations. Levy emphasizes that within a reward-prediction framework, the normally operating MDS responds nominally to obtained resources when those resources are anticipated and expected, but demonstrates increased activation in response to unexpected or better than expected resources, signalling the resource's importance to the affected organism. This finding has important implications for a brain-based understanding of addiction as it provides an evidence-based link between the normative functions of the MDS and chronic administration of drugs of abuse.

The link appears as follows: Drugs of abuse can be involved in cue-associated and context-associated learning just like natural rewards can. Studies of conditioned place-preference in rats are used to show that rats in some cases learn to prefer locations previously associated with drug administration over locations with no history of drug association (Solinas et al, 2008). Cue and context-associative learning has been demonstrated in human drug users as well, and is thought to play a central role in triggering episodes of relapse into addiction (Olive & Kalivas, 2011). However, because of their chemical properties, drugs of abuse are not like natural rewards (Levy, 2013). While only cues engage the MDS system when a cue and natural reward pairing is encountered by an organism – expected rewards elicit nominal MDS activation – drugs of abuse engage the MDS both through their associated cues, which signal drug availability, and through their primary chemical action, which, as was introduced above, is to increase synaptic availability of dopamine. The consequence to the organism in question is an inappropriate valuation of the drug of abuse, such that, via drug-induced dysfunction in normally adaptive brain physiology, drugs of abuse are continuously interpreted as better than expected, with an associated increase in the organism's motivation to pursue drugs. This effect is especially pronounced with drug administration that allows chemicals to reach the brain swiftly and in large quantities (Koob & Volkow, 2010). Without the introduction of restraining variables (such as incarceration, in humans) chronic seeking and self-administration of drugs, often through injection, smoking, or insufflations, can and does occur as a result.
Withdrawal

The evidence presented so far introduces the MDS as an important network of brain physiology that, under normal conditions, enables adaptive and survival promoting cognitions and resource pursuit. A connection between the MDS and the initiation of drug taking has also been developed, and this discussion has been extended to reproduce the basics of a well recognized, brain-based explanation for chronic drug administration after initial use. What, then, can be said of the relationship between the MDS and later stages in the addiction process? This section provides a survey of what is known about associations between the MDS and the withdrawal stage of addiction found in a 3-stage cycle conceptualization. Withdrawal is defined within the context of the BDMA by drawing on evidence concerning neuroadaptations in brain physiology that occur in response to chronic drug administration. This discussion continues to establish the transitional nature of addiction that is embraced in contemporary BDMA literature.

Chronic drug exposure produces neuroadaptation in areas of the brain that are consistent with the site of a drug’s acute chemical influence (Koob & Volkow, 2010). In drug addiction, it is suspected that the dopamine neurotransmitter system’s operation becomes compromised following repeated exposure to drugs of abuse. Evidence from imaging studies in humans suggests that the capacities of the MDS are reduced through “receptor down-regulation”, a natural reduction of receptor density in brain tissue that occurs in response to chronically elevated levels of the neurotransmitter dopamine produced by external sources like drugs (Nader & Czoty, 2005, p.1476). This down-regulation of dopamine receptors in brain tissue is believed to have motivational and behavioural correlates that eventually cannot be overcome by ingesting increasing quantities of drugs, presumably because the required quantity of drugs or the means to acquire them are not available, or because of diminishing returns of drug use (tolerance). Animal and human studies suggest that common changes in behaviour and motivation associated with MDS diminution include sleep disturbance, increased fatigue, decreased mood, and reduced motivation to pursue drug and non-drug rewards (Koob & Volkow, 2010). Together, neurophysiological changes in the MDS and their associated motivational and behavioural deficits form an important component of a brain-based understanding of the withdrawal process.
Neurochemical systems in the brain associated with stress and aversion responses are also important components of brain-based conceptualizations of drug withdrawal. Because these systems operate through chemicals other than dopamine, their invocation in response to chronic administration of drugs of abuse is considered a “between-system” rather than “within-system” neuroadaptation (Koob & Volkow, pg. 223). Recruitment of stress and aversion systems in the course of acute and protracted withdrawal from drugs of abuse produces an anxious and aversive state that is thought to be the brain’s automatic attempt to restore normal functioning. The aversive qualities of withdrawal are operationalized in animal research through measures of place aversion. Such work shows that physical environments previously associated with withdrawal (following dependence) from any drug with abuse potential tend to be undesirable, and that this association depends critically on the activation of stress and aversion circuitry in the brain (Koob & Volkow, 2010; Stinus et al., 2005). Consistent with earlier comments made about drug taking providing variable forms of reinforcement (initially positive and, later in the addiction cycle, negative reinforcement), it is at the point of removing the anxious and aversive states that characterize withdrawal that a drug’s reinforcement status is hypothesized to shift from positive to negative, though evidence for this hypothesis comes largely from animal studies, as the neural mechanisms underlying negative reinforcement in humans are only beginning to be documented (Koob & Volkow, 2010).

**Relapse**

BDMA research defines withdrawal by demonstrating associations between chronic drug administration, MDS hypoactivation, and the activation of stress and aversion-related brain systems. Research involving the BDMA also addresses the central animal and human behavioural element contributing to addiction’s definition as a chronic disease: relapse.

In a 3-stage cycle of addiction, relapse represents the final stage, within which an organism is vulnerable to the effects of a drug, once again craves and seeks a drug, and ultimately resumes drug administration following a period of withdrawal. Relapse is believed to be associated with a variety of events, including direct exposure to drugs or to drug-associated stimuli (objects and contexts), through the experience of stressful
events, or the protracted negative emotional states associated with withdrawal described above (Koob & Volkow, 2010; Nader & Czoty, 2005; Solinas et al., 2008). Each of the possible reinstatement pathways are associated with unique areas of brain physiology, some located within the MDS and others defined by their role in the stress and aversion responses already discussed. The remainder of this section is devoted to exploring some of the animal and human studies that have addressed both the neural correlates of relapse and the behavioural contexts associated with relapse. Particular attention is given to the role of cue and context drug-associations in the reinstatement of drug seeking and taking, reflecting the careful scrutiny that drug-stimuli conditioning (as compared to relapse specifically) has received in both experimental psychology and in brain-based accounts of relapse in addiction (Olive & Kalivas, 2011). It is worth noting, however, the sentiment among BDMA researchers that the neural mechanisms of relapse are the least well known of any in the addiction cycle, in part because of existing challenges in assessing the brain’s relevant molecular features (Koob & Volkow, 2010; Nader & Czoty, 2005).

From the imaging studies on human participants that have been completed, it would appear that many regions of brain physiology are involved in relapse. The frontal lobe (itself a dopamine rich area) contains a multitude of these differentiated neuronal regions, many of which seem to exhibit dysfunctional operation in drug abusers during extended periods of withdrawal (Koob & Volkow, 2010). Generally speaking, the frontal lobe is associated with organismic executive control that, among other cognitive responsibilities, includes collecting environmental reward and valuation information from other brain systems, and then inhibiting or initiating particular behaviours (such as pursuit or avoidance) based on the signalled importance or avoidance profile an observed resource evokes in neural circuitry (Crews & Boettiger, 2009). Results from imaging studies in detoxifying humans are interpreted within the context of the frontal lobe’s demonstrated cognitive control capacities, such that disruption of the frontal lobe’s normative functioning is taken to be at least a preliminary charting of the physiological mechanisms underlying impaired impulse and inhibitory control that is characteristic of relapsing drug abusers.

In addition to evidence indicating that frontal lobe brain regions modulate decision making control and, importantly for a brain-based understanding of addiction,
that this control is impaired in drug abusers prior to relapse, experimental evidence also connects particular brain physiology to heightened perceptibility of drug-related objects and environments. As introduced earlier, cues and contexts that become associated with drug use through repeated paired exposure can include smells, physical locations, drug paraphernalia, etc., and are limited in variety only by an organism’s capacity to in some way perceive them (Olive & Kalivas, 2011). It is believed that exposure to drug-associated stimuli induces both pleasurable recollections (due to the positive effects of acute intoxication) and negative recollections (due to withdrawal-associated cues), as well as subsequent craving in the drug user (animal or human). These induced drives are in turn thought to be strongly related to the eventual reinstatement of drug taking after withdrawal that is here and elsewhere defined as relapse (Gass & Chandler, 2013).

Cue and context conditioning is measured in animal research using a variety of techniques, including the place-preference technique, as well as techniques that pair the delivery of cues (such as a light or sound) with the delivery of drugs following an operant behaviour (lever press or nose poke) (Olive & Kalivas, 2011). This second method of assessment is called cue-induced enhancement of drug self-administration (pg. 163), and a major contribution from work of this type has been to show that animals respond more vigorously for drug dispersal by performing required operant behaviours (lever press) when a previously conditioned cue (light) is presented, compared to when it is not. This finding has been replicated in human studies of psychostimulant users, and is interpreted to indicate that, beyond the primary reinforcing effects that drugs of abuse have, cues previously associated with drug taking have reinforcing properties, and that exposure to cues is to some degree uniquely responsible for levels of sustained drug self-administration (Olive & Kalivas, 2011).

Once animals are trained in this paradigm of cue-induced enhancement, they are sometimes introduced to extinction training in order to provide a model for drug seeking (a hypothesized precursor to eventual drug taking) in humans. During extinction training, operant behavioural responses are no longer paired with drug delivery, resulting in a significant decrease in overall responding. In some cases, extinction occurs in environments that share very few of the characteristics of environments where conditioning originally occurred. The influence of contextual associations on drug seeking is shown via such observations, as animals who had previously demonstrated
significantly extinguished drug seeking reinstate operant behaviours (drug seeking) when reintroduced into previously conditioned environments (Olive & Kalivas, 2011). Similarly, when extinction has occurred and animals are exposed either to the drug, a cue (light, sound), or a stressor, operant responding significantly increases and drug seeking is said to have been reinstated.

With respect to underlying neural circuitry, results concerning cue and context induced drug seeking are generally consistent with those related to early stages in the addiction cycle, with dopaminergic neurotransmitter transmission providing a molecular framework. Animal studies often involve producing lesions in brain areas and then examining whether the introduced tissue damage causes any observable changes in stimulus-reward pairings (Yun & Fields, 2003). Sections of a neuronal structure called the amygdala appear to be particularly relevant to cue and context induced reinstatement of drug seeking, with lesions on specific areas of the amygdala tending to reduce drug seeking behaviour. Human imaging studies exploring the neural correlates of drug seeking tend to converge well with animal studies, through for obvious ethical reasons experimental destruction of brain tissue in living participants is not possible. Human studies instead demonstrate neuronal reactivity in response to presentations of conditioned cues (Volkow, Fowler, & Wang, 2004), with evidence indicating that the forebrain and other brain regions activate in response to conditioned cues, and that activation of these areas is strongly associated with drug craving (Olive & Kalivas, 2011).

1.3. The dislocation theory of addiction

1.3.1. Experimental origins

The dislocation theory of addiction overlaps with the BDMA in a number of ways, with some points of overlap being more obvious than others. Although each theory develops its approach from a unique direction, as this section will illustrate, both theories seek to explain the cause and course of drug addiction, particularly the human version of drug addiction. As the preceding section demonstrated, the BDMA is built upon a long history of drawing on evidence from animal studies to demonstrate the major brain-related features of addiction in humans and, indeed, to argue that addiction is a brain
disease *per se*. In this approach there resides a much less obvious similarity connecting the BDMA and dislocation theory of addiction, for although the dislocation theory addresses addiction without significant or even notable appeal to the language of brain physiology, it too draws on findings from animal studies in the course of establishing early empirical support.

Dislocation theory’s roots extend to experimental psychology, from which studies on rodents conducted in the late 1970’s began to illustrate important features of the relationship between living environment and a drug’s reinforcing properties (Alexander et al., 1978). Shortly thereafter, these findings were extended to the human example (Alexander, 1987). This early work examined the relationship between rodent housing environment and intensity of morphine self-administration. This work demonstrated that the housing environment rodents occupy during tests of drug self-administration factor significantly into the quantity of drug those same animals consume. Specifically, this early research showed that animals living in naturalistic, spacious, and socially robust settings decreased their consumption of morphine solution, when given a choice between morphine and water, compared to recorded levels established during a long period of morphine only access. In comparison, animals housed in austere and isolating laboratory cages – the typical environments provided to study animals – consumed more morphine solution on choice days compared to baseline levels. Additionally, socially housed rats consumed less overall during choice days than did rats housed in isolation.

Although interpreting these findings cautiously, the study’s authors concluded that housing condition appeared to have had a significant impact in the determination of morphine self-administration levels in study animals. Addressing these findings, they suggested that the sedating and retarding psychomotor effects of morphine may have provided isolated rats with a measure of relief from their otherwise uncomfortable, stimulation-deprived living environment. In the case of rats housed in social environments reproducing what the rodents would encounter outside of captivity, the authors offered the suggestion that morphine self-administration may interfere with the unique need to compete for mates and resources that more robust and social environments produce, thereby making morphine self-administration to a degree obstructive and detrimental.
This study, and other like it, demonstrated that animals living in supportive and pleasant environments had considerably less appetite for drugs of abuse than did their counterparts housed in isolation. A suite of different study designs were used to test variants of this hypothesis, with a clear picture emerging in support of the attenuating effect that living environment has on drug self-administration (Alexander, 2008, pg. 194). With data from animal trials in hand, it was not long until commentary emerged on the applicability of data to the human case, and an early version of the dislocation theory was introduced (Alexander & Hadaway, 1981).

Although the BDMA and dislocation theories share a common empirical heritage, the trajectory of the dislocation theory has departed substantially from these beginnings, as the following sections demonstrate. In the resultant differentiation, the dislocation theory has sought not only to move beyond investigation of animal models of addiction, but also to address the role that environmental determinants have in all drug addiction, whether animal or human. In the resulting work, brain physiology and drug interactions have faded as the major conceptual lattice through which addiction is understood.

As was the case in sections dealing with the major perspectives and arguments forwarded by the BDMA, major theoretical arguments forwarded by the dislocation theory are addressed and made apparent here. A careful examination and comparison of both theories of addiction remains a guiding principle for this thesis and space is devoted to exploring each theory’s formulation of addiction and its supporting evidence.

To help guide this comparison of the BDMA and dislocation theory, it is useful to establish some common ground concerning the scope of what each framework actually suggests about addiction. The field of research on drug addiction is vast, with many disparate parts that do not readily fit into or connect to a recognizable structure. Some authors have argued that, for the sake of clarity and parsimony, it is valuable to trim back this “overgrowth” of disconnected literature and, where possible, to synthesize existing research on addiction in terms of some unifying structure or structures (Alexander & Hadaway, 1981, pg. 78). I am in agreement with these authors. Accordingly, the following sections contain an exploration of the broadest features of dislocation theory, as well as a more detailed examination. This later, in-depth analysis is organized using the same 3-stage model of addiction as was introduced in the BDMA sections above.
I have opted to carry this structure forward for a number of reasons. First, to the best of my knowledge, no conceptualization of drug addiction in humans produced by BDMA scientists is more structured or categorically specific than what is apparent in the research reviewed above. I am referring to the 3-stage model, in which each stage of addiction has behavioural, physiological, and psychological correlates. That this framework is both available and widely supported makes it an enticing location from which to explore alternative theories. Second, the dislocation theory of addiction generates a series of logically connected hypotheses which together anticipate the environmental and cultural conditions required for drug addiction to occur at the levels currently observed in developed countries. These “causal hypotheses” (Alexander, 1990, pg. 38) suggest markedly different etiologic and sustaining factors for drug addiction than do those produced by the BDMA, but they are hypotheses nonetheless and, as such, can be organized within categories and contrasted against those of competing theories (namely, those of the BDMA).

This approach should not be taken to mean that exploring the dislocation theory of addiction within a BDMA framework compromises dislocation theory’s unique contributions to the study of drug addiction. In fact, I believe the opposite is true. By adopting a shared framework in the course of reviewing and contrasting the mechanistic hypotheses of each theory, there is an opportunity to more clearly recognize points of divergence while allowing a full and robust review of each as a whole. As suggested above, this process will reveal that although both the BDMA and dislocation theory of addiction can be organized in terms of three broad components of addiction – vulnerability and intoxication, withdrawal, and drug use relapse – the stage-specific mechanisms posited by each theory vary considerably. Prior to addressing these mechanisms in detail, I will trace a general survey of the dislocation theory of addiction, beginning with the theory’s interpretation of individual agency in drug addiction.

1.3.2. **Model principles and the role of intentionality**

The primary author behind the dislocation theory of addiction has described the theory as “the adaptive model of addiction” at various times during its maturation (Alexander & Hadaway, 1981; Alexander, 1990; Alexander, 2008). Drawing attention to the alternative titles the theory has been called by is a useful exercise for reasons other
than allowing interested scholars to appreciate obscure bits of history. Knowing that the theory has at various times been summarized as the adaptive theory reveals an important truth concerning the way in which drug addiction in humans was and continues to be interpreted within the theory. In light of prevailing BDMA perspectives, an adaptive interpretation of addiction is really a re-interpretation of addiction, one that shifts considerably the role that individual choice and intentionally plays in the addiction process; a shift that positions addicted persons not as medical patients, but instead as motivated actors (Alexander, 1987).

To address this point more explicitly, it is consistent to say that the dislocation theory rejects outright the BDMA assertion that addicted individuals are ill individuals (Alexander, 1990). It follows from this position that since the dislocation theory does not depend upon interpreting addicted individuals as ill, addiction cannot be characterized within the theory as a brain disease, or as a physical disease of any other kind. It was shown earlier that the BDMA conceptualizes addiction as a chronic, relapsing disease associated with drug-induced brain dysfunction. In contrast, addiction within the dislocation theory is defined without evoking physiological or medical description.

Drawing directly from work on dislocation theory, drug addiction is defined as follows: addiction is an “overwhelming involvement with drugs or alcohol that is harmful to the addicted person, to society, or to both” (Alexander, 2008, p. 29). Notably, there is no reference to brains or to illness in this definition of addiction; the emphasis within this theory predominantly concerns degree of involvement with a substance or behaviour, as well as the presence of some kind of harm to the actors involved and/or to society generally. Relieving the brain from its formerly major role in the addiction cycle has concurrent liberating effects on how addicted persons are understood within dislocation theory. This feature of the theory is a critical component in the reinterpretation of addicted persons into motivated actors and problem solvers, rather than as ill persons in need of medical care. This distinction is worth examining closely, for if only left at face value it contains the potential for assumptions about individual responsibility in the addiction process that are not consistent with dislocation theory.

For example, if, according to the theory, addicted individuals are motivated in some way to pursue drug or other behavioural addictions, is the dislocation theory not
simply a moral model of addiction, wherein individuals are understood as vulnerable to addiction because of shortcomings in their personality? The value of exploring this hypothetical argument is that it contains an erroneous assumption which, when made explicit, reveals a basic tenet of dislocation theory. Namely, this hypothetical argument assumes that the dislocation theory is a moral model of addiction, in so far as it theorises that drives for addictive behaviours grow from psychological internalities (i.e., character weakness, intellectual deficiency), rather than psychological externalities (i.e., debilitating cultural and social realities) (Alexander, 2012).

In other words, the dislocation theory of addiction is not a moral model of addiction, and this is so because it argues that people are motivated to pursue drug addiction because sometimes drug addiction is the best available response that individuals can exercise when faced with debilitating and painful environmental circumstances. In this regard, addicted persons are understood as responding as well as they can, given limited environmental and psychological resources. Were the dislocation theory a moral model of addiction, perturbed and progressively degenerating morality, something attributable to persons themselves, would instead be the driving influence (Peele, 1990).

To summarize what has been said of the dislocation theory of addiction thus far, it is an adaptive model of drug addiction, such that drug addiction is understood as a reasonable and contextually appropriate response made by volitional individuals faced with challenging and painful environmental circumstances. Furthermore, the dislocation theory of addiction conceptualizes addiction without invoking neurobiological explanations, without assigning powerful or usurping forces to drugs of abuse, and without positing addicted persons as ill persons. In all of these areas, it diverges significantly from the BDMA.

Despite the fact that neurobiological themes are not prominent in the dislocation theory’s conceptualization of addiction, the theory does not require denying their influence or validity outright, except perhaps in the case of disease status (Alexander, 2012). Rather, the dislocation theory “is intended to remove individual factors from the foreground of attention because psychosocial factors are more powerful determinants” (pg. 1480). Where Leshner (1997, pg. 47), arguing within the BDMA, suggests that
“because the brain is the core of the problem [in addiction], attending to the brain needs to be a core part of the solution”, the dislocation theory reconfigures this conceptualization of addiction. What this reconfiguration entails is a reduction of the emphasis placed on brains, drugs themselves, and disease status, as the central themes relevant to the initiation and maintenance of addiction. For the major determinants of addiction, the dislocation theory instead implicates environmental factors, though the theory acknowledges that drug addiction, like other behavioural addictions, is likely produced through a complex combination of factors, all contributing some degree of influence (Alexander, 2012).

Although a general introduction to the dislocation theory has been made, a number of major supporting concepts remain to be defined, and their interconnection addressed. These concepts coalesce to produce the theory’s structure and logical flow. In the following pages, the dislocation theory’s organization and supporting concepts are presented. Here, the emphasis is not on evaluating the feasibility or evidence supporting this structure, but instead on completing a high-level theoretical review to orient the reader. A later section addressing the evidence base for the dislocation theory supplements this review.

The following review draws on summarizing efforts by Alexander (2008; 2012), who to date has been the principal author behind the dislocation theory of addiction.

_Principle 1: Psychosocial integration is a necessity / Sustained dislocation is unbearable_

The first principle of dislocation theory addresses a particular existential context within which all human beings operate, whether drug addicted or not. “The human psyche is anything but self-sufficient” argues Alexander (2012, pg. 1478), and so it is that all persons require, in order to be healthy and happy, a stable place in society and a sense of that place. An important component in any person’s pursuit and successful achievement of this sense of belonging involves expressing one’s uniqueness and individuality in a way that is consistent with, and does not disrupt, the diverse supportive functions that one’s social network provides. Striking a sustainable balance between individuality and group cohesion is a lifelong task, a “profound interdependence between individual and society that normally grows and develops throughout each person’s
lifespan” (Alexander, 2008, pg. 58). It is thus both a process and effect that, within the dislocation theory of addiction, is summarily called psychosocial integration.

Psychosocial integration is a term adapted from Erik Erikson’s pioneering work in developmental psychology (Erikson, 1964), and although the context is different when used in theorizing about addiction, the meaning is essentially unchanged: psychosocial integration is a maturational stage characterized by the successful resolution of tensions between an individual’s need for autonomy and their concurrent need for companionship, belonging, and a social existence. Successfully achieving psychosocial integration provides individuals with identity, stability, a sense of support and, reciprocally, of being needed. It implies order and collective purpose, and it is therefore a desirable and positive experience for those who achieve it. Conversely, “an enduring lack of psychosocial integration, which is called dislocation, is both individually painful and socially destructive” (Alexander, 2008, pg. 58). Punitive criminal justice techniques like solitary confinement highlight the aversiveness of psychosocial dislocation and rely on it for their effectiveness. Dislocation, even experienced outside extreme circumstances like these, is bearable for only a time. Extended periods produce feelings of “shame, emotional anguish, boredom … suicide, and less direct forms of self-destruction” (Alexander, 2008, pg. 59).

Many of a society’s subgroups provide the foundation for individual psychosocial integration, and the availability and variety of these subgroups are era- and culture-dependent (Alexander, 2008). The practical result of this variability is that certain cultures more readily provide members with opportunities for psychosocial integration. For example, while nuclear families, friendships, and work-related groups persist relatively strongly across cultures and time periods, there is a considerable difference between modern cultures and aboriginal cultures with respect to priority placed on maintaining relationships through clans, places of birth, and associations with deceased family members (Alexander, 2008). Because of these differences in culture-specific opportunities, psychosocial integration is not achieved across different groups of people with a generalized regularity or ease.
Principle 2: Proliferation of free-market society inevitably produces mass dislocation

The second principle in the dislocation theory of addiction extends the first by identifying the ways in which psychosocial integration can be threatened and eroded. In this principle, free-market societies are identified as the primary source of dislocation, with acknowledgment that natural disasters, childhood trauma, and well-intentioned interference in local economy can have similar, though substantially weaker effects (Alexander, 2012). The integration-dissolving capacity of free-markets is said to exist even when free-market societies are functioning normally. In fact, were free-market ideals to be completely achieved, this “would inevitably create universal dislocation” (Alexander, 2008, pg. 61).

According to Alexander, (2008, pg. 60) “a free-market society is a social system in which virtually every aspect of human existence is embedded within, and shaped by, minimally regulated competitive markets”. In these kinds of societies, the primary function of government is to ensure that market forces continue unhampered and without restraint. With respect to individual behaviour and direction, free-market societies encourage individuals to pursue “his or her individual enrichment competitively and acquisitively (Alexander, 2012, pg. 1478). Within free-market societies, this kind of hyper-individualism comes at the expense of loyalty to family, friends, ritual, or religion, engagement with which requires significant energy and an encumbering concern for communal issues (Alexander, 2012). In turn, connections to these people and institutions are weakened in the name of market discipline.

Observations about the relationship between psychosocial dislocation and free-market societies made in the second principle draw heavily on Karl Polanyi’s (1944) work exploring the genealogy of the 21st century’s economic and political systems. Polanyi’s research stresses that free-market society represents a shift in the power differential between social concerns and market concerns. In particular, free-market society is characterized by a “subordination of social and religious concerns to market concerns” (Alexander, 2012, pg. 1475), rather than the possible alternative wherein social concerns take precedence over market concerns. The consequences of this shifting of cultural priorities includes the accumulation of wealth and power among financial institutions, corporations, and the coercion of government into drafting and
maintaining legislative conditions that support continued market dominance. Because the principle values of a free-market society are closely tied to competition and accumulation of personal wealth, free-market society disrupts social ties that otherwise would provide people with a sense of place, purpose, and identity. The integration dissolving effects of free-market society can be felt even by individuals made wealthy by free-markets. As Alexander (2012, pg. 1476) states, “dislocated people suffer, even if they are rich capitalists”.

**Principle 3: Addiction is a way of adapting to sustained dislocation**

The third and final structural principle of the dislocation theory introduces addiction into the mix of existential and cultural commentary forwarded by earlier principles. The argument put forward in this principle is that addiction (including drug addiction), and, indeed, even “the most harmful addictions, do serve a partial compensatory function for dislocated individuals” (Alexander, 2012, pg. 1479).

Faced with chronic, enduring psychosocial dislocation and the negative affective state it produces, some dislocated individuals attempt to establish or re-establish the social and cultural conditions psychosocial integration depends upon. Because of wildly varying individual and social circumstances, some dislocated persons are more successful with this attempt at restoration than are others. Persons failing to achieve a suitable level of integration sometimes embrace intensely focused, narrow lifestyles that are commonly described in pejorative terms implying addiction: “junkie, shopaholic, workaholic, crackhead, and alcoholic” are but a few examples (Alexander, 2008, pg. 62).

The narrow lifestyle choices these labels apply to are, from the perspective of dislocation theory, addictive lifestyles. They are also considered adaptive lifestyles, even though participation in them may carry undesirable consequences. These addictive lifestyles are adaptive to dislocated persons in much the same way that crutches are adaptive to injured persons (Alexander, 1987). Both the use of crutches and addictive lifestyles carry risks if used for prolonged periods – blisters may form, atrophy may occur and, in the case of addictions, disastrous health, social, and financial consequences exist – and yet they both are behaviors with adaptive qualities. For the injured person, crutches prevent exacerbation of injury and a small degree of mobility. For dislocated
persons, engaging in an addictive lifestyle buffers against the bleakness of life lived without meaning or place. By filling the vacuum of naturally occurring psychosocial integration with addictive pursuits, dislocated persons can achieve a minimal level of psychosocial integration, and some degree of relief from the existential, emotional challenges of chronic dislocation (Alexander, 2012).

1.3.3. Revisiting the 3-stage cycle

With the structural principles of dislocation theory introduced, the theory’s logic and flow has been surveyed. The above sections are largely intended to introduce readers to the theory’s organizing ideas and to the model’s novel interpretation of drug addicted persons as neither medically ill nor morally deficient. At this point, this review of the dislocation theory of addiction turns to address the intersection of dislocation theory principles and assumptions with specific behavioural stages that BDMA authors argue characterize the addiction process. These arguments were previously developed in section 1.2.3. Once again, this approach is adopted in order that dislocation theory principles and evidence may be evaluated in a structured manner, and to facilitate comparability against the prevailing brain-based model of addiction.

Evidence from animal and human studies presented here provides an important bridge between the dislocation theory principles just introduced and the behavioural, progressive characteristics of drug addiction in animals and humans. This evidence is derived from laboratory work as well as historical and anthropological studies. On occasion, portions of this evidence are based on the work of scientists pursuing causal hypotheses distinctly associated with the BDMA. This is especially true of evidence taken from studies of drug addiction in animals.

Vulnerability and intoxication

The dislocation theory predicts specific environmental circumstances that lead humans to experience more or less vulnerability to drug addiction. Before addressing these circumstances, it is important to distinguish the meaning of vulnerability under the dislocation theory, compared to the meaning of vulnerability under the BDMA. Whereas the BDMA associates vulnerability to drug addiction with the availability of neural
circuitry susceptible to activation (and alteration) by drugs of abuse, vulnerability in
dislocation theory refers instead to the likelihood of particular lifestyle choices being
consciously made. In particular, vulnerability to drug addiction in dislocation theory is
equivalent to being likely to embrace addiction to drugs (i.e., overwhelming involvement
with drugs) as a lifestyle feature (Alexander, 2012).

What, then, are the specific environmental circumstances that motivate people to
make lifestyle choices involving high frequency involvement with drugs? As has been
introduced, dislocation theory posits that psychosocial dislocation is the primary variable
of concern when formulating mechanistic explanations for human vulnerability to drug
addiction (Alexander, 2008). It is argued that persons (or animals) who experience
significant psychosocial dislocation should exhibit a greater preference for drug use than
those with a suitable degree of psychosocial integration. In complementary fashion,
psychosocial integration, according to the theory, protects humans against vulnerability
to addiction. The logic here is that persons who experience and achieve psychosocial
integration experience little motivation for addictive lifestyles; this is due to individuals’
enhanced sense of “belonging, community, wholeness, social cohesion, or simply
culture” (Alexander, 2008, pg. 59), the absence of which is an aversive condition
characterized by anxiety, depression, stress, and loneliness.

To date, animal-based studies of the mediating effects that an organism’s
environment has on vulnerability to drug use address the influence of environmental
stressors (and stress-hormone levels) far more than they do environmental enrichment
(Nader & Czoty, 2005). Research on environmental stressors has demonstrated that
manipulations of animal stress-hormone systems can both increase and attenuate drug
self-administration in animals, depending on whether or not stress is increased or
decreased (Koob & Kreek, 2007). The mediating effects of environmental enrichment on
an organism’s vulnerability to drug abuse has also been explored, and animal studies
exploring the protective effects of environmental enrichment have already been hinted at
in earlier sections of this thesis.

Alexander’s and colleagues’ (1978) early work evaluating preference for
morphine in rats demonstrated the attenuating effects that a robust and rich
environment, one which presumably promotes an animal model of psychosocial
integration, can have on rats’ willingness to self-administer drugs. Working with nonhuman primates, Nader and Czoty (2005) documented a similar effect of environmental enrichment on vulnerability to drug self-administration. In this work, the authors measured dopamine receptor function in monkeys during individual housing and, afterwards, during social housing. The authors found that becoming socially dominant, and thus receiving environmental enrichment through more attention from peers, better food rewards, and fewer space restrictions, caused significant changes in the newly dominant animals’ dopamine systems. Conversely, subordinate monkeys’ dopamine functioning was largely unchanged from baseline, individually housed levels.

In the same study, investigators went on to explore possible drug-related behavioural associations that environmental enrichment (social rank) may have with drug self-administration. In order to test for significant differences in vulnerability to drug use between dominant and subordinate monkeys, the authors allowed both groups to self-administer stimulant drugs (cocaine) while recording frequency and intensity of use. Under these conditions, subordinate monkeys self-administered cocaine more regularly, and in greater quantities per session, than did dominant monkeys.

This study and others like it (Bardo et al., 2001; Solinas et al., 2009) provide a complex, intersecting look at environmental enrichment, brain functioning, and vulnerability to drug abuse. This is an important research program because it addresses the interrelatedness of these variables, and in the process both reproduces and expands on the work by Alexander and colleagues (1978). These authors arrive at a similar conclusion to Alexander et al. concerning the effects of environmental enrichment on vulnerability to drug abuse. Drawing on different laboratories and techniques, results remain consistent with the idea that animals accustomed to enriched living environments show less vulnerability to pursue drugs of abuse compared to animals living in un-enriched environments. Evidence from animal studies also indicates that the removal of enriched environments causes rodents to display increased sensitivity to the effects of drugs and, furthermore, that this heightened sensitivity is, for an acute time period, significantly higher than that displayed by animals housed continuously in non-enriched environments (Nader et al., 2012). Thus, not only does environmental enrichment (analogous to psychosocial integration in humans) attenuate the desirability and reinforcing effects of drugs in animals, removal from enriched living environments
(analogous to psychosocial dislocation) causes animals to show an acutely elevated desire and preferences for drugs.

Nader and Coty’s (2005) work in particular is expansive in that it adds robustness to animal models investigating the interaction of environment and drug vulnerability. First, they utilized a primate model of drug addiction, rather than a rodent model. This feature of the research lends it a higher degree of credibility than rodent-based models, as various features of primate biology and social organization are thought to make primates a more valid experimental platform for modelling drug addiction in humans (Nader et al., 2008). The second contribution their research makes to the discussion about environmental mediation of vulnerability to drug addiction is through a demonstration of the influence that environmental variables can have on addiction-related brain physiology. Alexander and colleagues (1978) do not explore the physiological correlates of manipulation of environmental conditions. Nader’s and Czoty’s work, on the other hand, demonstrates the multivariate structure of addiction by offering linkages between environmental conditions, brain physiology, and vulnerability to drug addiction. If, as the dislocation theory suggests, psychosocial dislocation precipitates vulnerability to drug addiction, then it is a fortuitous coalescing of perspectives when neurophysiological evidence from animal studies begins to reconcile brain-based explanations of vulnerability to addiction with those proposed by environmentally tuned models.

With respect to human vulnerability to drug addiction, Alexander (2008; 2012) argues that the proliferation of highly competitive, market-driven societies produces psychosocial dislocation and, consequently, that individuals within those societies experience increased vulnerability to addiction. This claim appears to receive support from a variety of historical studies on human populations, wherein, consistent with results from animal studies, psychosocial dislocation (i.e., non-enriched environments) precede significant increases in vulnerability to drug addiction.

Alexander (2008) draws on the historical development of 17th and 18th century Europe, where social historians have indicated that alcohol abuse problems (the predominant drug of the time) were relatively unknown prior to the flourishing of free-market ideals and social organization. The development of addiction in the United States
appears to have occurred via a similar trajectory. Alcohol addiction in the United States, though present during the 17th and 18th centuries, did not become a major social problem until the early 19th century, following significant social transformation and fracturing brought about by the American Revolution. This trend is apparently not limited to alcohol addiction, either. China’s transition from largely unproblematic and controlled use of opiates in the 18th century to excessive and problematic levels of use in the 19th century follows a similar pattern, with free-market induced psychosocial dislocation precipitating increases in vulnerability to drug addiction (Alexander, 2008).

Alexander (2006) draws as well on historical trends among Canadian and American First Nations peoples to help illustrate the significant impact that cultural upheaval and dislocation can have on individual vulnerability to addiction. In this work, Alexander, referring to contact with Europeans, argues that there is "no evidence of pre-contact behaviour that could reasonably be called addiction, despite easy access to activities and goods that now comprise devastating addictions in today’s free-market society" (pg. 120). Upon contact with Europeans, which marked the introduction of alcohol to Canadian First Nations culture, First Nations people did not exhibit much in the way of problematic use. Where alcohol had been available prior to European contact, such as among Mexican and American First Nations people, “alcohol was used moderately, often ceremonially – but not addictively” (Alexander, 2006, pg. 120). It was not until Canadian First Nations peoples suffered terrible cultural destruction through European imposed dispossession of land and residential schools that “alcoholism emerged as a universal, crippling problem for native people” (Alexander, 2008, pg. 134). It is a fate that remains a tremendous source of difficulty for many First Nations Canadians today, who continue to experience addiction-related consequences.

Although departing from population level data, studies on childhood trauma appear to suggest a strong relationship between dislocation and vulnerability to addiction. Alexander (2012) maintains that while undesirable environmental circumstances like early childhood trauma and abuse may appear to be parenting failures, they are “better understood at a more general level as a psychosocial problem” (pg. 1480), produced by free-market social organization. In free-market societies, parents are thought to be at increased risk of traumatizing their children because of stressful economic and psychological pressures on the nuclear family. That many kinds
of childhood trauma (i.e., poverty, abuse, neglect) are associated with later drug addiction is a finding which has been widely reported and confirmed (Alexander, 2008; Enoch, 2011; Huang, Gundapuneedi, & Rao, 2012). However, important data addressing whether free-market societies are associated with higher rates of childhood trauma, compared to rates in other types of societies, are absent from existing work describing the dislocation theory of addiction.

**Abstinence**

Here, withdrawal has been replaced with the term abstinence. This is intended to reflect the dislocation theory’s relatively smaller emphasis of the physiological experience of withdrawal, compared to abstention from drug use *per se*. Recall that the BDMA draws definite intersections between the physiological correlates of chronic drug taking and drug withdrawal. Within the dislocation theory, exploring the cause or effect of withdrawal symptoms is a relatively minor issue relative to documenting the broader psychosocial conditions under which humans are likely to cease their addictive involvement with drugs. The following quote is illustrative of this emphasis:

> The dislocation theory of addiction implies that withdrawal symptoms are in no way necessary to the existence of any addiction, since the primary motivation for addiction is maintenance of a lifestyle and an identity that provides a dislocated person with a substitute for psychosocial integration. (Alexander, 2008, pg. 185)

Conceptually, the dislocation theory of addiction addresses abstinence from addiction as follows: if the drive to soothe or distract from the strongly negative experience of psychosocial dislocation increases individuals’ vulnerability to drug addiction, then those people will give up their chosen addictions under two circumstances. First, people will give up their addictive substances or activities if they become unavailable, for whatever reasons. In this case, individuals are likely to become intensely involved with another activity or substance or collection of activities or substances (Alexander, 2008). In the second, more desirable circumstance, individuals give up their addictive substances or activities after achieving a more robust experience of psychosocial integration. In the case of eliminating or significantly reducing addictive behaviours, rather than interchanging them, the dislocation theory suggests that
addiction may be successfully treated by enacting environmental modifications promoting psychosocial integration.

A number of animal studies have addressed the question of whether or not environmental enrichment is an effective “treatment” for addiction, both drug and otherwise. Solinas and colleagues (2008) conducted research exploring this hypothesis using rodents reared in standard, non-enriched environments. While living in standard environments, all rodents were repeatedly exposed to drugs (cocaine) until addiction-like behaviours were established. Once established, animals began forced abstinence, and were randomly assigned to either remain in standard housing or to receive enriched housing. Repeated measures of vulnerability to the effects of cocaine were obtained for 30 days. Between-group analyses revealed that rodents in the enriched-housing group demonstrated significantly less vulnerability to the reinforcing effects of cocaine and, importantly, significantly less drug-seeking behaviour as measured by preference for environments previously associated with cocaine. Rodents housed in standard housing continued to show significant preferences at 30 days for cocaine paired environments, while this preference was completely eliminated in rodents who received 30 days of enriched housing. Similar results were obtained from a study investigating the effects of environmental enrichment on food seeking in rats (Grimm et al., 2008).

In a follow-up to their original “housing as treatment” paper, Chauvet and colleagues (2009) explored limitations to the protective effects of enriched environments. Using a more valid, animal self-administration model of addiction, this follow-up confirmed the previous finding that rodents exposed to improved environments show significantly lower drug seeking behaviour, and that this is true even when re-exposed to drug-related cues and stressors. However, an improved housing environment did not prevent reinstatement of cocaine seeking behaviour if drug seeking was induced by exposure to cocaine itself. Thus, while improved environments appear to decrease animals’ willingness to pursue drugs after a period of abstinence, even when exposed to stress or drug-associated cues, these environments do not prevent drug seeking behaviour after exposure to drugs themselves any more than do standard environments.

These laboratory results suggest important intersections between living environment and the likelihood of an organism’s sustained abstinence from drug
addiction. Significantly higher drug-seeking behaviour among rodents housed continuously under normal environments, compared to those switched to enriched environments, supports the hypothesis that improvements to psychosocial environment can effectively be a “treatment” for drug addiction. These environmentally mediated reductions in animal drug-seeking behaviour provide preliminary support for the dislocation theory hypothesis that “psychosocial integration makes recovery from addiction possible” (Alexander, 2008, pg. 160), though not without the qualification that exposure to drugs themselves may in some cases be too powerful a cue for individuals to resist drug seeking. In those cases, reinstatement of drug seeking may ultimately result in drug acquisition and relapse into addiction.

According to the dislocation theory of addiction, the primary way to recover from addiction is to restore one’s psychosocial integration, with the understanding that full restoration cannot happen through addiction per se (Alexander, 2008). Rather, recovery from addiction, particularly untreated, spontaneous recovery, is said to occur as a result of adopting new or previously non-addicted lifestyle habits (i.e., environmental modification). Alexander cites a number of studies in humans that illustrate cases of spontaneous recovery from addiction involving these kinds of integration promoting lifestyle changes. Lifestyle changes associated with recovery from addiction especially tend to involve increased contact with “the addicted person’s family or close friends and [...] the supportive institutions of their culture” (Alexander, 2008, pg. 160). Regarding these institutions, recovery programs like Alcoholics Anonymous and church groups apparently operate and assist clients through their community building features, which encourage increased social integration and the formation of new relationships. In these cases, evidence suggests that participation and location in a community, rather than religious conviction independent of participation, is associated with reductions in alcohol and illicit drug consumption (Richard, Bell, & Carlson, 2000).

It is important to emphasize that, according to the dislocation theory, drug addiction is not a complete substitute for psychosocial integration (Alexander, 2012). As such, addicted persons are unable to achieve a robust sense of psychosocial integration through addiction alone. Drug addiction cannot completely fulfill people’s natural need for meaning, place, and identity, no matter how vigorous the addiction. At best, the dislocation theory posits, people can achieve a degree of integration through drug
addiction, particularly if drug addiction provides a person with a strong sense of identity through membership with a notable drug-using population (i.e., injection drug users). However, “addictions reciprocally increase society’s dislocation, because severely addicted people damage their own families and their own communities” (Alexander, 2012, pg. 1476). Drug users who achieve a degree of integration as a result of their overwhelming drug involvement therefore still remain vulnerable to escalating addiction as a result of the destructive cycle borne of dislocation, adaptation through addiction, and yet further dislocation (Alexander, 1990).

**Relapse**

Once again, available data from both animal and human studies demonstrate a place for environmental variables in discussions of the factors that contribute to, or attenuate drug addiction. This section specifically addresses those data that speak to the role that environmental factors play in preventing or anticipating animal and human relapse into drug taking.

To begin this survey, work by Nader & Czoty (2005) showed, using a primate, self-administration model, that dominant, abstinent monkeys (i.e., monkeys used to enriched environments) are significantly less vulnerable to relapse into drug seeking following exposure to cocaine than are subordinate monkeys. Similar results have confirmed this (Solinas et al., 2008) and partially confirmed and extended this elsewhere (Chauvet et al., 2009), showing that environmental enrichment protects as well against cue- and stress-induced reinstatement of drug seeking. These results suggest that rich living environments offer one-time drug using organisms a measure of resilience against reinstatement of drug-seeking, and that this resilience is robust, persisting through drug, cue, and stress inductions. Overall, these findings appear to support the dislocation theory principle that psychosocial integration can effectively treat addiction (Alexander, 2008).

Work by Nader and colleagues (2012) addresses the relationship between environmental enrichment and relapse into drug taking by exploring the effects of removal from enriched environments. In this study, removal of environmental enrichment was shown to have significant deleterious effects related to increased drug pursuit.
Rodents previously housed in enriched environments (and subsequently resistant to the reinforcing effects of cocaine) were switched into standard environments and tested for cocaine preference. For 30 days, these rodents showed a reinstated interest in cocaine that was significantly enhanced beyond even the preference levels shown by rodents housed continuously in standard environments. After 90 days, cocaine preference levels among rodents switched from enriched to standard environments remained elevated, though at a level comparable to baseline levels shown by rodents housed continuously in standard environments. Transition from enriched environment to standard environment was also associated with significant increases in depressive and anxious behavioural characteristics, interpreted by the authors as “a manifestation of enhanced behavioural despair and of an underlying negative emotional state” (Nader et al., 2012, pg. 1582).

Together these findings suggest that, among animals, enriched living environments have definite associations with both resilience and vulnerability to drug relapse. Findings addressing the protective effects of enriched environments suggest that organisms can be buffered against relapse into drug seeking. Conversely, data on the effects of enrichment removal suggest the experience of transition to lower levels of environmental enrichment and support increases drug seeking (an animal model of relapse) and induces significant negative behavioural and emotional states. These conclusions, however, are drawn from animal models, and therefore only provide peripheral support for the dislocation theory assertion that, in the human case, incipient psychosocial dislocation is addressed through addictive pursuits. Indeed, authors have shown that drug craving (upon which the above animal studies often rely) “is neither a necessary nor sufficient precursor to drug use or relapse” in the human case, suggesting the importance of conservatism when attempting to extend animal-based findings to human examples (Roache, 2011, pg. 137).

The dislocation theory of addiction addresses relapse explicitly and with the following hypothesis: Relapse into drug addiction tends to occur after periods of abstinence because of acute “breakdown of psychosocial integration”, and not, primarily, because of withdrawal symptoms or cravings (Alexander, 2008, pg. 156). Conversely, periods of increased psychosocial integration should correlate with relatively low risk of relapse. Human data supporting the validity of these claims are not plentiful within the
existing dislocation theory literature, though what is available does suggest tentative support for at least the latter case. In defending this claim, Alexander (1990) draws on surveys of Vietnam War veterans’ relapse rates upon returning to America, where, he notes, only 12% of formerly opiate addicted veterans experienced subsequent opiate addiction after three years return, and then usually only for a brief period of time. This attenuation of addiction cannot be attributed to treatment, as only 6% of men testing positive for opiates at departure from Vietnam later entered a treatment program (Robbins, 1993). It appears plausible then, given the veterans’ reports of continued availability of heroin in America at the time, and the relatively small uptake of drug abuse treatment, that a substantial increase in psychosocial integration was an influential mechanism in preventing continuation of previously established drug addiction.

1.4. Community integration

1.4.1. A fissure in dislocation theory evidence

Research supporting the dislocation theory of addiction comes from a variety of paradigms and thus provides various kinds of results: Animal studies provide quantitative, experimental evidence of the influence that enriched living environments can have on various aspects of drug addiction in animals. Cultural, historical, and observational studies on humans provide mostly narrative evidence describing how changes in cultural organization and opportunity appear to influence drug addiction at a population level. Evidence from rigorous, experimental studies among humans, on the other hand, is mostly lacking. An absence of high quality, operationally lucid quantitative evidence amounts to a knowledge gap, and a major impediment to attempts to evaluate the dislocation theory of addiction as a viable complement to the BDMA, even though the BDMA draws heavily on animal studies as well.

In part, difficulty assessing the validity of the dislocation theory of addiction arises because major concepts like psychosocial integration and drug addiction are operationally ambiguous in existing dislocation theory research conducted among human populations. Often, early life adverse experience and family breakdown is taken to be the primary measure of dislocation, with the presence or absence of some form of
childhood trauma establishing comparison groups (Braucht et al., 1973; Cook, 1991; Dube et al., 2003; as cited in Alexander, 2008). Elsewhere, mental illness or behavioral abnormalities are taken as sign of dislocation (Deyken et al., 1987; London et al., 1985; as cited in Alexander, 2008). While these all may very well describe dislocating experiences or conditions, they are not proven to be so much as assumed to be; there is a substantial risk of circular reasoning behind such operational definitions, where any unusual individual factor or variable associated with addiction must necessarily be a measure of dislocation. The effect of relying so heavily on variables of this sort is that there are a tremendous number of results showing positive associations between addiction and variables that all look very much like dislocation but that in reality are unsubstantiated beyond face validity. Results from studies of this sort are also difficult to compare across sites and difficult, if not impossible, to aggregate into quantitative meta-analyses. These limitations all significantly attenuate the influence and wider acceptance of the dislocation theory of addiction.

To my knowledge, there does not yet exist quantitative, experimentally derived hypothesis tests of dislocation-theory principles, based on clear, explicit operational definitions of both psychosocial integration and drug addiction in humans. Among the varied works reviewed for the preparation of the present work, I encountered no such research. This thesis begins to address this deficit in the dislocation theory literature.

1.4.2. A measure to bridge the gap

Because prior studies relevant to the dislocation theory of addiction have failed to employ direct, quantitative measures of psychosocial integration in human subjects, there is both great uncertainty about how to proceed and rich opportunity to draw from other knowledge domains. There is, for example, a close parallel to psychosocial integration within scientific literature dealing with the issue of housing among persons with serious mental illness (SMI). In this literature, community integration has become a variable of great interest in evaluations of the well-being of persons experiencing SMI who are living outside of institutional settings (Wong & Solomon, 2002). As a result of increased emphasis on community integration as a desirable outcome for housing program clients, collecting self-reported levels of community integration or other similar experience from this population has become routine when evaluating the impact and
potential benefit that supportive housing initiatives confer to their clients (Aubry & Myner, 1996; Prince & Gerber, 2005).

Community integration has carried a variety of different labels and conceptualizations in the community mental health literature. Wong’s and Solomon’s work (2002) argues for the superiority of a multidimensional conceptualization and provides a theoretical framework justifying and supporting this approach. At the time of publication, their work argued that most studies exploring the community integration of persons with SMI were based on a unidimensional concept of community integration. This singular approach tended only to address a person’s physical engagement in community activities and the utilization of community resources like parks and libraries. Left out of this conceptual discussion of community integration, they argued, is a sensitivity to the ways that social relationships with peers (rather than just physical presence) and psychological experiences of group membership affect one’s sense of community integration. Without a widened conceptual definition upon which to ground the measurement of community integration, sample data describe only a narrow range of possible integration experience.

Prior to the conceptual recommendations made by Wong & Solomon (2002), Aubry’s and Myner’s (1996) work evaluating self-reported community integration among clients of congregate-living housing programs was the first to utilize a multidimensional model of community integration. In describing the construction and process of establishing operational definitions for each of the three dimensions of community integration (physical, psychological, and social), Aubry & Myner draw on a variety of sources from the mental health services and housing literature. The resulting suite of community integration dimensions provides robust coverage of a wider range of possible community experience than had previously been conceptualized or measured.

Like psychosocial integration, community integration’s ideal conceptualization, according to Aubry & Myner (1996) and Wong & Solomon (2002), requires use of a multidimensional model that allows for nuanced measurement of experience along a continuum. Individual persons experience varying levels of community integration based on their own capacities and the resources available to them in their environment. In other words, individual-level community integration is understood to be an experience
that ebbs and flows with movement reminiscent of the smooth rising and falling of a wave, rather than of the binary ‘on’ or ‘off’ of a light switch. A person’s reported level of community integration is susceptible to change across time, too, since it is contingent upon a number of variables that need not remain stable indefinitely. Because these authors work within the supportive housing literature, variables proposed as having important influences on a mental health consumer’s sense of community integration are, rightly, housing and mental health service oriented. Wong & Solomon (2002) offer an explicit formulation of suspected variables of importance in this regard, and they go on to define them categorically as “housing environment, behavioral environment, support environment, and personal factors” (2002, pg. 20).

Since pioneering efforts at expanding the conceptual and operational bounds of community integration were made, a modest degree of uptake of the 3-factor model has emerged in literature addressing community integration. For example, in more recent work by Patterson et al. (2013), Prince & Gerber (2005), and Yanos et al. (2007), each study reports on community integration according to a multidimensional operational definition highly derivative of or drawn directly from the scales originally proposed by Aubry and Myner (1996). Despite these gains in operational consistency, community integration as a variable continues to evolve and, as such, at times appears in incongruous forms within the housing and mental health literature. These differences are evident when considering the specific integration dimensions to be operationalized (Fields, 2011; Townley et al., 2009), as well as the particular instruments selected to operationalize each dimension (Tsai & Rosenheck, 2012).

Notwithstanding these conceptual and operational challenges which, certainly, are by no means unique to this domain of literature, community integration is embraced in the present work for having the necessary conceptual and operational groundwork to enable its use as a kind of ‘operational surrogate’ for psychosocial integration. Recalling the deficits in dislocation theory evidence described above, a multidimensional model of community integration appears to be a ripe framework from which to mount an empirical and quantitative test of dislocation theory hypotheses. To this point, no published work on the dislocation theory of addiction has tested any of the theory’s major hypotheses using data derived from a human sample and collected via a quantitative, operationally explicit measure of psychosocial integration.
Empirical investigation of this kind requires a dataset with particular features: Primarily, numerical data should be available for the key variables of psychosocial integration (proposed here as suitably operationalized via community integration) and drug addiction. Ideally, these variables should be assessed uniformly across all study participants. There should also be enough observations to allow for the detection of small effects and for variability in responses to the primary variables of interest. In order to assess the independent associations of these variables while controlling for potential confounding factors, data on demographic and lifestyle circumstances are desirable. The Vancouver At Home (VAH) project, a collaborating site in the Canadian At Home/Chez Soi national research demonstration project, investigating homelessness and mental health, meets these requirements, and is the major research project from which this thesis draws its data. The following section introduces background and contextual information on the VAH project.

1.5. Vancouver at home

The VAH study is one of five component sites in Canada’s first randomized, controlled experiment to evaluate the efficacy of housing-first interventions among homeless individuals suffering from serious mental illness (Goering et al., 2011). Housing-first interventions are defined by their permissive eligibility criteria, and are believed to produce uniquely positive opportunities and results on these grounds (Kyle & Dunn, 2008). In particular, housing-first interventions permit clients to apply for and access housing without imposing requirements for abstinence from licit or illicit substances, and without requiring adherence to psychiatric treatment, including psychotherapy and medication. Less permissive, competing housing models leave persons reporting continued substance use at risk of program expulsion, or these users may be excluded from housing a priori. Given that homeless populations experience substance-related and mental health problems at rates much higher than is found among the general population (Hwang, 2001; Shelton et al., 2009), interventions that offer housing “first” and assistance with substance related problems or psychiatric conditions “second” are well-positioned to address this population. According to the housing-first ethos, suitable housing is a primary need and right whose fulfillment takes
priority relative to the fulfillment of collateral substance use and psychiatric treatment needs (Kyle & Dunn, 2008).

Data collection for the VAH study began in 2009, and was completed by May 2013 (Somers et al., 2013). Throughout the study, participants were in regular contact with investigators, leading to a significant collection of baseline and longitudinal data on a variety of health, housing, criminal justice, and quality of life measures (Patterson et al., 2012). Each of the five At Home study sites shared core methodology and a selection of cross-site instruments. Additionally, certain sites incorporated regionally and contextually appropriate measures and designs selected on the basis of expected study population characteristics and regional study-site features (Somers et al., 2013). Among the unique features present in the VAH protocol, improved ability to measure substance use characteristics was incorporated, based on prior knowledge of an existing high concentration of homeless individuals with concurrent substance use disorders.

Importantly for the present work, select measures included in the VAH instrumentation suite operationalize variables indicated in core dislocation theory assertions. Specifically, measures of both community integration (i.e., psychosocial integration) and detailed substance use surveys were included in the VAH protocol. As with many of VAH’s questionnaires, community integration and substance use measures were administered to VAH study participants both at baseline and at regular follow-up intervals.

While a fuller account of VAH study methodology appears in Chapter 2 of this work, certain additional features of the VAH protocol and already published results are highlighted here, in intentional proximity to earlier discussions about the conceptual and operational challenges pervasive within existing dislocation theory evidence. These comments are primarily meant to highlight features of the VAH study that support improved testing of dislocation theory principles.

1.5.1. Suitability of VAH study population

Firstly, VAH data are valuable to the current work because they include responses from active substance users. Drawing as it does from a housing-first model,
the VAH trial did not place expectations of abstinence from substances or engagement with related treatment programs on study participants, at study initiation or otherwise. This particular feature of the VAH dataset is an asset for the current work because it protects VAH data from a sampling bias that excludes substance users. Because the present work is concerned with a quantitative evaluation of the relationship between psychosocial integration and substance addiction, the inclusion of data from substance using persons – or at least freedom from the systematic exclusion of such data – is a necessary feature of any dataset used to test this posited association. In the hypothetical case in which study inclusion/exclusion criteria would eliminate substance users a priori, data on substance use would be uniformly unreported, obscuring any attempt to discern a predictive relationship between psychosocial integration and substance addiction (Pagano & Gauvreau, 2000).

Secondly, VAH study data includes levels of psychosocial integration (operationalized via community integration) as reported by individuals experiencing various intensities of homelessness and serious mental illness (Goering et al., 2011). It has been reported elsewhere that persons experiencing homelessness and mental illness often also report experiencing alienation and social exclusion (Townley & Kloos, 2009). In the terminology of the dislocation theory of addiction, homelessness and SMI produce substantial psychosocial dislocation, and they do so to the degree that the loss of stable housing or onset of mental illness is accompanied by perturbations of role identity, social networks, goals, skills, and beliefs (Anthony, 1993).

As a result of the presence of, and potential variance within, the psychosocial dislocation data obtained from VAH study participants, the VAH dataset appears to be an appropriate selection for testing dislocation theory hypotheses. A high likelihood of dislocation is particularly relevant in light of the posited relationship between psychosocial dislocation and substance addiction as a form of adaptive coping. Were a relationship of this type to exist, populations experiencing significant dislocation might also be expected to report heavy involvement with substances. Essentially, VAH data provides an opportunity to examine the substance involvement of a population that is very likely to be experiencing at least some degree of psychosocial dislocation.
1.5.2. **Support from published VAH results**

The feasibility of performing quantitative, operationally explicit tests of dislocation theory hypotheses using VAH data is also supported by papers coming from other VAH investigators. The first, prepared by Palepu and colleagues (2012), reports on the baseline recruitment data covering daily substance use patterns and mental health symptoms for all VAH study participants. In their paper, the authors dichotomized participant data into one of two categories: daily substance users or non-daily substance users. Once dichotomized, socio-demographic and mental health status data for both groups were compared. Of the 497 persons who completed baseline measures in Vancouver, 143 (29%) reported being daily licit or illicit drug users, whereas 354 (71%) reported less than daily drug use (N=232), or no daily drug use in the past month (N=122). Among daily drug users, cannabis, crack cocaine, and alcohol were the three most frequently reported substances. Also drawing on responses from daily drug users, 112 (78% of all daily drug users) reported using only one substance daily, with the remainder reporting daily polysubstance use.

The relevance of findings from Palepu and colleagues to the present study lies primarily in the discovery that many VAH participants do report significant rates of substance use at baseline measurement. Were this not the case, it would remain questionable as to whether the VAH dataset contained enough observations of high intensity substance use to allow meaningful conclusions to be drawn regarding a potential association between psychosocial integration and drug addiction.

A paper by Somers and colleagues (2013) also offers support to the feasibility of this thesis project. They reported on the substance using characteristics among all VAH participants, and in addition stratify baseline substance use frequency results by participant need status. Briefly, participants at all At Home study sites were randomized into either a high need (HN) or moderate need (MN) trial arm, based on a combination of social, legal, mental health and other medical factors.

Somers et al. reported that, with the exception of amphetamine use being higher among HN participants, the frequency of past-month substance use for individual substances (heroin, alcohol, crack, cocaine, or cannabis) did not differ according to participant need status. Additionally, HN and MN participants reported similar levels of
injection drug use, daily drug use, and polydrug use. This evidence supports the current study by establishing the relative homogeneity of substance use frequency among all VAH participants, regardless of need status. This is relevant to the hypothesis testing proposed in this thesis as it confirms a significant and uniform reporting of substance involvement among participants in the VAH sample, independent of their needs level.

1.6. Study Hypothesis

This thesis approaches correlates of drug addiction from the perspective of psychosocial determinants, rather than those related to brain physiology, drug pharmacology, or brain-drug interactions. Drawing as it does on the dislocation theory of addiction, this work addresses the question of whether or not drug addiction is associated with psychosocial integration.

If, as has been suggested here, community integration is appropriately analogous to psychosocial integration, then it would appear that a means of operationalizing a central variable in the dislocation theory of addiction has been identified. To this point, the lack of an operationally explicit, quantitative measure for psychosocial integration places significant limits on the validation and acceptance of the dislocation theory of addiction.

With improved instrumentation, it becomes possible to conduct a rigorous, quantitative test of a major prediction made by the dislocation theory of addiction. Specifically, the theory predicts that addiction is an adaptive response maintained by individuals who are attempting to compensate for an absent or diminished social and cultural existence. If this is true, one should find a negative association between community integration and addiction, whether to licit and illicit substances, gambling, television, work, or other activities.

The underlying logic here is that humans adaptively engage in addictive behaviours in a way that is systematically related to the deficit of psychosocial integration they are experiencing. Lower integration should mean a greater amount of supplementary addiction, and experiencing more integration should mean a relinquishing of addictive substances or activities.
On the grounds of the above logic, the current study proposes, a priori, one hypothesis, generated from the dislocation theory of addiction, to be tested using data from the Vancouver At Home project:

At baseline, among all VAH participants (N=497) psychosocial integration will predict substance addiction status after controlling for demographic and circumstantial variables. The direction expected is that higher levels of psychosocial integration will predict a reduced tendency for individuals to self-identify as a daily drug user.
Chapter 2. Methods & Analytic Strategy

2.1. Data Source

The Vancouver At Home study is one of five component sites that comprise Canada’s first randomized, controlled trial investigating the efficacy of housing-first interventions among homeless persons suffering from mental illness (Goering et al., 2011). At the VAH site, 497 participants were enrolled at baseline following telephone and in-person eligibility assessments (see Appendix A). Community agencies serving the homeless population in the Greater Vancouver area were the primary source of recruitment. All enrolled participants met inclusion criteria including adult status (19 years of age or older), confirmed homelessness or precarious housing, and the presence of a current mental disorder confirmed by the MINI International Neuropsychiatric Interview 6.0 (MINI; Sheehan et al., 1998).

Participants were considered homeless if they reported having had no fixed place to stay for more than seven nights and little likelihood of obtaining accommodation in the next month. Precarious housed participants included those whose primary residence was a Single Room Occupancy (SRO), rooming house or hotel/motel. Precarious housing also required that participants had two or more episodes of being absolutely homeless in the past year. Participants were excluded from participating in the study if they were a current client of another housing program, only reported marginal homelessness, or were not a Canadian citizen, landed immigrant, refugee, or refugee claimant.

During enrollment, participants were categorized as HN or MN based on objective measures of mental health, health care utilization, legal, and community ability histories (Somers et al., 2013). After baseline enrollment, both MN and HN participants completed a baseline questionnaire suite addressing housing, health status, community functioning, quality of life, justice service involvement, health care utilization, and social
service access. Participants received a $35 cash honorarium for these assessments. The project was approved by the Research Ethics Boards at Simon Fraser University and the University of British Columbia. Further details of follow-up and retention, randomization to trial arms, and the full At Home measurement suite are available in existing publications (Goering et al., 2011; Somers et al., 2013). This study draws exclusively from VAH baseline data. Comments on treatment conditions and the longitudinal aspects of study design are therefore left to other authors.

2.2. Variables of interest and operationalization

2.2.1. Dependent: Addiction status

The primary DV in this study is addiction status, which has been operationalized using the Maudsley Addiction Profile (MAP; Marsden et al., 1998). VAH baseline assessment included administration of the MAP, which assesses, among other outcomes, participants' frequency of past-month substance use. Queried substances are both illicit and licit, and include: alcohol, heroin, cocaine powder, crack cocaine, amphetamines, and cannabis. Participants are asked about past-month substance use patterns for a variety of substances, and if answers in the affirmative are given, responses are recorded for each substance as a frequency count representing number of days of use on a given week, presence of daily substance use, and quantity of a substance used on typical days of administration.

For the hypothesis test conducted in this study, past month daily drug use data are used to indicate, in a binary fashion, whether or not a participant is addicted to drugs. The dichotomous addiction variable is coded such that ‘1’ identifies that a participant is a daily drug user for at least one of the substances addressed within the MAP. A coding of 0 on the addiction status variable identifies a participant as not being a daily drug user, meaning the participant did not report past-month daily drug use on any of the substances addressed by the MAP. Appendix B contains representative items taken from the MAP.

The decision to operationalize addiction status as past-month daily drug use was made after considering the available measures contained in the VAH dataset as well as
the conceptualization of addiction provided by the dislocation theory. As introduced earlier, the dislocation theory frames addiction as “overwhelming involvement with drugs or alcohol that is harmful to the addicted person, to society, or to both” (Alexander, 2008, p. 29). Based on this conceptualization and the available VAH baseline measures, daily drug use status appears on face to be the most valid way of dichotomizing participants into ‘overwhelming involvement’ or ‘non overwhelming involvement’ with substances, while making clear and consistent distinctions for the behavioural criteria necessary for categorization in either group. Alternatives to this operationalization included using the presence or absence of substance dependence or abuse disorders to indicate addiction, in this case drawing on data from baseline MINI administration. This option was not pursued, as diagnoses of substance dependence or abuse appear to reflect more the consequences of overwhelming involvement with substances, versus the strict presence or absence of overwhelming involvement enabled through operationalizing via daily drug use status. Additionally, substance dependence and abuse are diagnoses that can be assigned on the basis of many different behavioural conditions, creating the potential for participants to potentially report having identical diagnoses despite dramatically different contributing factors.

2.2.2. **Primary independent: Psychosocial integration**

The primary IV in this study is psychosocial integration. Of the available measures in the VAH instrument suite, the community integration scales (CIS) were chosen for operationalizing this variable. This decision was made on the grounds that the CIS offers a robust, quantitative, and explicit measure of integration. As the present study is in part intended to begin to remedy the absence of rigorous human data testing dislocation theory predictions, these properties of the CIS were highly valued. The CIS suite was originally developed for use among mentally ill populations, and is based on a multidimensional conceptualization of integration, addressing three domains of integration: physical, social, and psychological (Aubry & Myner, 1996).

The physical integration subscale draws on work by Segal & Aviram (1978) and is intended to assess past month frequency of involvement in activities outside of a household setting. Examples include going to a library, playing sports or recreation, or meeting people at a restaurant. The original physical integration scale contained 12
items, was scored between 0 and 4 on each item (for a maximum score of 48), and had a Chronbach's alpha of .73 and .74 for persons with mental illness and non-disabled community residents, respectively (Aubry & Myner, 1996). Chronbach's alpha is a measure of item-specific variance within unidimensional measures, and generally takes values between 0 and 1. Large alphas (approaching 1) indicate that a large proportion of variance on test scores is due to attributes inherent to the test taker, rather than to any particular test item (Cortina, 1993).

The psychological integration subscale was first developed by Perkins et al. (1990) before being used as part of the community integration suite. This subscale originally contained 12 dichotomized items asking participants about a sense of belonging to and emotional connectivity with their neighbourhood and neighbours. Participants indicated that statements were either true (1) or false (0), giving the subscale a minimum score of 0 and a maximum of 12, indicating the highest integration level. Chronbach's alpha for this scale is .71 among both mentally ill and non-disabled populations.

The social integration subscale draws on work by Aubry, Tefft, & Currie (1995), and assesses the frequency of a variety of social interactions, such as saying hello to neighbours or going to social gatherings. The original social subscale included 12 items scored between 1 (never) and 5 (frequently), for a minimum score of 12 and a maximum score of 60, reflecting the highest level of social integration. This subscale has a Chronbach's alpha of .87 and .92 among persons with mental illness and non-disabled community residents, respectively.

Prior to the At Home national study, the multidimensional CIS had not been used in a homeless population. Because of this, pretesting of the CIS took place with members of the Vancouver, Winnipeg, and Toronto homeless populations before its use in the At Home baseline measurement suite (Adair et al., 2011). This process was undertaken to verify the comprehensibility and relevance of the CIS to the homeless and mentally-ill population addressed by the At Home study. The pre-testing phase revealed a number of issues tied to using the CIS suite in a homeless population, leading in the end to the removal of the social integration sub-scale, and elimination of many of the items on the remaining physical and psychological sub-scales. These modifications were
made to increase the relevance, comprehensibility, and sensitivity of the scales for mentally ill populations that are also homeless. Pretesting indicated that many activities were either not relevant to homeless persons, or were endorsed for inappropriate reasons that obscured the validity of scores.

The resulting CIS measure used in the At Home study addresses two integration dimensions: physical and psychological. The physical scale is composed of 7 dichotomously scored items assessing past month participation (yes / no) in similar activities as were found on the unmodified physical integration subscale. It carries a minimum score of 0 and a maximum score of 7, with 7 indicating the highest level of physical integration. The psychological subscale contains four items assessing participants’ sense of community belonging and familiarity. Each item is scored between 1 (strongly disagree) and 5 (strongly agree), for a minimum score of 4 and a maximum of 20, with 20 indicating the highest level of psychological integration. No psychometric information for the modified CIS is available at this time.

Because of differences in scale scoring and interpretation (i.e., dichotomous scoring versus continuous, binary participation versus agreement), the decision was made to model community integration using a separate variable for each subscale. Therefore, in later statistical tests, all modelling includes two integration variables (physical and psychological), though they both remain united conceptually as a proxy for psychosocial integration. See Appendix C for the modified CIS used in both the At Home study and this work.

**2.2.3. Additional independents**

Because this thesis seeks to determine what, if any, unique association exists between psychosocial integration and addiction, a number of secondary IVs were selected for inclusion in later multivariate analyses. Data on all secondary IVs were collected from VAH participants during the baseline interview process.

Secondary IVs of interest include a number of participant demographic characteristics: Age at randomization (continuous), age of first homelessness
(continuous), gender (categorical: male or female), and ethnicity (categorical: aboriginal or white or other).

Secondary IVs also address lifestyle characteristics: Education (categorical: incomplete high school or complete and higher), marital status (categorical: single or other), employment (categorical: unemployed or other or employed), lifetime history of homelessness (categorical: less than or equal to 3 years or greater than 3 years), longest single episode of homelessness (categorical: less than 1 year or 1 year and greater). Categories were created for lifetime history of homelessness and longest single episode of homelessness based on median values from the raw continuous data. The presence of significant outliers reported in each variable motivated the use of categorical presentation.

The remaining IVs selected address participant health status: Colorado Symptom Index (CSI) total score (continuous), less severe mental illness diagnosis (categorical: yes or no), severe mental illness diagnosis (categorical: yes or no), and Recovery Assessment Scale (RAS) total score (continuous).

The CSI is a 14 item instrument, designed specifically for homeless individuals with mental health issues (Boothroyd & Chen, 2008). It assesses past month frequency of mental illness symptoms using a likert type scale of 0 (no symptoms) to 4 (every day). The scale carries a minimum value of 0 and a maximum value of 56, denoting maximum symptom frequency and poorest mental health.

Less severe and severe mental illness diagnoses are based on baseline results from the MINI 6.0. The MINI is a brief, structured diagnostic interview intended to replace longer psychiatric evaluations of DSM-IV and ICD-10 disorders (Goering et al., 2011). Participants were coded in the less severe cluster if MINI results included at least one of (current): major depressive episode, panic disorder, and posttraumatic stress disorder. Participants were coded in the severe cluster if MINI results included at least one of (current): psychosis, mood disorder with psychotic features, and hypomanic or manic episode.

The RAS is a 22-item scale evaluating self-reported levels of recovery from mental illness (Corrigan et al., 2004). Items address a variety of recovery related topics.
and experiences. Responses are coded on a 5-point likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale has a minimum score of 22 and a maximum score of 110, the latter indicating more complete recovery from mental illness.

2.3. Analytic strategy

Before moving on to results, an important point should be made about the special circumstances that accompany the statistical analyses associated with all quantitative research conducted by members of the VAH research team. These circumstances are a direct result of the size, complexity, and sensitivity of the VAH dataset; it is a large dataset, featuring many thousands of observations across dozens of variables. It also features highly personal and necessarily restricted data. Because the VAH dataset has these features, access is restricted to a small number of pre-authorized members of the VAH research team. Strictly speaking, student investigators do not have direct access to the VAH data, and as such they are unable to perform statistical analyses directly. In their place, a VAH staff statistician (Dr. A. Moniruzzaman), who has considerable experience with the dataset, is charged with executing analyses requiring access to VAH data. With respect this thesis, analyses were executed following discussion between myself, members of the supervisory committee, and Dr. Moniruzzaman.

2.3.1. Statistical technique

Results begin with baseline descriptive statistics for all VAH participants (N=497). These statistics provide a high-level survey of VAH participant characteristics. Note that, in addition to describing measures of central tendency for the study’s DV, primary IV, and secondary IVs, descriptive statistics are included for certain variables not included in later multivariate analyses.

A preliminary hypothesis test using Student’s t-tests follows descriptive statistics. This test establishes whether or not an unadjusted association exists between psychosocial integration and addiction. Performing t-tests at an early stage allows a finer interrogation of whether or not this unadjusted association exists independently of the inclusivity of the daily drug use variable. Recall that, based on responses to the MAP,
participants are identified as a daily drug user if daily use of any drug is reported, whether or not the drug is licit (i.e.: alcohol) or illicit. T-tests allow consideration of whether an association between psychosocial integration and addiction depends on the composition of the daily drug use variable. Theoretical justification for this test included the possibility that psychosocial integration may be associated with addiction only if daily drug use is defined inclusively, with all drug use considered; or, alternatively, with more normalized substances, such as alcohol or cannabis, discounted when determining a participant’s daily drug use status.

This thesis’ final stage of hypothesis testing is accomplished using multivariable logistic regression analysis. Regardless of qualifications identified through t-tests, the primary outcome of interest in this study is addiction status, which is scored according to a set of binary yes (1) or no (0) conditions. The hypothesis undertaken by this thesis project determines the unique relationship between psychosocial integration and addiction status, while controlling for the variance in addiction status attributable to the secondary predictor variables described earlier. Given the binary nature of the DV in this study, as well as the cross-sectional scope of the study’s hypothesis test, logistic regression is identified as the appropriate statistical technique (Pagano & Gauvreau, 2000). All IVs were examined for a significant bivariate association with addiction status. Only those IVs showing significant bivariate association with addiction status were included in multivariable analysis.
Chapter 3. Results

3.1. Descriptive statistics

Descriptive statistics in Table 1 below provide high level, baseline summarization of VAH participants according to demographic and other study-relevant variables. A more complete descriptive examination of VAH baseline data is available elsewhere (Patterson et al., 2012; Somers et al., 2013).

Table 1. Socio-demographic, lifestyle, and select health characteristics of At Home participants at baseline (N=497)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Overall N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio-demographics</strong></td>
<td></td>
</tr>
<tr>
<td>Age at enrolment visit (years)</td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>40.8 (11.0)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>41 (32-48)</td>
</tr>
<tr>
<td>Male Gender</td>
<td>359 (73)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Aboriginals</td>
<td>77 (16)</td>
</tr>
<tr>
<td>White</td>
<td>280 (56)</td>
</tr>
<tr>
<td>Other</td>
<td>140 (28)</td>
</tr>
<tr>
<td>Incomplete High School</td>
<td>280 (57)</td>
</tr>
<tr>
<td>Single (never married)</td>
<td>343 (70)</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>18 (4)</td>
</tr>
<tr>
<td>Other</td>
<td>20 (4)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>457 (92)</td>
</tr>
<tr>
<td>High need status</td>
<td>297 (60)</td>
</tr>
<tr>
<td><strong>Homelessness</strong></td>
<td></td>
</tr>
<tr>
<td>Lifetime duration of homelessness (months)</td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>60.2 (70.3)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>36 (12-84)</td>
</tr>
</tbody>
</table>
### Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Overall N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Longest duration of homelessness (months)</strong></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>30.9 (40.1)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>12 (6-36)</td>
</tr>
<tr>
<td><strong>Age of first homelessness (years)</strong></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>30.3 (13.3)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>28 (19-41)</td>
</tr>
<tr>
<td><strong>Colorado Symptom Index (CSI)</strong></td>
<td></td>
</tr>
<tr>
<td>Total score</td>
<td>37.2 (12.5)</td>
</tr>
</tbody>
</table>

### MINI International

#### Neuropsychiatric Interview diagnosis

- Psychotic Disorder/Schizophrenia: 263 (53)
- Major Depressive Episode: 199 (40)
- Post Traumatic Stress Disorder (PTSD): 129 (26)
- Manic or Hypomanic Episode: 97 (19)
- Panic Disorder: 104 (21)
- Mood disorder with psychotic feature: 84 (17)
- Substance Dependence: 288 (58)
- Alcohol Dependence: 121 (24)
- Suicidality (high or moderate): 168 (34)

### Gain-SPS

#### Last withdrawal problems from alcohol or other drugs

- Past Month: 169 (34)
- 2-12 Months ago: 99 (19.9)
- One or more year ago: 79 (15.9)
- Never: 132 (26.6)

#### Last health problems from alcohol or other drugs

- Past Month: 125 (25.2)
- 2-12 Months ago: 82 (16.5)
- One or more year ago: 94 (18.9)
- Never: 170 (34.2)

#### Last law problems from alcohol or other drugs

- Past Month: 71 (14.3)
- 2-12 Months ago: 96 (19.3)
- One or more year ago: 131 (26.4)
As shown in Table 1, the VAH baseline sample is predominantly white (56%), male (73%), with a mean and median age at enrollment of approximately 41 years. Most participants are single (70%), have not completed high school (57%), and were unemployed at the time of baseline testing (92%).

Participants reported a significant history of homelessness, with a median total lifetime duration homeless of 3 years, a median longest single episode of homelessness of 1 year, and an age of first homelessness of approximately 28 years. Affirmative response rates for a variety of mental illnesses and health and legal problems are also included in Table 1.

Also included in Table 1 are descriptive statistics for community integration and addiction related variables. VAH participants scored an average of 2.1 out of a possible 7 on the community integration physical subscale, and an average of 10.9 out of a possible 20 on the community integration psychological subscale. Participants reported alcohol (49%) as the single most frequently used drug in the month prior to responding,
with cannabis (45%) being the second most frequently used. 18% of participants reported past month injection drug use. When considering all substances addressed by the MAP, 29% of the sample reported being a daily drug user. When considering all drugs excluding alcohol, the percentage of participants reporting daily drug use was reduced to 25%. When considering all drugs excluding alcohol and cannabis (i.e., ‘hard’ drug use only), 15% of participants qualified as daily drug users. These descriptive findings indicate that participants in the VAH sample were approximately three times more likely to be daily cannabis users than to be daily alcohol users (no test of significance was performed on this difference).

Although not shown, data on community integration and daily drug use variables had high fidelity. One percent or fewer missing responses were reported for community integration variables, and no missing responses were reported for daily drug use variables.

### 3.2. Student’s T-tests

T-test results in Table 2 assess the relationship between psychosocial integration and addiction under unadjusted conditions. Additionally, these t-tests indicate whether or not an unadjusted association varies according to addiction’s specific operational definition.

In Table 2 below, daily drug users and non-daily users are compared according to mean physical and psychological community integration scores. This comparison is repeated using three progressively more restrictive definitions of daily drug use. The first definition of daily drug use includes all licit and illicit drugs. The second excludes alcohol from its definition. The third, most restrictive definition of daily drug use, excludes both alcohol and cannabis from its definition.
Table 2. T-tests for community integration subscale mean differences

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Levels</th>
<th>Physical Subscale Mean</th>
<th>SD</th>
<th>P value</th>
<th>Psychological Subscale Mean</th>
<th>SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Drug Use</td>
<td>Less than daily</td>
<td>2.15</td>
<td>1.75</td>
<td>0.23</td>
<td>10.87</td>
<td>3.59</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Daily</td>
<td>1.95</td>
<td>1.66</td>
<td></td>
<td>10.85</td>
<td>3.36</td>
<td></td>
</tr>
<tr>
<td>Daily Drug Use (No Alcohol)</td>
<td>Less than daily</td>
<td>2.15</td>
<td>1.74</td>
<td>0.20</td>
<td>10.84</td>
<td>3.59</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>Daily</td>
<td>1.92</td>
<td>1.66</td>
<td></td>
<td>10.94</td>
<td>3.31</td>
<td></td>
</tr>
<tr>
<td>Daily Drug Use (No Alcohol or Cannabis)</td>
<td>Less than daily</td>
<td>2.17</td>
<td>1.73</td>
<td><strong>0.02</strong></td>
<td>10.71</td>
<td>3.56</td>
<td><strong>0.02</strong></td>
</tr>
<tr>
<td></td>
<td>Daily</td>
<td>1.67</td>
<td>1.63</td>
<td></td>
<td>11.76</td>
<td>3.14</td>
<td></td>
</tr>
</tbody>
</table>

T-tests indicate no significant association between community integration and addiction in two of the three sets of tests performed. In particular, null findings occurred when using either a fully inclusive definition for daily drug use, or a slightly more exclusive definition (i.e., daily use of alcohol was not considered). In these two cases, results are consistent across both the physical and psychological integration variables, indicating no significant difference between daily drug users and non-users on mean integration scores obtained from either subscale.

The third and final set of t-tests presented in Table 2 was performed using a yet more restrictive definition of daily drug use, which produced a significant integration difference between daily drug users and non-daily users. Using the most restrictive definition of daily drug use (excluding alcohol and cannabis), t-tests indicate that daily drug users and non-daily users report significantly different mean physical and psychological integration scores.

The derived association between daily drug use and community integration is not uniform for both integration subscales, and these results do not fully support this study’s hypothesis. That non-daily drug users report significantly higher physical integration
scores than do daily drug users (p = 0.02) is an anticipated result. The dislocation theory predicts that individuals with higher psychosocial integration are less likely to pursue addictive involvement with drugs. However, t-tests also indicate that daily ‘hard’ drug users report significantly higher psychological integration scores than do non-daily ‘hard’ drug users (p = 0.02). Evidence of a positive relationship between daily drug use and psychosocial integration (even if only a component) is unexpected, and matters greatly to the conclusions that will be drawn in this thesis.

The analyses presented in Table 2 above form the basis of a preliminary and qualifying hypothesis test, as they are made without adjustment for the influence of other IVs. These adjustments are made in later multivariate analyses. The tests are nevertheless important, as they provide a necessary qualification to the hypothesis addressed by this thesis. Namely, under unadjusted conditions, psychosocial integration appears associated with drug addiction, though only when using a definition of addiction that excludes both daily alcohol and cannabis use. The resulting operational definition includes drugs that are often considered significantly more dangerous, obscure, potent, and ‘hard’ as opposed to ‘soft’, although this seems to be based more on recent convention than on evidence (Dolin, 2001). Exploring the physical and psychological subcomponents of integration, we find the direction of the association diverges: increased physical integration is associated with no daily drug use, while increased psychological integration is associated with daily drug use.

3.3. Bivariate logistic regression

Table 3 below builds on the above difference of mean tests by displaying the unadjusted, bivariate associations between the IVs outlined earlier and daily drug use status. The most restrictive version of daily drug use (excluding alcohol and cannabis) was carried over from t-tests in order to further interrogate the relationship between psychosocial integration and drug addiction. This analysis was mounted first through uncontrolled, bivariate tests of association, and then, in the final section of this chapter, through multivariate modelling.
Bivariate associations for 15 IVs are presented in the UOR (95% CI) column of Table 3. Of these 15 variables, 11 proved to have significant associations with daily drug use in the unadjusted case. For each variable included in bivariate testing, unadjusted odds ratios (UOR) and 95% confidence intervals (CI) are provided, with bold text identifying significant associations.

As anticipated by earlier t-tests, both community integration physical and community integration psychological are significantly associated with daily drug use in bivariate logistic modelling. The inverse relationship already noted is reproduced, though now with additional information concerning the magnitude of each association and its accompanying precision. These and the remaining bivariate findings are addressed below.

The obtained UOR and 95% CI for community integration physical when predicting daily drug use are 0.83 and (0.71, 0.98), respectively. This result indicates that, for every one unit increase VAH participants reported on the community integration physical subscale (relative to other participants), they had a corresponding 17% reduction in the odds of also reporting daily drug use. At an individual level, increasingly robust physical integration, or a greater use of community resources in other words, is associated with a reduction in odds of drug addiction.

For community integration psychological, there appears to be a very different relationship between integration and addiction; the obtained UOR and 95% CI for community integration psychological are 1.09 and (1.01, 1.17). These findings indicates that, for each point of increase VAH participants reported on this subscale (relative to other participants’ scores), the odds of that individual also reporting daily drug use increased by 9%. In this case, increasingly robust psychological integration at an individual level, manifest as a sense of belonging and familiarity with one’s peers and neighbourhood, is associated with greater odds of also reporting drug addiction.

Nine additional variables had significant bivariate associations with daily drug use. Findings for age at randomization (UOR: 0.98, CI: 0.95, 0.99) and age of first homelessness (UOR: 0.97, CI: 0.95, 0.99) indicate a modest protective effect from age. Namely, one year increases in current age and greater age at first homeless predicted
2% and 3% reduced odds of reporting concurrent daily drug use, respectively. In this sample, being male also was protective, with males having 52% reduced odds of reporting daily drug use relative to females (UOR: 0.48, CI: 0.29, 0.81).

A number of demographic and lifestyle variables were associated with greater odds of daily drug use. Risk factors included aboriginal ethnicity (UOR: 2.54, CI: 1.22, 5.29), having failed to complete high school (UOR: 2.15, CI: 1.25, 3.68), being homeless for more than 3 years total (UOR: 3.47, CI: 2.00, 6.01), and having had a past episode of homelessness of at least 1 year in length (UOR: 2.74, CI: 1.61, 4.68). Neither marital status nor employment status predicted daily drug use.

Of the four IVs addressing mental health status, two showed significant, unadjusted associations with daily drug use. Both reported total score on the Colorado Symptom Index (UOR: 1.04, CI: 1.02, 1.06) and the presence of a less severe mental illness diagnosis (UOR: 2.19, CI: 1.29, 3.71) were risk factors for reporting daily drug use. Neither the presence of a severe mental illness diagnosis nor levels of self-reported recovery were associated with the outcome variables of interest.

### 3.4. Multivariate logistic regression

The multivariate analysis presented in Table 3 below extends results from bivariate testing. All IVs previously identified as being significantly associated with daily drug use were included in the final multivariate model in order to identify those predictors whose explanatory viability remained after taking into account the predictive influence of other candidate variables. In order to avoid needlessly complicating the multivariable model, IVs that showed no significant bivariate relationship to daily drug use were excluded, as were participants with missing data on included variables, with the latter adjustment reducing the sample size (N=471).

<table>
<thead>
<tr>
<th>Variable</th>
<th>UOR (95% CI)</th>
<th>AOR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at randomization (per year)</td>
<td>0.98 (0.95, .99)</td>
<td>0.97 (0.93, 1.00)</td>
</tr>
</tbody>
</table>
Of the original 11 variables identified as significant bivariate predictors of daily drug use, six maintained their significance in multivariate analysis. Most relevant to the hypothesis set out in the first chapter of this thesis is the finding that scores on both the physical and psychological community integration subscales are significant predictors of daily drug use after controlling for the predictive influence from a number of alternative sources.

As is shown in the final two entries of Table 3, odds ratios and confidence intervals for both physical and psychological integration are comparable in both the bivariate and multivariate models. In the multivariate model, a one unit increase in physical integration subscale score continues to predict a 17% reduction in the odds that a participant will also report daily drug use (AOR: .83, CI: .70, 1.00). In the multivariate model, the effect size for physical integration changes slightly, with a resultant increase

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bivariate Odds Ratio (95% CI)</th>
<th>Multivariate Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of first homelessness (per year)</td>
<td>0.97 (0.95, 0.99)</td>
<td>1.01 (0.97, 1.04)</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>0.48 (0.29, 0.81)</td>
<td>0.38 (0.20, 0.71)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aboriginals</td>
<td>2.54 (1.22, 5.29)</td>
<td>1.44 (0.62, 3.36)</td>
</tr>
<tr>
<td>White</td>
<td>1.25 (0.67, 2.33)</td>
<td>1.28 (0.63, 2.59)</td>
</tr>
<tr>
<td>Other</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Incomplete high school (vs. complete and higher)</td>
<td>2.15 (1.25, 3.68)</td>
<td>2.00 (1.04, 3.87)</td>
</tr>
<tr>
<td>Single marital status</td>
<td>0.78 (0.46, 1.31)</td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>1.14 (0.32, 4.06)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.01 (0.29, 3.54)</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Lifetime homelessness (greater than 3 years)</td>
<td>3.47 (2.00, 6.01)</td>
<td>2.85 (1.36, 5.97)</td>
</tr>
<tr>
<td>Longest single episode of homelessness (1 year plus)</td>
<td>2.74 (1.61, 4.68)</td>
<td>1.46 (0.74, 2.87)</td>
</tr>
<tr>
<td>Mental Health Symptoms (per unit CSI total)</td>
<td>1.04 (1.02, 1.06)</td>
<td>1.04 (1.01, 1.06)</td>
</tr>
<tr>
<td>Less severe mental illness diagnosis</td>
<td>2.19 (1.29, 3.71)</td>
<td>1.25 (0.67, 2.33)</td>
</tr>
<tr>
<td>Severe mental illness diagnosis</td>
<td>0.85 (0.49, 1.47)</td>
<td></td>
</tr>
<tr>
<td>Self-reported recovery (per unit RAS total)</td>
<td>0.99 (0.96, 1.01)</td>
<td></td>
</tr>
<tr>
<td>Community integration – physical (per unit CIS physical total)</td>
<td>0.83 (0.71, 0.98)</td>
<td>0.83 (0.70, 1.00)</td>
</tr>
<tr>
<td>Community integration – psychological (per unit CIS psych. total)</td>
<td>1.09 (1.01, 1.17)</td>
<td>1.11 (1.02, 1.20)</td>
</tr>
</tbody>
</table>
in odds of daily drug use predicted by a one unit increase in psychological integration subscale score equal to 11% (AOR: 1.11, CI: 1.02, 1.20).

Multivariate findings indicate that male gender remains a protective factor. In the present study, being male as opposed to female is associated with a 62% reduction in the odds that a participant reports daily drug use (AOR: 0.38, CI: 0.20, 0.71).

The association between education and daily drug use remains significant in multivariate testing, with failure to complete high school, as opposed to having completed high school or above, being associated with twice the odds of reporting daily drug use (AOR: 2.00, CI: 1.04, 3.87). In other words, participants in this sample who reported having a high school diploma had only half the odds of being a daily drug user compared to participants who did not complete high school.

Total lifetime duration of homelessness and mental illness symptoms (CSI total score) both maintained significant associations with daily drug use in multivariate testing. Participants having spent three years or more of their life homeless had nearly three times the odds of reporting daily drug use versus participants who had spend less than three years total living homeless (AOR: 2.85, CI: 1.36, 5.97). One unit increases in CSI total score (reflecting progressively worse mental health symptoms) were associated with a 4% increase in the odds that a participant reported daily drug use (AOR: 1.04, CI: 1.01, 1.06).

Although showing significant associations in bivariate testing, a number of variables failed to predict daily drug use in multivariate testing. In Table 3, these variables show bolded UOR and 95% CIS and plain-text AOR and 95% CI. Age at randomization, age of first homelessness, ethnicity, having had an episode of homelessness longer than 1 year, and having a confirmed less severe mental illness diagnosis all failed to significantly predict daily drug use in multivariate testing despite having significant unadjusted associations.

3.4.1. Visualizing multivariate results

Figures 1 and 2 below were produced to further convey key findings from multivariate testing, and specifically to complement AORs and CIs for community
integration (physical and psychological). Though drawn from the same data as was used to generate multivariate findings, these figures are not themselves hypothesis tests. Rather, they help to illustrate the predictive trends that adjusted odds ratios for physical and psychological community integration suggest.

**Figure 1.** Percentage of respondents reporting daily drug use according to community integration physical total score

Recall that the AOR for the physical component of community integration was 0.83. This result indicates the direction and magnitude of the relationship between physical integration scores and probability of reporting daily drug use. Namely, higher physical integration scores correspond to lower odds of reporting daily drug use, at an average rate of 17% reduction in odds for every one unit increase of physical integration. By plotting bins of physical integration total score against percentage of participants within each bin reporting daily drug use, the data behind this average relationship can be presented visually. In Figure 1, a linear trending, negative slope contextualizes to the obtained physical integration AOR of 0.83. The figure also reveals a plateau beginning at moderate levels (a score of 2) of physical community integration. If a causal relationship between variables exists, it may be the case that physical community integration
attenuates drug addiction primarily when individuals experience a near total absence of integration.

The obtained AOR for psychological integration was 1.11, indicating that increasing psychological integration scores correspond to increased odds of reporting daily drug use, at an average rate of 11% increased odds for every point of increase. Figure 2 below depicts this trend. In this case, a linear trending, positive slope can be seen on the plot. Among the lowest score bins of psychological integration, a smaller percentage of participants report daily drug use relative to higher scoring bins. Again, a plateau appears to begin at moderate levels of psychological integration (a score of 12) and extend to higher levels. The covariance between drug addiction and psychological integration therefore appears to be most active at and below moderate levels of integration; drug addiction appear to be relatively stable among participants with moderate or greater psychological integration.

Figure 2. Percentage of respondents reporting daily drug use according to community integration psychological total score
Chapter 4. Discussion

4.1. Interpreting key findings

This study’s multivariate analysis reveals a number of variables with significant associations to drug addiction. In contrast to the bulk of evidence reviewing the BDMA, none of the variables shown in this thesis to have associations with drug addiction were measures of brain physiology, drug characteristics, or interactions of the two. Instead, variables in this thesis, though quantitative in nature, are qualitatively different from those commonly found in existing studies of the correlates (or causes) of drug addiction in humans.

The primary hypothesis tested in this study explored the association between psychosocial integration and drug addiction. The use of psychosocial integration as a key predictor variable is consistent with this project’s primary goals, namely, to present the dislocation theory of addiction as a novel and complementary theory of drug addiction, and to provide rigorous hypothesis testing in order to further evaluate its claims. To this end, the analyses in this thesis indicate qualified support for the dislocation theory assertion that psychosocial integration is associated with drug addiction, given that significant findings were obtained only if a restrictive definition of drug addiction – one excluding daily alcohol and cannabis use – was used. Even then, the relationship between psychosocial integration and drug addiction was not as uniform as was predicted at the outset. The association between psychosocial integration and daily drug use varied according to the components of psychosocial integration being examined. When considering physical integration, or the extent of engagement at community sites (parks, shops, events), elevated scores predicted lower odds of daily drug use; conversely, elevated scores of psychological integration, or a sense of belonging and familiarity, predict higher odds of daily drug use. Although on the surface these results appear contradictory, I believe they are compatible with dislocation theory.
Initially, this thesis hypothesized an inverse relationship between both dimensions of psychosocial integration and drug addiction, reflecting the protective effects of psychosocial integration as argued by key dislocation theory literature (Alexander, 2008; 2012). Persons who experience high levels of integration, it is argued, are less likely to embrace addictive lifestyles to fulfill an impoverished sense of belonging, competency, desirability, and validation.

When considering only physical integration, this logic appears to be corroborated by the new data presented here; individuals who reported use of community resources (restaurants, movies, churches, libraries) were less likely to report drug addiction. Beyond dislocation theory arguments that explain this finding in terms of psychosocial need fulfillment, there are practical factors associated with physical engagement that help contextualize these findings. Primarily, overwhelming drug use, especially of the kinds of drugs addressed here (i.e., heroin, cocaine, crack, amphetamines), requires considerable expenditures of both time and money for drug acquisition (Oviedo-Joekes et al., 2008). Individuals spending time and money at community events therefore may also be excluded from addictive drug involvement for resource related reasons. Also, persons interested in spending time at community events and destinations may avoid drug use because of possibilities for psychomotor effects produced by acute drug intoxication and withdrawal. Because associated phenomena have the potential to be temporarily and highly disruptive to consumers, regular drug taking may be avoided by persons with competing interests, namely, persons who find utilizing highly public, regulated community sites to satisfy psychosocial needs.

Data presented here also confirm a positive relationship between psychological integration and drug addiction. This finding, however, does not support this study’s hypothesis. Indeed, persons reporting increased psychological integration were more likely to report being daily drug users, not less likely, as was anticipated. Nevertheless, positive association was found. Based on these findings, a number of integrative comments can be made, the first of which addresses study methodology.

Drawing on work from the mental health and housing literature (Aubry & Myner, 1996; Wong & Solomon, 2002), a multidimensional measure of psychosocial integration was selected as the primary operational measure to be used in the present study.
Divergent associations between components of this measure and drug addiction seem to confirm the value of operationalizing psychosocial integration using a multi-dimensional structure — within the same sample, two significant, directionally opposite relationships emerged between included measures of psychosocial integration and drug addiction. Measures addressing only a single domain of integration (i.e.: exclusively physical or psychological or social) are therefore unlikely to adequately address the variety of integration related experience that persons are likely to report, producing results that are not wholly valid. Additionally, divergent findings require either integration into existing dislocation theory literature, or else they justify modifications to the theory itself if reconciliation is not possible. In response, I believe existing dislocation theory literature addresses the positive association between psychological integration and drug addiction identified here.

Alexander (1990), for instance, argues that overwhelming (addictive) involvement with activities or substances does not produce a durable enough experience of psychosocial integration to allow addictions to eventually be discarded altogether. This assumption is made explicit within the theory, and is defended on the ground that, by their nature, addictions do not satisfy human needs for integration as fully as does a rich, multifaceted social, cultural, and material existence. Addiction, therefore, fulfills psychosocial needs only so long as the addiction remains active. Indeed, the same requirement for active involvement may very well be true of non-problematic kinds of behaviours and relationships and the psychosocial benefits they produce. This would seem to be supported by historical analyses of the emergence of addiction after widespread cultural dislocation (Alexander, 2008). Presumably, if the psychosocial benefits produced by non-addictive social and cultural engagements were inviolably robust, addiction would scarcely occur at all, regardless of the occurrence of dislocation.

If it is sufficiently clear then that the dislocation theory anticipates the need to maintain active addictions for psychosocial benefits to be felt, the finding that psychological integration is positively associated with drug addiction begins to take on a new clarity. Although physical integration would appear to be an exception to this trend, increased psychological integration quite readily co-occurs with an increased likelihood of drug addiction. This finding is quite suggestive; it seems to be either that 1) individuals with high psychological integration are more inclined to seek out subsequent drug
addictions, or that 2) drug addiction confers specific, psychologically-manifest psychosocial benefit. Because the evidence reviewed in Chapter 1 of this work offers a significant challenge to the notion of higher psychosocial integration actually causing drug addiction, efforts here will focus on addressing potential mechanisms behind the latter interpretation.

Describing communities of drug addicts and the social world of addiction, Alexander (2008, pg. 164) writes:

Many, perhaps most, types of addiction actually provide a kind of community or subculture that entails some real psychosocial gratifications. Psychosocial benefits are readily visible in people who are addicted to drinking together at parties and clubs or people who gamble together.

In an examination of the relational pay-offs of addiction, Alexander draws on both his experience as an addictions professional in the Vancouver, Canada area, as well as studies of heroin and crack cocaine users separated from their drugs and from their drug-using context. Based on this review, Alexander identifies a number of mechanisms enabling significant psychosocial benefits to be attained through drug addiction. Primarily, he concludes, drug addiction confers on the addict the ability, and indeed the privilege of membership in a subculture that, although often at odds with mainstream society, offers “norms, rituals, values, stable social relationships, and certain areas of mutual trust” (Alexander, 2008, pg. 164). Membership in an identifiable community, even one whose major symbols may appear to outsiders as depraved and tragic, provides a highly valued sense of place, support, and belonging.

These powerful psychosocial effects and benefits, Alexander argues, explain why ‘junkies’ will continue to purchase and consume adulterated drugs of negligible potency, even when the impossibility of any pharmacological effect is common knowledge among the addicts themselves. The relational benefits of drug addiction spring from interactions with non-addicts as well, such as when an addict takes on the identity of ‘black-sheep of the family’ and persists in engaging with their family members and other non-addicted contacts on these terms. Although dysfunctional and occasionally turbulent, this relational dynamic, known in the family therapy literature as co-dependence (Alexander,
2008, pg. 166), allows both addict and the addict’s family or friends an opportunity for regular interaction and a distinct social role. This mechanism also appears to account for null findings when including alcohol and cannabis in the operational definition of drug addiction. Presumably, alcohol and cannabis are used and accepted by mainstream culture to a great enough extent that dislocated persons stand to derive little psychosocial benefit from adopting the relatively pedestrian identities of ‘alcoholic’ or ‘pot head’.

Results in Chapter 3 describing psychological integration’s relationship to drug addiction thus seem to be consistent with assertions about the psychosocial benefits of adopting a drug addict or ‘junkie’ identity. The current data on psychological integration is in essence a cross-sectional snapshot of VAH participants whose psychological integration and drug addiction fluctuate in a meaningfully related way; increases in psychological integration predict higher odds of drug addiction. If we assume, based on the available evidence, that the causal chain involves increased odds of drug addiction preceding increases in psychological integration, and not the other way around, then obtained results indeed are consistent with existing dislocation theory principles.

If this causal description is in fact correct then, with all else being equal, VAH participants reporting current drug addiction would have been further deprived of psychological dislocation prior to embracing drug addiction. In other words, within the sample obtained, it appears as if drug addiction may indeed be conferring significant psychosocial benefits on addicted participants through an increased sense of identity, belonging, and camaraderie with other drug addicts, the ‘junkie’ community, and perhaps as well through structured – if not co-dependent – interaction with members of the non-junkie community. In light of the tremendously challenging mental health and housing circumstances shaping VAH study inclusion criteria, it seems straightforward to imagine that, for the individuals represented here, drug addiction forms something like a garden lattice; a structured framework around which young stems of belonging and familiarity might twist and climb, to occasionally bud, and sometimes even to flourish.
4.2. Broader implications

This study endeavored to examine, and has succeeded in providing evidence of, the association between psychosocial integration and drug addiction. The revealed association is complex – a finding that has been arrived at through the use of a multidimensional suite of scales designed specifically to measure levels of clearly and explicitly defined physical and psychological phenomena. Alone, these results indicate important differences in the covariance pattern between different aspects of community integration and drug addiction. That components of psychosocial integration seem to be meaningfully and differentially related to an individual’s propensity for drug addiction is not an idea that has been addressed in existing dislocation theory literature. Evidence presented here of a differential relationship between subcomponents of psychosocial integration and drug addiction therefore underscores the importance of a nuanced examination of variable associations within socially and culturally attuned models of drug addiction. In particular, this thesis demonstrates for the first time within dislocation theory literature the importance of approaching psychosocial integration not as an undifferentiated, homogenous human experience, but instead as a complex and multi-determined one, and especially one where component dimensions need not co-vary with drug addiction in uniform ways.

In addition to providing primary results addressing the conceptual structure of psychosocial integration, results in this thesis indicate a number of significant, secondary variable associations with drug addiction. Variables assessing educational attainment, lifetime duration of homelessness, severity of mental health symptoms, and, perhaps to a lesser degree but no less importantly gender, all appear at face value to represent aspects of lived experience that stand to influence a person’s given level of psychosocial integration. VAH participants who had not completed high school were twice as likely to report drug addiction compared to those who had. Participants who spent a total of three years or more of their life homeless were nearly three times as likely to report drug addiction compared to their less-often homeless counterparts. Incremental increases in mental illness symptoms were each associated with a 4% increase in the odds of reporting drug addiction. Women were twice as likely as men to report the same.
The direction of each of these associations is in the direction one would expect if the variables in question are examined using dislocation theory language: Failing to complete high school likely creates significant intellectual and skills barriers to participating in mainstream culture, leaving affected individuals at risk of increased preference for substance use while outside normal opportunities for psychosocial integration (Toomela, 2008). Education failure is also associated with an increased risk of prolonged and persistent homelessness (Patterson et al., 2011). Homelessness itself is a separation from mainstream cultural expectations about lifestyle, personal safety, and roles. Part of the experience of homelessness involves disconnection from friends and family, and exposure of the homeless individual to powerful stigmatization (Schneider & Remillard, 2013). It seems likely that enduring these circumstances for extended periods of time would cause tremendous erosion of one’s psychosocial existence, a conclusion that is consistent with the three-fold increase in drug addiction among chronically homeless persons reported here. Mental illness too has been connected with social alienation, and this relationship is often addressed in post-institutionalization terms describing mental health clients as increasingly visible as such, given their location in communities of non-disabled persons (Erdner et al., 2005; Patterson et al., 2013). Results presented here at least suggest the possibility that, like education failure and extended homelessness, progressively severe mental illness symptoms are coped with, at least in part, by increased uptake of drug addiction.

When the statistical modeling in this study is considered as a whole, what emerges is a model that draws on a variety of psychosocial measures and indicators in an attempt to predict the likelihood of drug addiction. Alexander (2008, pg. 155) acknowledges the validity of this approach, and perhaps understates it, when he argues that “no one indication of dislocation is by itself a powerful predictor of later addiction; people who have been exposed to several of them are much more likely to become addicted”. The model presented in this work accounts for a cumulative effect by including a variety of psychosocial variables when predicting drug addiction. As shown, a number of these variables have significant predictive power. Coming at a time when the prevailing empirical perspectives on addiction tend to dwell primarily within the confines of neurophysiology and pharmacology, the results in this study offer an important reminder that while drug addiction undoubtedly involves drugs as well as brains, so too
do a great number of non-pathological human experiences that cannot appropriately be called diseases. The implication here is that it is prudent to resist engaging drug addiction according only to contexts understandable through drugs and brains themselves, even though we know that drugs and brains are undoubtedly involved in addictive processes. At the same time, to maintain an inclusive perspective on the issue, we must be willing to look literally outside ourselves, to the social world, its organization, and our place within it, for clues that help us grasp more completely the causes and consequences of our addictive pursuits.

4.3. Strengths and limitations

The present study builds on existing dislocation theory literature by adopting quantitative, explicit operational definitions for both drug addiction and psychosocial dislocation. Previous studies (see section 1.4.1) taken as evidence for the dislocation theory have been conducted using a variety of operational definitions, many of which do not explicitly address psychosocial integration into society; rather, they have tended to measure the extent to which individuals have endured experiences that appear to have a high potential for dislocating effect. The present study addresses this operational ‘fissure’ by drawing on a multidimensional measure of community integration whose component scales explicitly address self-reported levels of integration across a variety of domains. Using this approach produced the important finding that, when conceptualized using multiple dimensions, psychosocial integration need not be related to drug addiction in a uniform way. Indeed, the primary hypothesis tested in this thesis reveals a complex, conceptually challenging relationship between addiction and the two components of psychosocial integration addressed here.

In addition to the above, this thesis introduces a broad, multivariate predictive model of drug addiction based entirely on psychosocial variables, using data drawn from the Vancouver At Home research demonstration project – a national, randomized controlled trial investigating homelessness and mental health. Data collection for this rigorous and highly scrutinized project involved documenting the lived experience of nearly 500 participants in the Vancouver, British Columbia area, all of whom had been experiencing adverse and enduring housing and health status conditions at the time of
enrollment. As noted earlier, the VAH research team adopted additional measures assessing participant substance use because of the acknowledged high frequency of drug use present in the area. Without site-specific substance use data of this kind, the hypothesis tested in this study would not have been approachable. Building on these data, this thesis promotes and interrogates a model of addiction complementary to the prevailing brain-disease model of addiction; one that emphasizes social, cultural, and lifestyle determinants. Broadly speaking, this work encourages the uptake of a systemic, inclusive conceptual gaze when addressing the correlates and determinants of drug addiction in humans.

Although this work contributes in important ways to existing discourse on drug addiction in humans, there are several limitations that should be addressed. Perhaps the most significant of these is the cross-sectional nature of statistical analyses supporting this study. Because of the exploratory goals set out for this thesis project, longitudinal data on substance use and community integration were not utilized. As such, it remains tentative to assert whether changes in psychosocial integration scores precipitate changes in drug addiction, or vice versa. This limitation in assessing temporality applies equally to all variables included in the multivariate analysis, not simply those addressing psychosocial integration.

It has been noted from animal studies that environmental enrichment (i.e., psychosocial integration, see Chapter 1) produces a robust protective effect against drug addiction, with some evidence from human studies indicating the same (Alexander, 2008). However, it remains possible that the correlative findings presented here describe a causal chain between psychosocial integration and drug addiction that operates in either direction. Indeed, it is even possible that each component of psychosocial integration holds a unique causal relationship to drug addiction. Although the default interpretation within dislocation theory is that an individual’s level of integration is the primary and the initial variable responsible for later changes in addiction status, the results presented here require modest and restrained interpretation. There is some acknowledgement of this bi-directionality within dislocation theory, especially around the possibility for addiction to increase rather than decrease dislocation in cases in which an addicted individual becomes further alienated from disapproving peers or family as a result of their substance use (Alexander, 1990).
Without drawing on longitudinal data, causal interpretations of the findings in this thesis remain out of reach. One causal relationship of particular interest concerns the finding of a positive association between the psychological component of integration and drug addiction. Because data in this project are cross-sectional, it is impossible to gauge whether participants might have, after some extended period of dislocation, encountered drug addicted individuals and experienced an incipient rise in psychosocial integration. This initial rise in integration need not initially be connected to drug use or drug addiction per se, only to interactions and partial identification with what has been called the “junkie mystique” (Alexander, 2008, pg. 164). Following this initial drug-free encounter, individuals interested in exploring further opportunities for psychosocial integration within the junkie mystique might, as a condition of their continued involvement, be persuaded or otherwise feel obligated to increasingly validate their commitment and identity through actual drug use. In this scenario, increases in psychosocial integration would in fact appear to drive, rather than attenuate, drug addiction. Based on this example alone, it becomes clear that establishing causal pathways between the variables in question is an important task that will contribute to the larger project of establishing bounds and contexts for dislocation theory principles. Such conclusions also extend beyond what the data and analysis in this project reasonably permit.

Although the current study contributes robust and nuanced findings to dislocation theory literature, they are not without methodological limitations. Although the primary measure of psychosocial dislocation used in this study draws on a suite of community integration scales for which psychometric data are available (Aubry & Myner, 1996), its use among a homeless, mentally ill study population prompted significant modification (Goering et al., 2011). Changes were made to adapt the CIS to the unique population encountered by all At Home study sites. These changes were intended to increase suite comprehension, relevance, and to improve the validity of responses. In order to accomplish these goals, At Home investigators concluded on the removal of a number of items on both the physical and psychological subscales, as well as the outright removal of the social integration scale. No supplemental questions addressing physical or psychological components of integration were added to the VAH version of CIS; no supplemental social integration subscale or items were added.
As a result of modifications, existing data on the CIS validity and reliability cannot be applied to the updated CIS reported on here. Furthermore, even though changes to the CIS may have led to better comprehension and relevance of remaining questions among VAH participants, removal of the social integration subscale without subsequent addition of a complementary, sample-relevant version means no information is available on participants' experience of social integration. Certainly, homeless, mentally ill persons have some experience of social integration, even though that experience may be dramatically different from mainstream conceptualizations and experiences. Unfortunately, the present work addresses neither the nature of these experiences, nor their statistical relationship with drug addiction. Although the current work advances the study of psychosocial determinants of addiction using updated methodology and a rigorous study design, opportunity for further improvements exist.

A further limitation of the current work involves the relative uniformity of sample participants, particularly with respect to low mean integration scores. Participants in the VAH study were homeless and experiencing mental illness at the time of enrollment. Regardless of daily drug use status, participants reported average integration scores well below the physical integration subscale mean, and just equal to the psychological integration subscale mean. In other words, results in this work are based on a population that is actively experiencing significant psychosocial dislocation. As such, the integration-addiction relationship reported here may not represent the relationship as it exists among populations with higher mean levels of integration. The results in this study give only a preliminary indication of how psychosocial integration and addiction might be related among a housed population with improved mental wellness. Describing this relationship according to different population characteristics remains an open task.

4.4. Future research

Details of the specific causal relationship between psychosocial integration and drug addiction remain open for further study. Results produced in this work raise questions that cannot be answered here. Addressing the causal relationship between integration and addiction should remain a top priority for future work on the dislocation theory. Results describing directionality stand to contribute significantly to the larger
process of establishing and validating psychosocial models of drug addiction as reasonable and necessary complements to brain-based models.

Future studies have an additional opportunity to move beyond the current work by examining psychosocial transition. VAH data is neither sufficiently variable nor plentiful enough to allow conclusions to be drawn about how it is that the relationship between psychosocial integration and addiction operates at very high and very low levels of integration. These cut-off points are far from academic. Understanding the correlative and causal relationship among these variables at very high and very low levels of integration is analogous to understanding key addiction cycle transition points discussed in Chapter 1. If, as the dislocation theory suggests, psychosocial integration is intimately connected to addiction – and considerable data, including the present work, suggest this is true – then the transition in to addiction and out of addiction will occur on an individual level during periods of increasing and decreasing levels of psychosocial integration.

A greater understanding of the initiation of, recovery from, and relapse into addiction quite literally depends on careful observation and recording of at risk persons as they transition from psychosocial integration to dislocation, and back again. Future studies therefore could be designed with sensitivity to nuanced and rapidly fluctuating levels of integration and drug involvement in mind. Ideally, this would lead to collection of longitudinal data with sufficient power to enable statistical analysis of the integration-addiction relationship during the unfolding of a variety of dislocation-producing (and reducing) life events. When considering VAH data more widely, experimental housing conditions used in the VAH study appear to have largely failed to induce increases in participant community integration (Patterson et al., 2013). These results underscore the considerable ethical and practical challenges associated with designing interventions capable of significantly altering participant psychosocial integration. These challenges will need to be addressed if the integration-addiction relationship is to be charted for transitional periods (i.e.: into or out of relapse, initiation of drug taking).

Undoubtedly, successful integration of dislocated persons depends on fulfilling an array of criteria, including but not limited to health and housing. Also relevant here is the need to recognize that study inclusion criteria places limits on the generalizability of
results. Inclusion criteria can pre-determine a narrow range of responses to integration or addiction-type measures, both towards low and high values. If studies on the psychosocial determinants of addiction continue to rely on purposive, non-randomized sampling methods for participant selection, limitations on the generalizability of results should be made clear.

Exploring additional components of psychosocial integration is also an important task for future work. As noted, this study cannot address the social aspects of integration because of limits inherent to the instrumentation used during data collection. Future measures intended to survey psychosocial integration should not only address the social aspect of integration; scales should be developed for or at least validated with target populations in order to determine their relevance and comprehensiveness. Although this work is based on reports from a population suffering from mental illness and homelessness, housed populations may also experience low psychosocial integration (Patterson et al., 2013). It is unknown whether integration and addiction interact in housed populations as it does in the homeless, and future studies will need to address this question along with those about population specific methodology.

At its core, the dislocation theory of addiction predicts that all addictions, whether to drugs, television, work, or the accumulation of material goods, are significantly related to psychosocial integration. This thesis has advanced this discussion as it relates to drugs, specifically. As such, the results will contribute to a specific portion of integration-addiction related debate, while leaving questions about the relationship between other kinds of addiction and psychosocial integration to other research efforts. A great deal remains to be discovered.
References


Appendix A.

Vancouver at home flow-through diagram
Appendix B.

Maudsley addiction profile (MAP) sample items

1.b – How many days have you used alcohol in the past month? __
2.b – How many days have you used heroin in the past month? __
6.b – How many days have you used cocaine powder during the past month? __
8.b – How many days have you used amphetamines during the past month? __

Response options:
[0] None
[1] 1 day only
[2] 2 days only
[3] 3 days only
[4] 1 day a week
[9] 2 days a week
[13] 3 days a week
[17] 4 days a week
[21] 5 days a week
[26] 6 days a week
[30] Every day
Appendix C.

The modified community integration scale (CIS)

Physical Integration
In the past month, have you:

1. Attended a movie or concert?
2. Participated in outside sports or recreation?
3. Gone to meet people at a restaurant or coffee shop?
4. Participated in a community event?
5. Gone to a place of worship or participated in a spiritual ceremony?
6. Participated in a volunteer activity?
7. Gone to a library?

Response options: (1)Yes/ (0)No/ Don’t Know/ Declined

Psychological Integration
8. I know most of the people who live near me.
9. I interact with the people who live near me.
10. I feel at home where I live.
11. I feel like I belong where I live.

Response options:
(1)Strongly disagree/ (2)Disagree/ (3)Neither/ (4)Agree/ (5)Strongly agree/ Don’t know/ Declined