Retrospection and Recollection of Influences of Physical Activity and Sport on the Development of Substance Addiction Among People in Recovery from Substance Addiction

by

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Abstract

The development of substance addiction in the context of physical activity (PA) and sport is an issue about which little is known. Investigating through the first hand experience of people dealing with substance addiction provided some insight into the role of PA and sport, and the possible connections with the development of substance addiction.

Using qualitative realistic evaluation, the purpose of this study was to examine and identify the perceived main mechanisms associated with participation in PA and sports and the subsequent development of substance addiction. The research questions were:

1. What perceived mechanisms linked participation or non-participation in physical activity or sport with the development of substance addiction?
2. How do these mechanisms vary by context?
3. What different mechanisms are associated with different patterns in the development of substance addiction?

One time, individual semi-structured interviews were conducted. A small pilot study included people (5 men and 2 women, ages 28-61) in recovery from substance addiction for over one year. The main study used a convenience sample of people (8 men and 5 women, ages 20-59) undergoing treatment for their substance addiction, who had completed 30 days of treatment at a private treatment centre. One addictions counsellor was also interviewed.

The participants' involvement in PA and sport ranged from limited to a high level of commitment including professional athletes. None of the participants were completely inactive. Initiation of substance abuse began between the ages of 12 and 18.

The mechanisms identified were personal characteristics, coping strategies, availability of substances and relationships. The contexts identified were social acceptance of alcohol, family influences, heritability, role models, school culture, sport culture and loss of sport. The interactions between the mechanisms and contexts are discussed as they relate to the outcome of substance addiction.

Preface

This thesis is an original work by Laurie de Grace. The research project, of which this thesis is a part, received ethics approval from the University of Alberta Research Ethics Board, project name "The Role of Physical Activity and Sport for People with Substance Addiction: a realistic evaluation study", No. Pro00037988, May 7, 2015.

Quotation

"You are infinitely stronger than anything life sends your way. If you put all of your life challenges together in a pile and stood yourself beside them, you would see clearly that you are bigger than the sum of adversity. You are greater than any challenge, holding the power needed to overcome anything and everything life throws your way."

Joe Roberts, Skid Row CEO, *Seven Secrets to Profit from Adversity*

Acknowledgements

This journey began when I decided to return to school to learn more about the use of physical activity to treat substance addiction. It was undertaken out of interest and was anticipated to take a couple of years. I was wrong; it has been a far more difficult and extensive endeavour than I had envisioned. The net result is that I have learned far more than I had anticipated sparking an even greater interest in the field of substance addiction.

Conducting this research would not have been possible without the openness and enthusiasm of those who volunteered to share their stories. During each interview, I was overwhelmed by the generosity of the participants as they provided such deeply personal accounts of their lives. Already having empathy for those with substance addiction, I was particularly touched by the kindness expressed by almost all of them, and their desire to help others by sharing their stories. Several of them had already been giving back by working with people struggling with substance addiction and by coaching young people.

I would like to thank the members of my committee for their time and efforts. I feel very fortunate to have had the support and advice provided by Dr. Alex Clark. In addition to his suggestion to consider the use of Realistic Evaluation, he was very helpful in shaping and containing the findings. I am particularly grateful to have had Dr. Wendy Rodgers as my supervisor. From our first point of contact, she demonstrated interest in my proposed project and I really appreciate her accepting me as a student. It has been a long and challenging journey but, Wendy, you kept me in line providing exceptional coaching. Your kindness, support and expertise have been greatly appreciated every step of the way.

Without my family, this journey would never have occurred and I am very grateful to all of them for their individual contributions. I appreciate the support from my husband, Pat, who was accepting of my decision to return to school at this stage in our lives. Together with Pat and my daughters, Adrienne and Alexa, we have struggled and learned about substance addiction and recovery. Despite the ups and substantial downs we have succeeded as a family by overcoming adversity, remaining intact and we have come out stronger, closer and a bigger family as a result! The arrival of grandchildren has added a wonderful dimension to all of our lives and one that directly contributed to the healing and recovery process.

Table of Contents

List of Tables

List of Figures

Chapter 1 Introduction

Substance addiction is a widespread problem (Potenza, 2013). The 2010 National Survey on Drug Use and Health (NSDUH) shows that in the United States, over 22 million people age 12 and older suffer from substance dependence or abuse (Substance Abuse and Mental Health Services Administration, 2011).

In Canada, the estimated social costs of substance abuse in 2002 were $39.8 billion; $14.6 billion associated with alcohol abuse and $8.2 billion for illegal drugs (Canadian Centre on Substance Abuse, 2002). These direct and indirect costs include additional health care, law enforcement, and loss of productivity. The social impact of addictions is estimated to affect seven people for each identified addicted individual (Potenza, 2013).

Substance Use by Adolescents

Youth (typically from about 12 to about 18 years old) is the most common time of life when alcohol and drug use begins (Ashtari et al., 2011; DuPont, 2000; Swendsen et al., 2012). This age group is also four times more likely than adults to report harm to self and others resulting from drug use (Canadian Alcohol and Drug Use Monitoring Survey (CADUMS), 2012). Personal harm occurs through overdose, suicide, injury, impaired development of the brain, and unsafe sex resulting in unwanted pregnancy and/or contracting HIV (Ashtari et al., 2011; Collin, C., 2006; Foxcroft, Ireland, Lister-Sharp, Lowe, and Breen, 2003; Grant et al., 2012). Harm to others is most often injury or death due to violence or driving while impaired (Collin, 2006; Hawkins et al., 2009). Young people are at a greater risk of drinking and driving related incidents due to their lack of risk aversion and their greater frequency of heavy drinking episodes (World Health Organization (WHO), 2014).

The greatest escalation of use occurs between ages 13 and 14, peaking around age 16 (Ashtari et al., 2011; Meier, Anthony, and Troost, 2012). The period between grades 8 and 12 is when lifetime use of illicit drugs more than doubles (Goldberg and Elliot, 2005; Merikangas et al., 2010).

Early initiation of drug and alcohol use is associated with future cognitive impairments (Ashtari et al., 2011; Potenza, 2013; Torregrossa, Corlett, and Taylor, 2011), a larger number of problems in adulthood and raises the likelihood of adult drug abuse (Goldberg & Elliot, 2005; Hawkins et al., 2009; Swendsen et al., 2012; Terry-McElrath and O'Malley, 2011). Those who initiate alcohol use by age 14, as compared to those who wait until age 20, are more likely to face impaired health status due to the associated risk of a

lifetime of alcohol dependence and abuse (Foxcroft et al., 2003; Hawkins et al., 2009; WHO, 2014). The 2010 NSUDH shared this finding and also reported that the adults over age 21 who reported first using alcohol at age 14 or younger were five times more likely to be classified as alcohol dependent than those who had their first drink after age 21 (SAMHSA, 2011). The evidence for drug use is similar, where of those who reported using marijuana at or before age 14, 12.8 % were classified as drug dependent (SAMHSA, 2011).

Early use is just one of the risk factors in the development of addiction. Other risk factors are biological vulnerability, the influence of home and family, times of transition, the desire to do something new or risky, and peer pressure (DuPont, 2000; Szapocznik and Coatsworth, 1999). The more risk factors that are present, the more likely it is that addiction will occur (Szapocznik & Coatsworth, 1999). Conversely, the elimination or reduction of risk factors and/or an increase in protective factors such as personal competence, social acceptance, and community and family support can help prevent addiction (EMCDDA, 2009).

Physical Activity as a Protective Factor

Physical activity (PA) has been shown to reduce risk factors and increase protective factors that are associated with addiction (Tassitano et al., 2010). Some of the protective factors are increased social wellbeing, improved self-esteem and better academic achievement (Moore and Werch, 2005; Peck, Eccles, and Vida, 2008; Taliaferro, Donovan, and Rienzo, 2010). PA has also been demonstrated to decrease many of the health risks associated with youth (Dunton, Atienza, Rodriguez, and Tscherne, 2011). A growing body of evidence shows that moderate to vigorous physical activity is associated with fewer general health and mental health problems (Donaghy, 2007; Harrison and Narayan, 2003; Kantomaa , Ebeling, Taanila, and Tammelin, 2008; Moore & Werch, 2005).

Physical Activity as a Risk Factor

The relationship between physical activity and substance abuse is not clear. While sport participation can be a protective factor there are situations where it increases the risk of substance use (Goldberg & Elliot, 2005; Korhonen , Kaprio, Kujala, and Rose., 2009; McCaul, Baker, and Yardley, 2004; Moore & Werch, 2005; Wichstrøm and Wichstrøm, 2009; Moore & , 2009). For some individuals who are at risk of developing addiction, certain sport conditions, such as alcohol use in team sports, have been shown to encourage substance use (Goldberg & Elliot, 2005; Lisha & Sussman, 2010; Moore & Werch, 2005; Wichstrøm & Wichstrøm, 2009). Factors that appear to mediate the relationship between sport participation and substance use are the type of sport and whether participation is through

school or community (Taliaferro et al., 2010). Despite these findings, PA is still preferable to inactivity; the latter is more positively associated with emotional and behavioural problems in adolescence and adulthood (Kantomaa et al., 2008).

Physical Inactivity

Although the relationship between the risk of substance abuse and participation in PA and sport is ambiguous, the known health benefits of PA make it preferable to inactivity (Barnes, Colley, and Tremblay, 2012; Kantomaa et al., 2008). Inactivity is clearly an unhealthy behaviour and a major concern with the alarmingly low levels of PA for Canadian children and youth (Barnes et al., 2012). While an estimate of only 30% of students in their final year of high school in the United States are meeting the recommended guidelines for daily PA (Dunton et al., 2011; Koezuka et al., 2009), the results in Canada are worse. The Active Healthy Kids Canada Report 2011 Report Card gave a grade of F for the fifth consecutive year for PA (Barnes et al., 2012). It is reported that only 7% of children and youth are meeting the guidelines of 60 minutes of Moderate to Vigorous PA per day (Barnes et al., 2012).

The risks of persistent inactivity during adolescence are increased risk of later drug use even for those who had no history of taking drugs, and drug use in adulthood (Korhonen et al., 2009). A study using twins discordant for PA found that the less active twin was the one who used drugs (Korhonen et al., 2009)

Physical Activity as an Adjunct Treatment for Substance Abuse

Exercise and PA are gaining attention as interventions for reducing substance use and as adjunct treatments for substance use disorders. Recognizing the many health benefits associated with PA, it is now commonly included in the treatment protocol at facilities providing treatment for substance addiction (Weinstock, Van Heest, and Wadeson, 2012). There is also some evidence that PA assists in the recovery from substance addiction through a variety of action mechanisms (Weinstock, Barry, and Petry, 2008; Zschucke, Heinz, and Ströhle, 2012). By alleviating conditions such as mood disturbances, depression, sleep disorders and reactivity, and by providing a healthy alternative activity to those revolving around drug use, PA helps decrease the risk of relapse (Brown et al., 2010; Weinstock et al., 2012).

Despite the growing interest in the inclusion of PA to treat substance abuse, there is limited evidence of its success as a treatment protocol. Zschucke et al. (2012) conducted a review of adjuvant treatment for substance use and found a very limited number of randomized controlled trials investigating the treatment of alcohol and illicit drug use, which

resulted in their including studies with small samples and inadequate controls. The strongest evidence supporting the efficacy of PA is as an adjunct treatment for addiction is for smoking cessation (Zschucke et al., 2012).

Research regarding the attitudes toward PA by people in treatment for substance abuse disorders is sparse (Abrantes et al., 2011; Read et al., 2001). The results of Abrantes et al. (2011) indicate the willingness of the patients in treatment to engage in PA, with walking found to be the preferred activity. Walking is the mandatory activity at the treatment facility where the interviews took place for this research project.

Purpose

Using qualitative Realist Evaluation (RE), the purpose of this study was to examine and identify the perceived main mechanisms associated with participation or non-participation in physical activity or sports and the subsequent development of substance addiction.

Accordingly, the research questions were:

1. What perceived mechanisms linked participation or non-participation in physical activity or sport with the development of substance addiction?
2. How do these mechanisms vary by context?
3. What different mechanisms are associated with different patterns in the development of substance addiction?

Proposed Research

Little is known about the development of substance addiction in the context of PA and sport. This is a complex issue due to combination of sophisticated social interactions and the reciprocal interplay of underlying biological, psychological and social factors leading to addiction. With very little known about the role of PA and sport or their absence, and the influence on substance addiction, the focus of this research project was knowledge development. As an inquiry regarding substance addiction, I wanted to learn what the positive and negative effects of the presence or absence of physical activity (PA) and sport were for whom and under what conditions. The Qualitative framework, Realistic Evaluation was used because "realist evaluation produces results that are aimed at a relatively complex question – what works for whom in what circumstances and in what respects?" (Pawson and Tilley, 2004, p. 20) Investigating through the first hand experience of people dealing with substance addiction provided some insight into the role of PA and sport, and the possible connections with their substance addiction.

The source of most of the information was retrospective memory and recall, and although subject to the effects of the participants' current emotional and cognitive state or

memory bias the data obtained was useful (Ballard, de Wit, and Gallo, 2013; Swendsen and Le Moal, 2011; Torregrossa et al., 2011). The information that participants shared provided a basis for further exploration into the protective or risk factors associated with PA and sport in the development of addiction. Participants' attitudes toward PA during the treatment will shed light on their views about the contribution PA makes in the recovery process.

For those who participated in PA and sport prior to the development of their substance addiction, I inquired about how their participation (e.g., withdrawal, intensification, reduced competitive involvement, or adopting a new activity) linked to the development of their addiction. Regardless of their level of involvement in PA and sports, I examined their perceptions of how PA and sport experiences might have been engineered to produce more positive experiences and to reduce risks relating to substance abuse. I asked about any negative experiences with PA and sport to determine if there was any connection to the initiation of substance use or the development of their addiction

The data collection for the main study took place through individual interviews conducted on site at a treatment facility.

Significance of Study

Health risk behaviours, such as drug and alcohol use, adopted during youth have been shown to predict health behaviours into adulthood, leading to unnecessary morbidity and mortality (Hawkins et al., 2009; Huotari, Nupponen, Mikkelsson, Laakso, and Kujala, 2011; Paavola, Haukkala, and Vartiainen, 2004). Many lives are ruined or lost due to substance abuse as early drug and alcohol use limits the potential of affected individuals and leads to many problems later in life (Grant et al., 2012; Swendsen et al., 2012). Worse are the deaths of countless young people and adults that are attributable to alcohol and drug use (Donaghy, 2007; Foxcroft et al., 2003; Swendsen et al., 2012).

Through the participants, I gained insight into the role of PA and sport in the development of the substance addiction and subsequently how it has influenced their attitudes toward PA during treatment. This will contribute to the body of knowledge about the role of PA and sports as they might have related to the development of substance addiction for the participants and about PA during rehabilitation from substance addiction.

Assumptions

The participants, who satisfied the inclusion and exclusion criteria described in the methods section, were recruited from the inpatient population at a private treatment facility in Western Canada. Through rapport building and assurances of confidentiality, it was

assumed that the participants responded to questions honestly and to the best of their ability.

Definitions:

Addiction: The diagnosis or classification of addiction or substance use disorder continues to evolve as more is learned. In the recently released Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association, 2013), the word addiction has been omitted from the official "substance use disorder because of its uncertain definition and its potentially negative connotation." However, due to the various terminology used throughout the literature, for the purpose of this research, addiction was considered to be a behavioural process incorporating both compulsion and dependence which is used to create pleasure and/or relief from some internal discomfort and where there is repeated failure to control the behaviour regardless of the negative consequences (Berczik et al., 2012).

Physical Activity: Activity that comprises all types of muscular activity that increase energy expenditure substantially.

Sport: An activity involving physical exertion and skill in which an individual or team competes against another or others.

Chapter 2 Review of Literature

Addiction

The diagnosis of substance addiction is made according to the criteria outlined in either the Diagnostic and Statistical Manual of Mental Disorders DSM IV (American Psychiatric Association, 2000) or the DSM-5 where the latter describes substance use disorder as having a "cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues using the substance despite significant substance-related problems" (5th ed.; DSM–5; American Psychiatric Association, 2013). It is commonly recognized as a brain disease characterized by underlying changes in the brain circuits that may persist beyond detoxification where repeated relapse can occur when individuals are exposed to drug-related stimuli (5th ed.; DSM–5; American Psychiatric Association, 2013; Erickson, 2007). Overall, the diagnosis of a substance use disorder is based on a pathological pattern of behaviors related to use of the substance.

The term impaired control which is considered to be more accurate than the former loss of control, explains a more complex biopsychosocial process (George, Gilmore, and Stappenback, 2012; Gifford and Humphreys, 2007; Redish, Jensen, and Johnson, 2008). This change in terminology reflects a clearer understanding of the cause of impaired control as a result of the combined effects of biological changes and psychosocial factors on future behaviours (George et al., 2012). It is this understanding that points to the need to study the contributions of other factors in the life of those with substance addictions such as involvement in PA and sports.

Theories provide a framework to further understand the development of addiction,. Social and psychological theories provide an understanding of the behaviours associated with initial and continued substance use.

Social Learning Theory

Social learning theory (SLT) recognizes that human beings do not function independently of their environment and that behaviour is influenced by both direct and vicarious experiences (Bandura, 1977; Leonard and Blane, 1999; Moos, 2007). SLT explains human behavior in terms of continuous reciprocal interaction between cognitive, behavioral, and environmental influences (Kouimtsidis, 2010). The development of personal traits and attributes are influenced by people in various social contexts and environments. SLT is a comprehensive theory that explains human behaviour through the roles played by

both external and self-generated influences with significant emphasis placed on the latter. It recognizes the prominence of control that people exercise over their own behaviour (Bandura, 1977). SLT also acknowledges that behaviour cannot be solely explained as coming from within due to personality or biological traits, just as it also cannot solely be determined by external factors. The result is that human behaviour occurs as a continuous reciprocal interaction between environmental, social and cognitive influences (Bandura, 1977).

There are three key components to SLT. First, people learn through observation (or modeling). Second, internal mental states are essential components of learning. Third, behaviours learned through observation do not necessarily result in changed behaviour (Bandura, 1977).

Humans develop successful forms of behaviour by differentiating between those with positive and those with negative outcomes; repeating those with positive outcomes and avoiding those with negative outcomes. Responding to the consequences of behaviours provides information, motivates repeating behaviour through incentive, and helps to strengthen the response through repetition.

Bandura (1977) recognized that in addition to reflecting on one's own behaviour and comparing it to a self or other generated standard, knowledge must also be acquired through the observation of others. Learning could not occur exclusively through personal performance, leading to the concept of modeling, that is, learning via observation.

Modeling follows a similar process but the experience of performing a behaviour is replaced by observing the outcomes of behaviours performed by others (Bandura, 1977; George et al., 2012; Leonard & Blane, 1999). Seeing positive outcomes or reward for an action can encourage imitation, whereas perceiving negative consequences can serve as a deterrent.

For learning via observation to occur, the processes of attention, retention, motor reproduction, and motivation must exist (Bandura, 1977). With an abundance of modeling influences available, an observer must selectively pay attention to a person performing an action for learning to occur. Attention is more likely to be given if the behaviour being observed is considered to be of value to the observer and if the model possesses pleasing characteristics. These factors combined with the observer's personal characteristics will determine the amount of attention given. An example of the effect of personal characteristics on learning is the variation in the characteristics of children raised in the same family. The attention given to different parental attributes helps to explain the

development of varying characteristics of siblings despite their growing up in the same home environment (Bandura, 1977).

Retention of the information refers to the encoding process of the observed behaviour. To be captured in memory for future reference requires conversion of the behaviour to a symbolic form through either imagery or verbal systems. Drawing on the memory to reproduce the behaviour at a future time will occur through processes of motor reproduction.

The motor reproduction involves putting into action behaviours that have been observed and were converted into a symbolic form. This stage will rely on the existence of an individual's initial motor skills and the ability to practice the demonstrated action (Bandura, 1977).

The final process of motivation recognizes that all behaviours learned will not be put into action. The cognitive abilities of humans allow for interpretation of the incoming information, and to learn from the consequences of actions. The decision to imitate behaviour is therefore contingent upon the evaluation of the behaviour and its anticipated consequence. People learn to regulate their behaviour by what they have learned about situations or events. If the perceived outcome is rewarding or pleasant and they have a favourable reaction, they are more likely to pursue the behaviour. Conversely, aversive outcomes will be feared or avoided and might inhibit behaviours perceived as leading to punishment (Bandura, 1977). The observer can then choose to imitate only those behaviours that they perceive to have desirable and rewarding outcomes.

SLT also explains behaviour as more than simply a stimulus response. Humans have the ability to interpret information from incoming stimuli. Expectancy learning, which takes place through both direct experience and information provided by others, is the process through which environmental cues create anticipatory reactions. A baby, not having learned to associate or anticipate outcomes, will respond only to stimuli that have an inherent effect (Bandura, 1977). Swaddling will create comfort while hunger and pain will create discomfort. As life progresses a child learns to anticipate outcomes from environmental cues, which predict either events to come or outcomes that will result from particular actions. A child who smells alcohol on his parents' breath and recognizes this as a sign that a fight is likely to occur might learn to hide to avoid the confrontation. Behaviours are therefore influenced by their predicted outcomes (Bandura, 1977). Behaviours might also be accompanied by physiological responses that are resulting in the association of a neutral stimulus and a perceived outcome.

An individual's thoughts at the time events are occurring will influence the accuracy of their interpretation which means the expectancies learned from both direct and indirect exposure can lead to anticipation of incorrect probabilistic outcomes (Bandura, 1977). For example, a child might observe his/her parents engaging in activities that seem fun, or so frequently that they seem normal. But, children do not have any context for judging what is normal. This can lead to mistakes in future social situations where they reproduce what is 'normal' to them, but the actor does not realize the anticipated outcome 'fun' because others do not receive the behavior as intended. Through learning, environmental stimuli such as people, places, things or social signals can develop the capacity to influence behaviour (Bandura, 1977). These expectancies can also influence physiological responses. Using the previous example, due to watching his parents fight after they have been drinking, a child might develop the physiological response associated with fear whenever he smells alcohol. Learning of such physiological responses to expectancies can be either appropriate or aberrant depending upon the accuracy of the learned expectancy (Bandura, 1977).

Reinforcement

Behaviours and physiological responses are developed through the process of reinforcement, the result of repetition of behaviours that generate either a positive response or eliminate behaviours resulting in negative outcomes (Bandura, 1977). Reinforcement can be either intrinsic or extrinsic (Bandura, 1977). Intrinsic reinforcement can occur naturally when a behaviour directly generates a physiological effect. Reinforcement can also emerge as the result of an externally occurring consequence. However, these responses are altered with the use of drugs of abuse.

A naturally occurring response would be the effect following consumption of a drug and reinforcement would be through continued usage to repeat the pleasurable effect. However, drugs of abuse change the effect of reinforcement. According to Torregrossa et al. (2011), "…addictive substances create artificial learning signals that are of a greater magnitude and duration than what is observed neurochemically in response to natural events" (p.609). They also report that studies "…demonstrate that chronic exposure to an addictive drug persistently alters normal learning about non-drug, reward-associated cues." (Torregrossa et al., 2011, p. 610). The more powerful reinforcement effects of drugs overshadow those of normal behaviours, raising the likelihood of continued drug use (Torregrossa et al., 2011).

Vicarious reinforcement/ inhibition

Just as behaviour can be reinforced through vicarious observation, it can also be inhibited. If an observed behaviour is consistently punished by those in authority, it will be avoided. However, if an activity which should result in punishment, goes unnoticed and without punishment, the oversight becomes a form of reward (Bandura, 1977). The disinhibition becomes a significant motivator (Bandura, 1977). For example, an adolescent who has begun experimenting with marijuana in social situations on the weekends is reluctant to use marijuana during the school day. After observing peers smoking marijuana between classes without negative consequences, the adolescent might be motivated to smoke marijuana between classes, having lost the inhibition to use marijuana during the school day.

Differential reinforcement refers to the influence of a social environment on a behaviour resulting in different consequences; on the one hand, one rewarding, and on the other, punishing (Brauer and Tittle, 2012). For example, a young teen who comfortably drinks alcohol in the company of peers and enjoys their acceptance will most likely experience a completely different outcome drinking alcohol in the company of his parents if they frown upon him drinking. From the differing outcomes he learns to regulate his behaviour based upon the social environment. Individuals learn to behave according to the anticipated outcome in each context.

The decision to engage in a particular behaviour will be heavily influenced by efficacy expectations, that is, an individual's belief that they can execute a particular behaviour to produce the desired outcome. Self-efficacy is based upon several sources of information, each with a differing degree of influence. The most influential is performance accomplishment where learning occurs through doing. How much effort an individual exerts will be determined by their efficacy expectation. The achievement of satisfactory outcomes will increase self-efficacy whereas failure to achieve the desired outcome will adversely affect self-efficacy.

SLT explains how past experience provides the current motivation leading to behaviours such as the initiation of substance use. The combination of consequences and reinforcement provide the necessary motivation. An expectation of future consequences allows an individual to assess the situation and choose behaviours based upon prior learning.

Expectancy Theory

The concept of expectancy is an umbrella term encompassing a variety of neurocognitive processes through which organisms are motivated to behave based upon anticipated outcomes. First introduced by Tolman in 1932, Expectancy Theory (ET) provides an explanation for how humans use knowledge acquired at one point in time, from the distant past to a few seconds ago, to guide behaviour in the future (Kouimtsidis, 2010; Leonard & Blane, 1999; Reich and Goldman, 2005; Tolman, 1932). It provides a very good framework for understanding substance use along the spectrum from initiation to abuse to addiction (Goldman, Brown, and Christiansen, 1987; Goldman, 2002; Jones, Corbin, and Fromme, 2001).

Expectancy is an if /then relationship, with a causal relationship inferred between the "if" condition and the outcome. An individual is motivated to produce an action in particular circumstances based upon the expectancy of a reward. Circumstances activate an expectancy leading to a behaviour such as alcohol consumption (Darkes, Goldman, and Reich, 2006). The greater emphasis on the anticipation of a reward is what differentiates ET from SLT.

Expectancies are developed and strengthened through the reinforcement of outcomes that result from both the direct and vicarious performance of behaviours (Jones et al., 2001; Leonard & Blane, 1999; Reich, Below, and Goldman, 2010). Studies of drinking behaviours have shown a causal connection between expectancy and drinking; both in terms of the decision to drink and in terms of on the volume consumed (George et al., 2012; Darkes et al., 2006; Goldman, 2002; Leonard & Blane, 1999). A positive expectancy about drinking generally results in future drinking. For example, pre-drinking adolescents with positive expectancies toward alcohol have a likelihood of them drinking in the future (Goldman, 2002; Jones et al., 2001; Leonard & Blane, 1999). Once alcohol use exists, the expectancy influences the volume consumed and can be predictive of the escalation of non-problem or an acceptable level of 'social' drinking to problem drinking (excessive drinking in volume or frequency or both, that is negatively influencing other aspects of life)(Connors and Maisto, 1988; Goldman, 2002; Jones et al., 2001).

Memory Templates

The development of expectancies is made possible by memory templates. In complex organisms, memory templates organize and store information obtained through the various sensory systems (Brick and Erickson, 2013; Goldman, 2002; Darkes et al., 2006;

Leonard & Blane, 1999). The development of the memory template is the result of the stimulus, the context and the interaction with individual characteristics (Goldman, 2002).

Incoming stimuli arrive and are subsequently stored in formats determined by the sensory system (Del Boca, Darkes, Goldman, and Smith, 2002; Darkes et al., 2006; Goldman, 2002). As information is newly acquired, the complex and dynamic storage system amalgamates and organizes the content, creating memory. The organization of such diverse information is made possible by memory templates developed from previous experiences. They facilitate the associations and linkages between stimuli and anticipation of an outcome (Goldman, 2002; Leonard & Blane, 1999; Torregrossa et al., 2011). An organism's survival is dependent upon its ability to adapt its behaviour based upon past experiences (Darkes et al., 2006; Goldman, 2002). The process of anticipating an outcome and the resulting biological and behavioural adjustments is known as plasticity (Darkes et al., 2006).

Plasticity describes the adaptability of an organism, basing the performance of an action upon an assessment of the incoming stimuli and evaluating the degree of similarity to situations previously encountered (Leonard & Blane, 1999). The assessment of stimuli does not require a perfect match to past experience; a best estimate of the anticipated reward or punishment is sufficient to direct behaviour (Goldman, 2002; Redish et al., 2008).

Behaviour is determined by the existence of expectancies, not their validity (Jones et al., 2001; Redish et al., 2008). The failure to make the correct association of the pre-use expectancy with a negative outcome will motivate behaviour such as continuing to drink (Redish et al., 2008). Similarly, the incongruence between the anticipated outcome and the actual outcome, whether due to false memory (remembering something that did not occur) or selective memory, "…consequences (generally negative) not consistent with the predrinking expectancy…" (Connors & Maisto, 1988, p.491) are likely determinates of drinking behaviour (Reich, Goldman, and Noll, 2004). That is, the presence of an expectancy, regardless of accuracy, that will influence behaviour.

Alcohol Expectancy Templates

Drugs have the ability to alter expectancies (Brick & Erickson, 2013; Torregrossa et al., 2011). And example is when young hockey players begin drinking alcohol in the sports environment, alcohol expectancy templates are created through the co-occurrence of common stimuli and alcohol use (Darkes et al., 2006). The stimuli develop a salience, which stimulates continued alcohol use.

Once alcohol use exists, cues to continue drinking are triggered by temporal features such as the time of day, day(s) of the week or special occasions. Social situations, which are typical settings in which substance use begins, are where expectancies are developed. Similar situations become cues for memory retrieval triggering the response of substance using behaviour (George et al., 2012; Goldman, Brown, Christiansen, and Smith 1991; Leonard & Blane, 1999; Reich & Goldman, 2005; Redish et al., 2008). Environmental cues such as the presence of a particular substance, circumstances such as venue or events, are often involved in activating memory templates. Social and environmental cues combine with memories and attitudes to play a significant role in motivating the behaviour to use or refrain from substance use (Leonard & Blane, 1999; Redish et al., 2008).

Drugs and Expectancies

Compared to other behavioural applications, ET differs in the field of substance addiction due to the multiple effects of drugs (Goldman, 2002). With their many powerful impacts on the body and mind, drugs alter learning and memory processes, interoceptive effects, and are involved in interactions with natural rewards (Goldman et al., 1987; Potenza, 2013; Redish et al., 2008) resulting in the aberrant development of expectancies (Torregrossa et al., 2011).

Interoceptive effects, the internal responses such as fear or anxiety, change with drug use and can strengthen drug cue-reward behaviours (Torregrossa et al., 2011). This creates an added complexity to distinguish the pharmacological/physiological effects from the expectancy effects (Goldman et al 1987; Redish et al., 2008).

The pharmacological effect of drugs of abuse appear to cause aberrant learning and memory (Redish et al., 2008; Torregrossa et al., 2011). "Drugs of abuse not only increase learning about the positive effects of the drug, but they also overshadow and diminish the impact of other features of the environment resulting in increased attention toward the drug and away from normal activities" (p. 609, Torregrossa et al., 2011). For vulnerable individuals, the initiation of drug use begins the process toward addiction (Potenza, 2013).

Both SLT and ET recognize that vulnerability to addiction is strongly influenced by social contexts and psychological development (Drobes, Carter, and Goldman, 2009; Swendsen & Le Moal, 2011; Szapocznik & Coatsworth, 1999). The continuous reciprocal interaction between cognitive, behavioral, and environmental factors influence the development of expectancies held about substances and their use. The behaviour choices resulting from these expectancies will then increase or decrease the risk of addiction.

Development of Addiction

The development of addiction is a unique process for each individual (Goldman et al., 1991; Redish et al., 2008). Just as with other diseases, vulnerability varies, as does the progression of addiction (Torregrossa et al., 2011). What is commonly accepted is that addiction results from biological, psychological, social and environmental factors which combine to influence behaviour (Redish et al., 2008; Shaffer et al., 2004). While some people are more at risk of developing addiction there is no single trait or constellation of traits that can reliably predict its occurrence (Leonard & Blane, 1999). Individual vulnerabilities vary but generally as the number of risks increase, the more likely it is that use and abuse of substances will result in addiction (West, 2001). Conversely, the increased presence of protective factors can reduce the likelihood of addiction. This includes involvement in protective activities which help to build self-efficacy, develop coping skills, teach goal setting, provide positive role models and occupy time. All of these conditions will reduce the risk of initiating or continuing substance use (Moos, 2007).

Syndrome Model of Addiction

Traditionally addiction was viewed from a pharmacological perspective and was considered to be drug specific (Redish et al., 2008; Shaffer et al., 2004). Recognizing that addiction is more likely to have a biopsychological origin than being drug based, Shaffer introduced the now accepted concept of addiction as a syndrome (Le Moal, 2008; Redish et al., 2008; Shaffer et al., 2004). A syndrome can be described as a specific disorder or disease where each incidence has common expressions but not all manifestations will be present in each situation. The syndrome model of addiction (SMA) describes addiction as not being associated with a particular substance or behaviour, but the shared manifestations and sequelae that describe the classification. This stems from both the identification of several personality traits associated with various forms of addiction (Swendsen & Le Moal, 2011) and through the course of addiction where personality can be altered (Goodman, 2008; Shaffer et al., 2004). Psychosocially, people active in their addiction have recognizable sequelae in common such as deceit, shame, guilt and dysthymia (Berczik et al., 2012; Shaffer et al., 2004; Swendsen & Le Moal, 2011).

Although a particular behaviour or substance contributed to the development of the addiction, once addiction exists, individuals are more vulnerable to the development of new addictions (Goodman, 2008; Redish et al., 2008; Shaffer et al., 2004). In fact, lifetime morbidity has been proven to exist in both clinical and epidemiological research (Goodman,

2008). This applies to poly-substance addiction and also to other process-addictive disorders such as gambling, bulimia and sexual addiction (Goodman, 2008).

The development of addiction in the SMA is consistent with the disease model. Vulnerable individuals are those with a genetic risk, have comorbid psychiatric conditions and/or social risks all of which the syndrome model refers to as Distal Antecedents. It recognizes the common pathway to addiction regardless of the original object of addiction.

Biological Risks

Biological risks include genetic makeup, gender, ethnicity, mental state and stage of life (NIDA, 2010; Whelan et al., 2012; Goodman, 2008; Shaffer et al., 2004; Squeglia et al., 2012). With the exception of mental state, these underlying risk factors cannot be altered or controlled and predispose some individuals to addiction.

Raging hormones led to the new size, shape and functions of teenage bodies. These rapid physiological changes have an impact both socially and psychologically, often leading to the loss of self-esteem and increased risk-taking during this stage of life (Leonard & Blane, 1999; Swendsen & Le Moal, 2011; Swendsen et al., 2012). Not only is adolescence the stage of life where the risk of initiating substance use is highest (SAMHSA, 2011) but the potential for doing long term damage is also the greatest (Ashtari et al., 2011; Grant et al., 2012; Shaffer et al., 2004). The brain is undergoing significant developmental changes and adolescence is a key period for neuronal maturation (Ashtari et al., 2011). Drug use during this period both increases the vulnerability to addiction and the potential for permanent damage (Potenza, 2013).

Genetic factors significantly influence the initial decision to use a substance, described as being "…susceptible to the attractions of alcohol and drugs…" (Acheson and Lovallo, 2014) and whether or not dependence develops, determined by the influence and interaction of other risk factors (DuPont, 2000; Erickson, 2007; Potenza, 2013; Redish et al., 2008; Shaffer et al., 2004). Shared neurobiological antecedents means that genetics account for the risk of addiction but not the vulnerability to specific objects of addiction (Redish et al., 2008; Shaffer et al., 2004). The genetic risk for developing addiction is estimated to be between 30-70% according to studies using twin data (Potenza, 2013). For alcohol dependence, up to 60% of contributing causes can be attributed to heredity (Brick & Erickson, 2013)

Behaviour and brain development are reciprocally influencing, and both are subject to environmental influences (Shaffer et al., 2004). This is a good example of reciprocal determinism as described in SLT.

Psychological Risks

The psychological development of an individual contributes to attitudes, social and cognitive competencies, and decision making skills, which then influence behavioural choices (Gifford and Humphreys, 2007). Some core traits begin developing at birth with physiological predispositions being strengthened over time (Leonard & Blane, 1999). Therefore, some behaviours remain unchanged throughout life while others evolve through the maturation process and through life circumstances.

The desire to begin using substances, either alone or in the company of others, can be determined to some extent by personality. The decision to use alcohol at a young age can lead to behaviour while under the influence of alcohol that will contribute to the reciprocal relationship between the individual and the social environment.

At great risk of developing substance addiction are those individuals with psychopathology (Drobes et al., 2009; DuPont, 2000; Shaffer et al., 2004). Most commonly this will be people with major depression or anxiety disorders (Grant et al., 2012; Shaffer et al., 2004; Swendsen & Le Moal, 2011; Merikangas et al., 2010).

The presence of certain personality traits is associated with the stage of life at which alcoholism is likely to develop. Increasing depressive symptoms and loss of self-esteem, particularly in girls, often accompany pubertal changes (Leonard & Blane, 1999) whereas other traits are more likely to result in alcoholism later in life. Antisocial and impulsivity/disinhibition results in social problems, failure to perform in school and association with deviant peers all of which increase the risk for substance abuse (Potenza, 2013) and is associated with early onset alcoholism (Leonard & Blane, 1999).

Social and Environmental Contexts

The social contexts in which the person exists play a significant role in the development of attitudes and expectancies influencing behavioural choices, such as the initiation of substance use and its subsequent continued use. Social domains include a wide range of affiliations such as family, peer groups, network of friends, community or neighbourhood, school, religious organizations, support groups and cultural groups (Potenza, 2013).

The relationship between an individual and the social contexts is a complex and dynamic process. SLT explains the reciprocal relationship where individual attributes will influence interactions with the various social domains just as the characteristics of the social domains will have an effect on the personal development. Over time, all of these interactions have a cumulative effect (Szapocznik & Coatsworth, 1999). As an example, a

child born with character traits leading to an unpleasant disposition may generate a parental response that prevents favourable development of the child. The child's continued difficult or inappropriate behaviour potentially will lead to failure in the school environment through unsatisfactory relationships with teachers and peers, and poor academic performance. Failure to bond and succeed at school can contribute to affiliation with deviant peers leading to substance use (Szapocznik & Coatsworth, 1999). What began with the child's inherent personality trait led to social interactions which increased the risk of substance use and abuse.

Social control theory.

Social control theory (SCT) focuses on the strength of social bonds in individuals' lives and their resulting motivational effects (Hirschi, 1969). Where SLT focuses on the importance of role models, SCT puts more emphasis on the bonds between individuals or group members. SCT identifies four components to the bonds; emotional attachment, commitment to conventional goals, involvement in conventional activities, and acceptance of moral standards. It is the synergistic effect of these four influences that results in conformity to societal norms. A weakening in any of the components creates vulnerability to deviant behaviour such as substance use (Hirschi, 1969).

Hirschi (1969) postulates that individuals are inherently deviant and that it is through the social bonds that conformity to conventional norms develop. The strength of the bonds with the various affiliations such as family and school, will determine the level of support, and if actions are monitored (Gifford & Humphreys, 2007; Moos, 2007). Individuals lacking strong social bonds will be at greater risk of addiction. Strong bonds in healthy relationships in combination with structure and monitoring will contribute to more positive personal development. This is demonstrated through enhanced decision making, conflict resolution and peer-resistance skills (Moos, 2007). Strong bonds in healthy relationships will help to motivate responsible behaviour and prevent substance use. However, strong bonds in unhealthy relationships such as gang membership or dysfunctional families will increase the potential risks of substance use.

The risk of addiction worsens if the family attachment is weak. Weak attachments are caused by inadequate monitoring and shaping of behaviour, and lack of cohesion and structure in a family (Moos, 2007). Psychological maltreatment (PM) is one reason for weak attachments. Recent research indicates that compared to physical abuse or sexual abuse, not only is PM the "…strongest predictor of substance abuse" it is also linked to relational insecurity and negative self-perception (Spinazzola et al., 2014).

The largest known risk group for the development of substance abuse and addiction is children with addicted parents (Acheson et al., 2014; Belles, Buddes, Klein, and Morgan, 2011; Dupont, 2000). In addition to the genetic predisposition to addiction, it is the problems associated with substance abuse that increases the risk of addiction for their children (Belles et al., 2011). The parenting practices associated with heavy drinking can adversely affect child development. Unhealthy parent-child relationships and the mistreatment of children, including sexual abuse, physical abuse and psychological maltreatment, can lead to childhood psychopathology (WHO, 2014).

Other factors within the family environment likely to increase the risk of substance use are family conflict, harsh or inconsistent discipline techniques and poor communication skills, common conditions in families with addicted parents (Szapocznik & Coatsworth, 1999). Within the family, conflict, lack of cohesion and structure, and all forms of abuse are factors likely to create stress, which is another risk for substance use.

Stress is likely to impel substance use during adolescence (Leonard & Blane, 1999; Moos, 2007), the stage in life when substance use is known to escalate (Szapocznik & Coatsworth, 1999). Not only are adolescents more prone to impulsiveness, but they are experiencing a time of life characterized by change, a potential source of stress. Stress can intensify the salience of cues, increasing the behavioural response to learned reinforcers such as drugs and alcohol (Gifford & Humphreys, 2007).

Social environments are often the source of life stressors that create anxiety by challenging self-image and creating doubts about self-competence (Leonard & Blane, 1999; Moos, 2007). At particular risk are those who lack self-confidence and coping skills and avoid facing problems, issues common to victims of PM (Spinazzola et al., 2014). Adolescents are simultaneously dealing with the bidirectional struggle for support and autonomy from parents and family, and parental influence is eclipsed by peer influence (Leonard & Blane, 1999). These changing relationships and friendships occur with the transitions from elementary to middle school and middle school to high school.

Process of Addiction

Substance addiction is a temporal progression that begins with the decision to use a substance. Social learning significantly influences initial experimentation as expectancies about alcohol will predict alcohol-related behaviours (Drobes et al., 2009; George et al., 2012). Observing parents who use alcohol and drugs can instill positive expectancies about the effects of substances and how to obtain them (Moos, 2007).

Neurobiological, psychosocial and environmental elements combine to influence the behaviour to initiate the substance use career (Shaffer et al., 2004). Although exposure and access to the object of addiction by a vulnerable individual will increase the likelihood that interaction will occur, the initial use of a substance is the result of a conscious decision to do so (Kouimtsidis, 2010; Shaffer et al., 2004). Positive expectancies about alcohol use resulting from social learning have been shown to exist in young children who have not yet had their first drink (Christiansen, Goldman, and Inn, 1982). Alcohol expectancies play a significant role in the decision to initiate drinking (Goldman et al. 1987). Studies consistently show that adolescent drinking can be predicted by parental drinking, and then by peer group attitudes and drinking behaviours (Christiansen, Brown, and Goldman, 1985; Goldman et al. 1987).

Exposure and initiation

The conscious decision to initiate use of any substance is typically motivated by positive expectancies (Connors & Maisto, 1988; Drobes et al., 2009; Goldman, 2002; McDuff and Baron, 2005). Modeling effects occur through the observation (Potenza, 2013) and then imitation of substance specific behaviours such as a child observing the parents seeking relief from a stressful day by having a drink. Being a part of a family with substance abuse or addiction will be a major risk factor for initiation and escalation of use (Christiansen et al., 1985; Gifford & Humphreys, 2007).

The attitudes and behaviours of adults and peers as role models contribute to the development of the young person's attitudes toward and about the positive and negative consequences of substance use (Leonard & Blane, 1999). Alcohol use in the household plays a key role in the development of a child's favourable attitude toward drinking behaviour (Jackson, Barnett, Colby, and Rogers, 2014). If a child is given sips of alcohol, not only does this create an awareness of its availability, but also the child may want to reinforce the effect, that is, the feeling from the ethanol or the taste (Jackson et al., 2014). Having sips of alcohol was strongly associated with subsequent alcohol use and other substance use (Jackson et al., 2014).

Adolescents' attitudes toward alcohol use appear to be further influenced by alcohol-specific parenting. A recent study by Zehe and Colder (2014) suggests that alcohol-use specific parenting can foster a negative attitude toward alcohol use and deter their adolescent's alcohol use. Frequent messaging about the risks of drinking was associated with a reduced likelihood of initiating drinking and a slower increase of drinking (Zehe & Colder, 2014). Conversely, when messaging was reduced, or parents were less restrictive

about their adolescent's drinking, the risk for alcohol use increased and there was an escalation of alcohol use (Jackson et al., 2014; Zehe & Colder, 2014). Jackson et al. (2014) indicate that the provision of alcohol at home is "prospectively associated with greater levels of adolescent alcohol use, heavy use, drunkenness and drinking intentions" (p 218).

Object exposure and interactions increases during adolescence (Shaffer et al., 2004) a key period for initiating alcohol and drug use (Leonard & Blane, 1999). Impulsivity has not yet normalized and self-regulatory executive function is still maturing while thrill seeking and risk taking behaviours escalate (Ashtari et al., 2011; Swendsen & Le Moal, 2011). The willingness to try new things and the disregard for the associated risks makes early and middle adolescence a very vulnerable time of life (Swendsen & Le Moal, 2011).

Peer groups are very influential in the initiation and continuance of substance use by serving as models through which the user acquires attitudes and develops patterns of behaviour (Kuther, 2002). Where positive norms of substance use exist, initial and ongoing use will be positively reinforced. The development of expectancies with positive outcomes culminate in substance use and abuse (George et al., 2012).

The most commonly used substance for the initial drug experience and continued use during adolescence is marijuana (Ashtari et al., 2011; Fergusson, Boden, and Horwood, 2006; Johnston, Bachman, O'Malley, and Schulenberg, 2011; Korhonen et al., 2009; SAMHSA, 2011; Swendsen et al., 2012). In 2010, over 60% of those reporting drug use for the first time used marijuana (SAMHSA, 2011). This rise in marijuana use is speculated to be the result of adolescents' favourable attitude towards its use and failure to recognize the associated harm (Johnston et al., 2011; Swendsen & Le Moal, 2011). The technical report by Porath-Waller, Brown, Frigon, and Clark (2013) confirms that this is the case in Canada.

In the US, the use of marijuana has increased for the fourth consecutive year and is now at a 30 year high (Johnston et al., 2011; SAMHSA, 2011). Marijuana is sometimes considered to be a gateway drug, meaning its use can lead to the use of other substances (Ashtari et al., 2011; Fergusson et al., 2006), the rise in daily use or near daily use, and use on 20 or more occasions during the previous 30 days, is reason for concern according to Johnston and colleagues (2011). In Canada, daily use of cannabis by youth ages 12-18 in 2007 and 2008 was 2.5% and in the US, daily use is estimated to be evident among 6.6% of high school seniors (CADUMS, 2012; Johnston et al., 2011). It is important to note that the data compiled in the CADUMs report relies on a random survey of households using landlines and thereby underreporting the segments of society unlikely to have a landline: homeless, institutionalized and young people (Carter and MacPherson, 2013).

Regular use of marijuana is strongly associated with the regular use of other substances and weekly marijuana users are "59 times more likely to engage in illicit drug use" (Fergusson et al., 2006, p 557). Thirty three percent of occasional marijuana users and 84% of regular marijuana users reported using other illicit drugs (Fergusson et al., 2006).

The motivation to continue using a substance is the result of either the same or some other combination of risk factors and expectancies that led to the initial use (Bilard, Hauw, and Ninot, 2011; George et al., 2012; McDuff & Baron, 2005). When a positive outcome such as feeling good or eliminating the experience of feeling bad is sought and achieved, use will continue (George et al., 2012; Gifford & Humphreys, 2007; Moos, 2007). Motivation to continue using becomes one of a pathological craving resulting from changes to the neural system (Kouimtsidis, 2010). As the brain processes enhance the reward value of the behaviour over time, the use begins to occur without thinking (George et al., 2012; Gifford & Humphreys, 2007). Striving for the continued effect at all costs without regard for potential harm is evidence of addiction and increases an individual's vulnerability to other addictions (Kouimtsidis, 2010; Shaffer et al., 2004). The impaired control and impaired response inhibition are the hallmarks of addiction (George et al., 2012; Kouimtsidis, 2010).

The trend of drug use by adolescents is a concern as the patterns established during adolescence help to determine adult substance abuse and associated disorders. The increase in marijuana use in North America in recent years is predictive of an increase in the number of adults with addictions (Swendsen et al., 2012).

Physical Activity

Research supports that engaging in PA is generally associated with positive health outcomes (Barnes et al., 2012; Tassitano et al., 2010). Fontes-Ribeiro, Macedo, Marques, Pereira, and Silva (2011) in a study using rats, suggests that chronic exercise can prevent addiction. Traditionally, health practitioners have viewed PA and sport participation as providing protection against stress, depression and drug use (Lisha and Sussman, 2010; Pichard, Cohen-Salmon, Gorwood, and Hamon, 2009; Tassitano et al., 2010). However, the relationship between PA and sports, and substance use, is far from conclusive (Korhonen et al, 2009; Peck et al., 2008).

Some of the positive outcomes of PA and sports that are particularly relevant during adolescence are improved physical self concept and self-esteem, and protecting against and alleviating the symptoms of depression and anxiety (Donaghy, 2007; Fontes-Ribeiro et al., 2011; Goldberg & Elliot, 2005; Harrison & Narayan, 2003; Kantomaa et al., 2008; Moore & Werch, 2005) all of which commonly occur during adolescence (Shaffer et al., 2004). With

both PA and sports, and substance use, providing rewards such as elevating mood and decreasing anxiety, regular PA might prevent the desire to engage in other reward seeking behaviours as well as prevent escalating substance use (Fontes-Ribeiro et al., 2011; Kantomaa et al., 2008; Moos, 2007). The protective role of PA and sports comes from the activity itself, potentially shielding exposure to substances, and by being in the company of those with a negative attitude toward drug use (Chen et al., 2004; Donaghy, 2007; Korhonen et al., 2009; Moos, 2007; Pichard et al., 2009).

Physical Activity as a Risk

Involvement in PA and sport can also be a risk, with ample evidence showing the positive association between some sports and the use of particular substances (Bilard et al., 2011; McDuff & Baron, 2005; Taliaferro et al., 2010). The most common findings with respect to sport participation and substance use are decreased use of tobacco and illicit drugs, and increased alcohol use (Lisha & Sussman, 2010). In fact, the rate of use of some substances is higher for athletes than non-athletes (McDuff & Baron, 2005).

Alcohol.

Werch, DiClemente, and Moore (2003) demonstrated that a sport-based activity intervention in adolescence both significantly reduced alcohol initiation and increased the frequency of PA. Conversely, other studies have shown a positive linear relationship between the amount of exercise undertaken and volume of alcohol consumed (Barry and Piazza, 2010). These differences can be partially explained by the other factors which influence the behaviours of sport involvement and alcohol use; adult role models, peer relationships, social contexts and personality traits (Lisha & Sussman, 2010; Peck et al., 2008). Behaviours such as aggression and problem behaviour are predictive of higher alcohol and drug use (Peck et al., 2008) and heavy drinking is a part of a constellation of behaviours that might include sport activity (Barry & Piazza, 2010).

There is substantial evidence that participation in PA and some sports is positively associated with alcohol use (Tassitano et al., 2010). Participants in team sports are at the greatest risk (Terry-McElrath and O'Malley, 2011; McDuff & Baron, 2005) with binge drinking being more common for athletes than for non-athletes (Barry & Piazza, 2010; Lisha & Sussman, 2010; McCaul et al., 2004; McDuff & Baron, 2005; Moore & Werch, 2005; Terry-McElrath & O'Malley, 2011).

The motivation to drink alcohol is influenced by social conformity, performance enhancement, stress reduction, alcohol exposure at sporting events and the competitive

nature of sport (Pichard et al., 2009; Terry-McElrath & O'Malley, 2011). Whatever the reason for drinking, alcohol has negative effects on both health and performance (McDuff & Baron, 2005). It may not interfere with athletes' performances in the short term and it is harder to detect as it leaves the system quickly (Lisha & Sussman, 2010) but the injury rates for athletes drinking alcohol has been shown to be higher than for non-drinkers. Athletes who drink as a coping mechanism also tend to experience more negative consequences (McDuff & Baron, 2005).

Participants in endurance sports are the least likely to use alcohol (Wichstrøm & Wichstrøm, 2009). This is attributable to the negative impact on aerobic performance and the conflicting timing of endurance events and social events involving alcohol with both typically scheduled on weekends (McDuff & Baron, 2005; Wichstrøm & Wichstrøm, 2009).

Illicit drugs.

While it appears that sports participation provides a protective mechanism against illicit drug use, the results for illicit drugs are less consistent than those for alcohol and tobacco (Lisha & Sussman, 2010). Generally athletes are less likely to use marijuana or other illegal drugs, although usage is influenced by gender and ethnicity, by social and cultural influences and by the type of sport (Bilard et al, 2011; Taliaferro et al., 2010).

Female athletes are less likely to use marijuana than non-athletes. Males tend to be heavier users than females and ethnicity is a factor (Taliaferro et al., 2010). Male athletes are more likely to use steroids, chewing tobacco and alcohol, and they are less likely to use marijuana and cocaine than non-athletes (Taliaferro et al., 2010). Whites and Hispanics are the heaviest alcohol users but white males are the least likely to use illegal drugs (Peck et al., 2008; Swendsen et al., 2012).

Competitive or High Intensity Activity or Sport

Whereas voluntary, recreational sport is protective against addiction, competitive sports activity might increase the vulnerability to addiction. This is particularly true for elite athletes, high intensity sport participants and team-based competitive sport participants (Terry-McElrath & O'Malley, 2011). Pichard et al. (2009) showed this relationship using a strain of rats bred with a genetic vulnerability to high alcohol preference. They demonstrated that moderate and voluntary PA was associated with reduced alcohol intake but that alcohol intake increased with forced and intense PA (Pichard et al., 2009).

The reasons for drug use in sport include but are not limited to enhancement of body image, reduction of anxiety, injury prevention, pain relief and recovery (Bilard et al., 2011).

The type of participation (technical, team or endurance) and the particular sport have been found to be related to the types of substances used (Bilard et al., 2011; McCaul et al., 2004; McDuff & Baron, 2005; Wichstrøm & Wichstrøm, 2009). The varying physical requirements and sport cultures are factors influencing the choice of drugs used (Bilard et al., 2011; Lisha & Sussman, 2010).

The justification for use is supported by the norm of acceptance (Bilard et al., 2011; Goldberg & Elliot, 2005 Wichstrøm & Wichstrøm, 2009). In a team sport such as football, the culture can be the overriding influence. The original motivation for substance use might be performance enhancement or relief from anxiety but the social aspect of the culture enhances the reason for continued use (Bilard et al., 2011; McDuff & Baron, 2005).

Dropping out.

Regardless of the cause for dropping out of an activity, the components described in SCT are weakened and can lead to negative outcomes including substance abuse. For those at risk of addiction, the loss of the protective mechanism of sport increases their vulnerability to substance use and abuse.

Withdrawal from intense PA can result in clinical symptoms similar to those associated with withdrawal from substances such as mood disorders, anxiety, difficulty concentrating and physical pain (Berczik et al., 2012; Pichard et al., 2009). The risk of substance use and abuse is increased with a forced stop from high intensity sport (McDuff & Baron, 2005) such as the severing of social connections after being cut from a team (Neely, 2012) or the result of injury.

Depression, anxiety and traumatic stress have been shown to magnify pain disproportionately, causing difficulty in interpreting pain sensations (Bailey, Gold, and Hurley, 2010). Extended use of pain treatment through prescriptions such as opioids increases the likelihood of addiction (Pichard et al., 2009; Richardson et al., 2012).

Physical Inactivity

A number of associations have been made between physical inactivity and behaviours linked directly or indirectly with substance use. Although causality has not been determined, there is an association between physical inactivity and mental health problems in adolescence (Kantomaa et al., 2008). The significant amount of time spent in sedentary behaviours has adverse effects on self-esteem and prosocial behaviour (Barnes et al., 2012). Therefore, physical inactivity is a particular concern for girls who are consistently

less active than boys (Koezuka et al., 2009), more prone to depression, and more inclined to experiment with illicit drug use at an earlier age than boys (Korhonen et al., 2009).

Dunton et al. (2011) report that adolescents who use substances are less likely to be physically active and that the use of some substances, particularly alcohol and tobacco, is associated with inactivity. It is also known that adolescents engaged in highest level of delinquent behaviour tend to drop out of school athletics (Peck et al., 2008) and therefore, the increasing dropout rates from PA and sport tends to coincide with increased levels of substance abuse (McCaul et al., 2004; Werch et al., 2003).

Health behaviours, both positive and negative, adopted during adolescence are predictive of adult health behaviours (Dunton et al., 2011; Huotari et al. 2011; Korhonen et al., 2009). The argument about the pathway from a sedentary lifestyle to drug use is strengthened by knowing that alcohol and drug use are more common among physically inactive adolescents and that dropping out of sports activities is a predictor for alcohol use as an adult (Korhonen et al., 2009; Peck et al., 2008). It is also known that those who include PA and sport as a significant part of their leisure activity generally adopt healthier lifestyles (Bartík, 2012). What is lacking is a conclusive relationship between participation in PA and sport, and substance use (Lisha & Sussman, 2010). Clarity is also lacking regarding the association between the risk of addiction and type of PA (Peck et al., 2008). Unknown are the attitudes of people who have substance addictions toward PA and sports, and the possible influence it had in the course of their substance using careers.

Objectives

The learning theories provided an explanation for how addictions are developed. A review of the research indicated that while non-participation is more closely linked with substance use (Korhonen et al., 2009), participation in sports is not necessarily either a protective factor or a risk for addiction. Some types of sport involvement, such as team sports, are associated with increased substance use while others are not (Moore & Werch, 2005; Peck et al., 2008; Tassitano et al., 2010). However, there is relatively little research directly considering the association between addictions and PA and sport involvement.

A gap in the literature is the perspectives of people with substance addictions regarding their own PA and sport involvement. Therefore, the objective of this research was to look for patterns and associations between PA and sport involvement, and the development of substance addiction for people who were undergoing treatment for their addiction. The main focus of the project was to provide insight into our understanding of positive and negative influences of PA and sport on the initiation of use and continued use of substances, and the development of addiction during the participants' lives.

To accomplish this I explored the development of the participants' substance addiction to determine what influences generally, and more specifically sport and PA involvement (or lack thereof), contributed to the initial and continued use of substances. Their experience with PA and sports, particularly during their formative years, contributed to an emergent understanding of its role as a protective or risk mechanism.

This research project contributes to the knowledge of the role of PA and sport in the development of substance from the perspective of people with substance addictions. The participants shared information about how they thought their involvement in PA and sport did or did not influence them as their substance addictions developed.

In the results of this study, I was not looking to provide a single explanation of outcome but rather a good evaluation to explain the complexity of the outcome of substance addiction (Pawson & Tilley, 2004). The information gleaned has contributed to an understanding of the most pertinent underlying mechanisms associated with various contexts of participation in PA and sport and the development of substance addiction (Porter and O'Halloran, 2012).

Chapter 3 Methods and Procedures

Introduction of Methodological Approach

With very little known about the role of PA and sport and their influence on substance addiction, Realistic Evaluation (RE) offers a framework that is effective for evaluating complex interactions between people, places and programs (Pawson & Tilley, 1997; Porter & O'Halloran, 2011). The RE exploration of what works for whom in what circumstances is suitable for this inquiry where substance addiction is the result of a complex and reciprocal interplay of underlying biological, psychological and social causal factors (Clark, Whelan, Barbour, and MacIntyre, 2005).

Pawson and Tilley (1997) use the exemplar of a program to provide post-secondary education to prison inmates and the challenge of evaluating the program. The complexity in this situation arises from a variety of factors; the length of the program, the 1,000 subjects choosing to participate in the program and their hundreds of reasons for doing so. The outcomes of the program are also influenced by factors that were in place before the participants entered prison; their beliefs, volitions, peer groups and social circumstances, all of which contributed to the criminal actions that put them in prison (Pawson & Tilley, 1997).

The current research project is not the evaluation of an intervention or program but potentially pre-intervention, as the investigation aimed to learn about how actions were associated with the development of substance addiction. It was undertaken from a developmental perspective to construct knowledge about a topic with a paucity of existing research. Through the identification of mechanisms and contexts I have been able to shed light on the experiences of the participants through their involvement in PA and sport and the outcome the development of their substance addiction.

Similar to the prison education example, involvement or lack of involvement in PA and sport as it relates to the development of substance addiction is dauntingly complex. Before substance addiction develops, individuals have beliefs, volitions, peer groups and social circumstances. There are many different forms of PA and sports and a multitude of reasons for participating or not. The use of a qualitative research approach allowed for the exploration of the lived experiences of people with substance addictions regarding their participation in PA and sports and the development of their substance addiction.

The Role of the Researcher

In qualitative research, the researcher is the main data-gathering instrument which means that subjectivity is inherent to the research process. Relying upon personal histories and all of the senses in response to everything that is seen, heard and felt (Trochim and

Donnelly, 2008), it is impossible for a researcher as a human being to approach the research process with no preconceptions (Sandelowski, 2010). These preconceptions are influenced by lived experience, social and cultural parameters, and a pre-understanding of the research topic (Jasper, 2005; Sandelowski, 2010). This leads to the unique perspective of the researcher and influences how the data is collected, analyzed, and interpreted and how the results are constructed (Darawsheh, 2014; Jasper, 2005).

It is important for researchers to be mindful of their views and attitudes upon commencing a research project and to be open to sharing this information. Throughout the research as the data is collected and analyzed, qualitative researchers must be prepared to change their position if warranted by the investigation (Sandelowski, 2010).

Situating the Researcher

With a business background and no prior addiction training, my inspiration to pursue this area of study was through my experience as the mother of a daughter who suffered through and is now in recovery from substance addiction. It was while participating in a program for family members of those with substance addiction at a treatment centre that I was exposed to the concept of using physical activity as an adjunct to treatment for substance addiction. As a lifelong recreational athlete, this captured my attention.

Having enjoyed the benefits of a regular exercise regime, I have a very positive attitude towards PA and schedule it into my life. It is the tool I typically use to manage stress; I have used race goals as a coping mechanism during the most stressful times in my life. Therefore, the use of physical activity to treat addiction resonated, providing the impetus for this research.

My experience with my daughter, and navigating the various counseling and treatment options over the years, have developed my empathy for those who are affected by substance addiction. Experiencing first hand a family member's struggle with substance addiction has been enlightening. Not only have I come to appreciate the impact of addiction on so many lives, but I have developed an understanding of the challenges faced on a daily basis by those either active in or in recovery from substance addiction. Spending time in the company of these people has provided the opportunity to learn about their lifestyles, many of which included sports. As my daughter was raised participating in a variety of activities and sports, I knew that despite the benefits of these activities, her involvement in PA and sport did not prevent substance abuse from occurring.

I undertook this project with the awareness that my attitude toward PA and sports, and my compassion for those with substance addiction, would provide the lenses through which I approached the research. Through the data collection and analysis, I have noted

my reactions and beliefs as they may relate to the work, contributing to my self-awareness throughout the process of conducting the project (Peshkin, 1988).

While reviewing research linking sport and PA and substance addiction, it became clear that the relationship was equivocal. Therefore, the direction of the research was changed from the original concept of exploring PA as an adjunct to treatment for substance addiction to investigating the relationship between involvement in sport and PA and the development of substance addiction

Method

A qualitative approach, in particular RE, with its primary focus on context and the identification of what produces particular effects, offers the framework to address the research questions (Allen et al., 2012; Rycroft-Malone, Fontenla, Bick, and Seers, 2010). The aim of RE is to explain the processes involved in particular contexts between the introduction of an intervention and the outcomes that are produced (Porter & O'Halloran, 2011). It is a process of exploration and explanation that recognizes that outcomes follow from causal mechanisms being activated in particular contexts (Mark, Henry, and Julnes, 1998).

Pawson & Tilley (1997) laid out eight methodological rules which provide a guide for RE research; 1) Generative causation, 2) Ontological depth, 3) Mechanisms, 4) Contexts, 5) Outcomes, 6) Context Mechanism Outcome (CMO) configurations, 7) Teacher-learner processes and 8) Open systems.

Generative causation.

Generative causation refers to the underlying causal powers of individuals and communities, rather than external forces such as the implementation of a program. Change will only occur if the conditions are conducive, allowing the program's causal potential to be unleashed (Pawson & Tilley, 1997). Just as with interventions, addiction will only occur if conditions are such that a vulnerable individual becomes susceptible, generally as the number of risks increase (West, 2001).

Ontological depth.

Research that goes beyond what is apparent on the surface to look at underlying factors that influence the outcome are said to have ontological depth. This takes into account the interactions amongst various causal tendencies in the complex systems where we live (Kazi, 2003). Consistent with SLT, this rule recognizes that individuals do not

function in isolation but that there is an interdependent influence between the individual, the environment and behaviour. An individual will behave differently depending upon the current influences some of which could be causal mechanisms.

Mechanisms.

Mechanisms are the ways through which an intervention or action comes to influence the problem of interest (in this instance, providing an explanation of the outcome the development of substance addition). Mechanisms describe the steps or series of steps that bring about change or effects, by influencing the choices that people make (Pawson & Tilley, 2004). That is, they are the decisions and capacities that led to regular patterns of social behaviour (Pawson & Tilley, 1997). Mechanisms are usually "unobservable attributes of some unit of analysis" that help to explain why variables are related (Ashbury & Leeuw, 2010, p367). To identify mechanisms it is helpful to refer to the analogy of gunpowder as used by Pawson & Tilley (1997). Gunpowder will not explode if it is stored in a particular environment, however once it is exposed to a spark or flame, it will explode. Similarly, a mechanism may exist in a context but will not lead to a behaviour, however, in a different context, the mechanism is activated and a behaviour will occur.

Realists typically describe mechanisms as being hidden and sensitive to variations in context which means they can be triggered or deactivated thus producing different outcomes (Hewitt, Sims, and Harris, 2012). They can be inactive in some circumstances yet with a small change produce a correspondingly large effect on an outcome (Clark, Lissel, and Davis, 2008). There can be multiple causal mechanisms that overlap and they can be enabling or preventive (Kazi, 2003). Modifying one mechanism has the potential to alter the interrelationship with other mechanisms and contexts (de Souza, 2013). That is, mechanisms are influenced by other mechanisms just as they can be triggered or inhibited by different contexts (Hewitt et al., 2012; Ranmuthugala et al., 2011).

Contexts.

Contexts are the spatial and institutional locations of social situations, including the norms, values, prior sets of social rules that affect the individual, and all of the interrelationships between these components (Pawson & Tilley, 1997). In the prison education program described by Pawson & Tilley (1997), some of the contexts identified included the type of crime committed, the prisoner characteristics, prison culture and the prison organization. These multiple contexts combine to influence the mechanisms, leading

to different outcomes. Compared to mechanisms, they are structures in the circumstances of people that typically take longer to change (Kazi, 2003).

Outcomes.

In most RE research, the investigators look at multiple outcomes to determine the impact of several mechanisms acting on different subjects in different situations (Pawson & Tilley, 1997). The conjectured mechanism/context theories are confirmed through an analysis of the outcomes (Pawson & Tilley, 1997). Byng, Norman, and Redfern (2005) conducted retrospective interviews to identify the outcomes "likely to be of importance" (p 73) in their multiple case study research and then for each outcome constructed prototype CMO configurations. They found a multiplicity of contexts and mechanisms that were potentially involved in producing each outcome.

In this research project, there was only one outcome of interest the development of substance addiction, however, there were other outcomes that came to light.

CMO configurations.

Just as with mechanisms and contexts, outcomes cannot be explained in isolation. An outcome is produced through the interaction of a particular constellation of mechanisms and contexts (Kazi, 2003). The rule pertaining to the realist formula of Context + Mechanism = Outcome (CMO) leads to the development of outcome pattern configurations which need to be identified to develop transferable and cumulative lessons from research (Pawson & Tilley, 1997).

To explain and understand programs, a realist evaluation focuses on the linked concepts of the components: mechanisms, contexts, outcome patterns, and context-mechanism-outcome-pattern configurations (Pawson & Tilley, 2004). Identifying mechanisms and their links between inputs and outputs has been referred to as 'unpacking the black box' (Astbury and Leeuw, 2010; Stame, 2004), that is, identifying the mechanisms underlying the relationship between an intervention or program and its effects. Examining the contexts in which the mechanisms operate will help to uncover how mechanisms can be removed or countered with alternative mechanisms (Porter & O'Halloran, 2011).

The objective of RE research is to generalize the findings by identifying the differences and similarities between families of programs, that is, programs designed to address a particular problem (Pawson & Tilley, 1997). In this research, the goal was to look for similarities and differences between participant experiences with sport and PA that might

have influenced the CMOs related to development of substance use, abuse and addiction among individuals in recovery from addiction.

Teacher-learner processes.

Constructing the CMO pattern configurations can best be established through a process of teacher-learner engagement. During many research interviews, the researcher is aware of the full nature of the hypothesis embedded in the interview questions; however, the respondent knows only that they are expected to answer questions (Pawson & Tilley, 1997). To obtain more apposite data, Pawson and Tilley (1997) recommend orienting the participant to the research tack, or direction.

This project began with the identification of the theories that apply to the participants' lives, that is, learning theories, theories of addiction and the roles of PA and sport as they relate to substance use. RE suggests that the most effective way to obtain information from the participants in the context of the theories is to familiarize them with the theories. Therefore, throughout the interviews, I attempted to offer a formal description of the participants' own thinking as it would be explained by the theories in order to optimize obtaining their insider knowledge. The questions and explanatory cues put participants in a position to think about their responses in the context of the investigation. That is, the questions supplied a formula for how the participants made various choices regarding substance use.

Open systems.

The final methodological rule acknowledges that programs are implemented into a dynamic world. This means that there is no clear link between any mechanism and an outcome (de Souza, 2013). Unanticipated contexts and changing causal powers will always exist with the potential to impact even established CMO configurations (Pawson & Tilley, 1997). We live in dynamic environments which makes it impossible to control for the interaction between social systems (Porter & O'Halloran, 2011).

The focus of this research project was the exploration and identification of the mechanisms and contexts related to PA and sport where substance addiction was the outcome. I attempted to identify the mechanisms that influenced substance abuse and to study the interactions among these mechanisms and the various contexts (Ranmuthugala et al., 2011) to describe how involvement in PA or sport contributed to the development of substance addiction.

To best identify what works for whom in what circumstances, the use of multiple data sources is recommended (Pawson & Tilley, 1997). When gathering subjective views of participants where the data source is limited to the subjective accounts of the people recovering from substance addiction, reliability will be enhanced by comparison to other perspectives (Clark et al, 2008). For this research, the only potential secondary data source was input from the counsellors at the treatment facility.

Interview

To gather information on a topic about which little is known, the choice of data collection methods is limited. As with most evaluation research, the best means of data collection is talking to people either in focus groups or individual interviews. The decision was made to conduct individual interviews due to the relatively small group of potential participants and the opportunity that this would provide to develop closeness and intimacy during data collection. The one on one relationship with each participant gave them a better opportunity to share their first hand experiences with PA and sport, and the development of their substance addiction.

At the outset of each interview, I explained my interest in their PA and sport background and the development of their substance addiction, as per the interview guide, which helped the participants to position themselves as they thought about their responses. The roles were then reversed, as I became the learner, striving to understand the experiences as they were shared. The participants framed their responses around the choices that they made and the outcomes they experienced. They easily adopted the role of expert, which was demonstrated through their openness and willingness in talking about their lives and experiences. By adopting the teacher-learner concept, my interactions with the participants were more likely to lead to more informed contributions (Pawson & Tilley, 1997).

A semi-structured interview format allowed the participants to speak freely about their subjective experiences (Rubin and Rubin, 2012; Thorne, 2008). The first question suggested the topic but allowed the participants flexibility in the direction taken to talk about their experiences. The subsequent questions were formulated to follow the flow of the conversation and to gather the desired information. Their wording reflected the information provided in the participant responses and gave the participants' opportunity to explain and clarify their thinking (Rubin & Rubin, 2012), developing both richness and depth (Pawson & Tilley, 1997).

Probes such as physical gestures, or simple questions or comments, were used to encourage elaboration or clarification, and to obtain depth of data (Markula, 2011; Rubin &

Rubin, 2012). They were also used to demonstrate attention, to manage the conversation by staying on topic, to verify understanding, and to confirm the credibility of the information provided (Rubin & Rubin, 2012).

To obtain richness and depth of information researchers should attempt to develop a relationship based on trust with each participant (Rubin & Rubin, 2012). This includes honesty and openness on the part of the researcher and the sharing of personal information where appropriate (Rubin & Rubin, 2012).

The interviews were semi-structured and responsive using questions that were constructed to ensure the topic was well covered (Rubin & Rubin, 2012). The interview guides found in Appendices 4 – 6 served as guidelines and were not necessarily followed in sequence or used verbatim. The guides provided a reminder of what to ask and of what information was required in order to answer the research questions (Rubin & Rubin, 2012).

Pilot Study

The interview guide was developed with the assistance from a faculty member who has expertise with vulnerable populations. Drawing upon her experience in previous research, the interview guide was adapted and then used during practice interviews with six fellow students. The purpose of these was threefold: to assess the effectiveness of the interview guide, to test the audio recorders in an interview situation, and to provide me with practice conducting interviews.

During the practice interviews with fellow students, the expectation was that they would role-play. However, only one student commenced the interview by role-playing; mid-way through the interview she switched to answering truthfully, sharing details about her life. The remainder of the students chose to answer the questions truthfully, openly sharing information about their lives and their substance use histories. Although some had abused substances, none had developed a substance addiction.

The conclusion following the student interviews was that the interview guide was effective in generating responses and that I was comfortable in conducting interviews in this format. I have a background in business where my interviewing experience was of a different style than that used for qualitative research. However, some skills are transferable, such as asking open-ended questions, demonstrating interest and empathy, and being respectful.

Despite the apparent effectiveness of the interview guide there remained a need to interview people in recovery from substance addictions to address the concern that the interview guide might not generate the desired information with the population of interest. Therefore, prior to conducting the interviews at the treatment centre, a small pilot study

was undertaken to address the concern that the interview guide might not generate the information required to answer the research questions, and that the topic might not be engaging to possible participants. The overall goal of the pilot study was to conduct a sufficient number of interviews to represent different levels of participation in PA and sport, and different sports and activities, in order to provide different vantage points (Rubin & Rubin, 2012).

The procedure for each of these interviews was to welcome and thank the participants for their involvement, review the information letter and obtain consent to proceed with the interview. The recorders were then turned on and the interview commenced.

The first interview was with a participant who was unknown to me. Just as would be the case with the subsequent interviews, after the first question was asked, the conversation flowed freely. Each of the participants enthusiastically shared the details of their lives relating to substance use, abuse, and PA and sport. Typically, with very little prompting, they disclosed information about their upbringing, their involvement in PA and sports and their substance use history. The participants easily adopted the role of expert, which was demonstrated through their openness and willingness to share their knowledge and experience with me. The duration of the seven interviews ranged from 48 minutes to one hour and 45 minutes.

The willingness of the pilot participants' to share their stories and quality of the information provided confirmed the suitability of the interview guide for use in the main study. As a result, the data collected from the pilot interviews has been included in the results from the main study.

Participants.

A convenience sample of seven participants was interviewed. Six participants were previously known to me through volunteer work, we were on a planning committee for an event to celebrate recovery from addiction. One participant was invited to participate after he was seen on a television news program talking about his recovery from substance addiction and subsequent involvement in a competitive sport, that is, a sport newly undertaken in his recovery. The participants included 5 men and 2 women, ranging in age from 28 to 61 years of age, who were self-assessed as being in recovery from substance addiction. Their periods of abstinence ranged from 3 years to 29 years.

Procedures.

Written consent was obtained and first names were used according to the participants' preference. Although future contact with some of these participants is likely through our ongoing volunteer work, the content of the interview will remain confidential and no further discussion about the study topic will take place.

Interview procedures.

The interviews were scheduled by the researcher and took place in a private setting on the university campus over the course of three weeks. Two audio recorders were used to facilitate transcription of the interviews. I read the information letter out loud, after which the participants provided their consent to participate, including the use of the audio recorders. The interviews commenced with the first question on the interview guide. Rubin & Rubin (2012) suggest for ethical reasons to remind participants of the presence of the recorders. This was accomplished by touching the recorders periodically throughout the interviews. The interviews were concluded when the participants felt they had no further information to share. The participants were thanked for their time and contributions, then, following a short casual conversation, the participants left.

Main Study

Participants.

With the population of interest being people with substance addictions undergoing treatment for their addiction, access is typically very restricted due to the confidential nature of addiction treatment programs. However, access to the patients at a treatment center located in Western Canada provided a convenience sample.

Through ongoing communication with the Program Director (PD) at the treatment centre, I knew the number of potential participants would be limited due to the varied duration of treatment and the voluntary nature of admission and discharge. Participation was restricted to those people who had completed 30 days of treatment. The PD suggested that this would ensure that the participants were sober, stabilized, receptive to sharing, and that their recall had been refreshed through participation in treatment.

Participant recruitment.

Through regular communication with the PD, the purpose of the study and the methods were clearly explained and supported by written documentation. The inclusion/exclusion (see below) criteria were developed with input from the PD.

Care was taken to ensure that potential participants did not feel obligated to participate and that they understood participation was completely optional and voluntary. All participants who satisfied the inclusion criteria and who expressed interest in the study were invited to participate. Their participation was limited only by their availability during the time scheduled for conducting the interviews.

***Inclusion criteria*.**

The inclusion criteria were individuals who: 1) were over 18 years of age (age 18 is the minimum age at the treatment facility), 2) had met the facility's criteria for substance addiction, 3) had completed detoxification and were sober, 4) had completed 30 continuous days of treatment at the facility where the interviews took place, 5) were deemed competent to provide meaningful input, 6) staff had deemed participation to be appropriate for the person and unlikely to cause distress, and 7) had provided informed consent.

***Exclusion criteria*.**

Exclusions from the study sample included: 1) those identified by the PD for whom participation would be inappropriate for any reason 2) those who had not completed 30 days of treatment 3) those who met the inclusion criteria but were not available during the scheduled times.

Secondary data source.

Due to the priority of counsellors to attend to the needs of the patients, their availability was limited during the days that I was on site. Three interviews were scheduled with counsellors but were subsequently cancelled to allow them to deal with patient situations. Therefore, the secondary data source was limited to the content from an interview with one counsellor who provided a broader perspective about patients' experiences. However, as explained by Clark et al. (2005), the absence of multiple data sources does not preclude obtaining good information.

The participants from the treatment centre included one counsellor and 13 patients. The patients included 9 men and 5 women between the ages of 20 and 59 years. In total, including the participants from both the pilot study and the main study, there were 21 individuals. Table 1 shows the demographics of the participants, excluding the counsellor.

Table 1 - Participant Demographics

Participant	Gender	Age	Sport	Level of Sport	Drug of Choice*	Age abuse began
Participant 1	Male	37	Hockey	Junior A	EtOH	16
Participant 2	Male	32	Basketball	H.S. Varsity	CM	12
Participant 3	Male	28	Badminton	Jr. H. Varsity	CM	12
Participant 4	Male	61	Hockey	AAA	C	13
Participant 5	Male	33	Various	Casual- school	CM	16
Participant 6	Female	33	Dance	Competitive	MJ	18
Participant 7	Female	59	Various	School	EtOH	13
Participant 8	Male	Unknown	Dirt bike	Professional	Rx	13
Participant 9	Male	30	Hockey/ Soccer	Varsity	MJ	13
Participant 10	Male	40	Rowing	H.S. - International	EtOH	18
Participant 11	Female	28	Soccer	College Scholarship	Crack	18
Participant 12	Male	59	Gymnastics	Provincial	C	12
Participant 13	Male	46	Various	Recreational	EtOH	18
Participant 14	Female	40	Various	Recreational	EtOH	14
Participant 15	Male	28	Hockey	Junior A	C	16
Participant 16	Male	Unknown	Hockey/ Soccer	AA	EtOH	14
Participant 17	Female	25	Karate	Black Belt	EtOH	15
Participant 18	Female	28	Various	Recreational	EtOH & MJ	15
Participant 19	Male	20	Various	Recreational	EtOH & C	15
Participant 20	Female	42	Fastball	Competitive	EtOH	13

*** EtOh - alcohol, CM-Crystal Meth, C-Cocaine, MJ-Marijuana, Rx - Prescription**

Ethics

The University of Alberta Health Research Ethics Board approved this research. Participation was voluntary. Participants were advised of the purpose of the research, the reason for their participation, the expected duration of the interview, and their right to withdraw from the research at any time. Informed consent took into account the five essential elements of competence, disclosure, understanding, voluntariness and consent (Beauchamp and Childress, 2013). Extra care was taken to ensure that participants felt comfortable with the decision to participate, as they are considered to be members of a vulnerable population.

Procedures

Confidentiality throughout this research project was of the utmost concern. Due to the nature of the treatment facility, everyone entering is required to complete a confidentiality agreement. The interview was the only contact that I had with any of the participants, that is, there will be no future interaction with any of them.

This study was non-intrusive, non-deceptive and did not endanger the participants physically or emotionally. The PD had provided assurance that since the tough questions had already been asked during treatment, the proposed research questions were unlikely to prompt strong emotions. Tears were shed during some interviews but the emotions were controlled. A counsellor was always close at hand should assistance have been required.

Each participant was given a $10 credit for use in the on site store. The credit, which was intended as a thank you for participation, was given to the participants at the outset of the interview to prevent it from being seen as a conflict with the consent.

Data collection.

The PD introduced me to the patient community at the end of a group session on the morning that I arrived at the treatment facility. The introduction provided an opportunity to present a brief overview of the research and served as the first step in developing a connection with potential participants.

Interview procedures.

The interviews were scheduled by a staff member and took place on-site at the treatment facility. The number of interviews per day ranged from one to four. Although there was the risk of interviewer fatigue on the busier days, it was necessary to conduct the

interviews when the participants were available. While I did feel emotionally drained after conducting multiple interviews, during the interviews, I was so fascinated by the participants' stories that there was no difficulty in remaining attentive.

The interviews were scheduled around the daily programming and most took place in the staff meeting room. On a few occasions when impromptu meetings were required, making the room unavailable, the interviews were conducted at a picnic table outside.

To accurately capture the interview and to provide back up, two audio recorders were used.

Developing rapport.

During the interviews I was fully prepared to respond to any inquiries regarding my personal connection to either substance addiction or the treatment facility, however, none were asked. The participants were all completely focused on sharing their stories and thus made no inquiries. I was, however, able to demonstrate familiarity with the participants' world through explanations made either in response to their comments or in formulating questions. This helped to generate responses that went beyond a superficial level and provided more depth of information (Rubin & Rubin, 2012).

Field notes.

Following the interviews, I made notes that included my impressions of the interview, ideas and thoughts about what was heard, and observations about the participants that were useful when reviewing the transcripts (Mayan, 2009). When time permitted, the notes were made immediately following the interview, however with many back-to-back interviews, it was often necessary to capture the field notes at the end of the day. The comments about the participants included their appearance, their tone of voice and demeanor during various stages of the interview. The notes also included oversights and things that should have been asked during the interview (Mayan, 2009; Olson, 2011). Reviewing these notes was useful in preparing for subsequent interviews.

Reflexive journal.

The use of a reflexive journal is a deliberative strategy considered to be both a criterion of rigour and a tool to promote the quality of the research (Darawsheh, 2014). It enhances a researcher's self-awareness by facilitating an internal dialog as the researcher evaluates thoughts and feelings about the information being gathered (Jasper, 2005; Mayan, 2009; Olson, 2011). Reflexivity takes into account the integral part that the researcher plays in the collection of, interaction with, and analysis of the data (Jasper,

2005; Mayan, 2009). It is an introspective process through which thoughts are brought to a conscious level creating an awareness of their influence on the research process (Darawsheh, 2014). To acknowledge the subjective nature of qualitative research, researchers need to be aware of their influence on the participants and the mutual influence between the researcher and the participants, as these have the capacity to guide the research process and affect the findings (Darawsheh, 2014).

Maintaining a reflexive journal provides for a continuous process of self-reflection and enables researchers to generate self-awareness about their actions, feelings, reactions, perceptions and hunches and can lead to the emergence of different perspectives (Darawsheh, 2014; Jasper, 2005; Peshkin, 1988). Studying personal reflection draws attention to the decisions and interpretations made throughout the research process (Jasper, 2005; Mayan, 2009).

Data Analysis

There is no single analytic method that is recommended for RE research. In fact, there is very little instruction available beyond creating a design to suit the proposed theories and the available data (Pawson & Tilley, 2004). With the goal of this RE research being to identify the contexts and mechanisms in the role of PA and sports where the outcome is substance addiction, the starting point was to initially identify themes that could then be categorized into contexts and mechanisms. The task of analyzing the massive amount of data was daunting, particularly for a novice researcher. It was a much larger task than had been anticipated and it was very much a task of learning by doing. Dr. Wendy Rodgers, my supervisor, and Dr. Camilla Knight, who has expertise in qualitative research, provided assistance.

The analysis of the data took place concurrently with the data collection. That is, the analysis of the completed interviews began upon the conclusion of each and before all of the interviews were completed. The first step was to listen to the recording of each interview. The data files from each recorder were then uploaded to my computer. For back up purposes, they were then shared via confidential and secure Google Drive with my supervisor.

Once all of the interviews were completed, I transcribed the twenty-one interviews using Transcribe software by Wreally Studios. This product offers a dictation feature that allows for the simultaneous listening to and dictation of the content of the interviews, a useful tool in creating the first drafts of the transcriptions. Editing the first drafts while listening once again to the interviews produced the second drafts. The final verbatim transcriptions were created by reading through the transcriptions once again while listening

to the interviews. Stripping the final transcripts of any identifying information and replacing the participants' first names with a participant number created a blinded set of transcriptions. These blinded transcripts were shared with a committee member and another researcher.

While reviewing the transcripts a summary sheet was created for each interview noting the demographic characteristics, each participant's PA and sport involvement, and their substance use history. This summary was used to create a data matrix, the first step in identifying the contexts or mechanisms, and was reviewed with my supervisor and a committee member.

In order to more thoroughly tease out the contexts and mechanisms, sticky notes were used to record themes while listening to and reading the transcriptions. The theme and the participant name were recorded on each sticky note, which were then grouped by theme on a large sheet of paper. The groupings were ultimately categorized into contexts or mechanisms.

Through regular discussions with my supervisor and using the themes identified during the initial phases of the analysis, the main headings were established for the contexts and mechanisms (enabling and protective mechanisms). Sub themes (lower order) were then noted beneath each main heading in order to identify the key factors that appeared to contribute to the substance addiction.

To identify the patterns across participants, a visual display was employed. A matrix was created to show the contexts and mechanisms associated with each participant along with supporting quotations (Kazi, 2003). This facilitated the presentation of the findings.

Rigour.

The production of high quality research requires that the findings be reliable and valid, however with the presence of subjectivity and creativity in qualitative methods, there is no single guideline to follow (Morse, Barret, Mayan, Olson, and Spiers, 2002; Trochim & Donnelly, 2008; Whittemore, Chase, and Mandle, 2001). Cresswell (2007) suggests that validation in qualitative research is more of a process than verification, and that it attempts to evaluate the accuracy of the findings described by the participants and the researcher. Rigour can be incorporated into the research process through the use of verification strategies that include "checking, confirming, making sure, and being certain" (Morse et al., 2002, p.9). This meant incrementally identifying and correcting errors throughout data collection by maintaining a focus on the thoroughness of the data and it's fit with the proposed questions.

I employed a number of recommended strategies throughout this research. These included the concurrent collection and analysis of data, use of audio recorders to accurately record the interviews, capturing field notes, the use of a reflexive journal, and triangulation which included the use of a secondary data source and multiple researchers reviewing the themes.

Beginning the data analysis prior to the completion of the data collection phase provided the opportunity to make changes. While listening to the initial interviews, it was noted that open-ended questions could have been used more effectively and that some probes were not ideal. Awareness of these issues allowed for improvement in conducting subsequent interviews.

The use of a secondary data source was the interview with the counsellor. The counsellor has both the formal education and the hands on experience of working with patients. This expertise combined with his sports background enabled him to validate some of the information shared by the participants.

Credibility in qualitative research, which is comparable to validity in quantitative research, refers to the accurate portrayal of the participants' stories (Trochim & Donnelly, 2008). The use of audio recorders to assist with transcription, in conjunction with the contents of the field notes and the reflexive journal, also contributed to the credibility of the research (Mayan, 2009; Olson, 2011). Listening to the interviews multiple times allowed me to become very familiar not only with the content of each interview but with the tone of voice and inflection used to deliver the information. Complimenting this with my field notes and comments in the reflective journal allowed me to provide a more accurate reflection of the participants' experiences (Whittemore et al., 2001).

The use of the audio recorders and the resulting verbatim transcripts also enabled me to provide thick and rich data. The accompanying descriptions inform the readers allowing them to draw their own conclusions.

Researcher bias was addressed by providing comments on my past prejudices, biases and experiences that could influence my interpretation and approach (Cresswell, 2007). This was complimented by the use of a reflexive journal that improved the transparency of my subjective role while conducting the research and when analyzing the data. The awareness of my reactions to the participants' stories and how this influenced the information contributed to the audit trail linking the personal nature of the writing to the final results (Darawsheh, 2014; Jasper, 2005).

Triangulation was further incorporated through regular discussions with my supervisor as I worked through the transcripts to identify emerging themes. Additional

input came from a comparison of themes and the categorization into contexts and mechanisms by both my supervisor and another researcher (Dr. Knight). Their input was discussed and used to refine the identification of the contexts and mechanisms.

Throughout the project, I acknowledged my centrality to the research process as it contributed to the legitimacy of my work (Jasper, 2005). Dependability stems from truthfulness, which has been demonstrated through the creation of an audit trail and the transparency of process.

Chapter 4 Findings

Introduction

This chapter presents the data that were obtained from the interviews with the 7 participants in the pilot study and the 13 patients and one counsellor at the treatment centre in the main study. Some participants had common experiences but overall they were a diverse group of individuals who followed various paths resulting in their substance addictions.

All of the participants had engaged in some form of sport and PA with the level of involvement ranging from limited or sporadic to a very high level of competition. It was not unusual for the level of sport or PA to wane and at times disappear during the most active stages of addiction. None of the participants were completely inactive or chose to be inactive except when they dropped out as a result of escalating substance use. For many of the participants, there was a common perception of a link between participation in sports and substance use to the extent that some viewed substance use as an integral part of particular sports environments.

The participants were categorized as being a part of one of four groups: 1) those with limited PA backgrounds, 2) those who played recreational sports throughout childhood, 3) competitive athletes, and 4) competitive athletes who lost their sport. Among these groups there were some similarities in the contexts and mechanisms but there were many more differences.

In RE, the objective is to determine what works for whom in what circumstances (Pawson & Tilley, 1997). The outcome of interest in this research was: the development of substance addiction. Also, I wanted to identify the contexts and the mechanisms that were perceived to prompt substance use and then led to substance addiction. The process of determining what was a context and what was a mechanism was not obvious. The main contexts that were identified were the social acceptance of alcohol, heritability of substance addiction, family influences, school culture, sport culture, role models and the loss of sport. The main mechanisms identified that when activated led to behaviours resulting in the development of substance addiction were personal characteristics, coping strategies, the availability of substances, and relationships.

Figure 1 Relationship of Main Findings

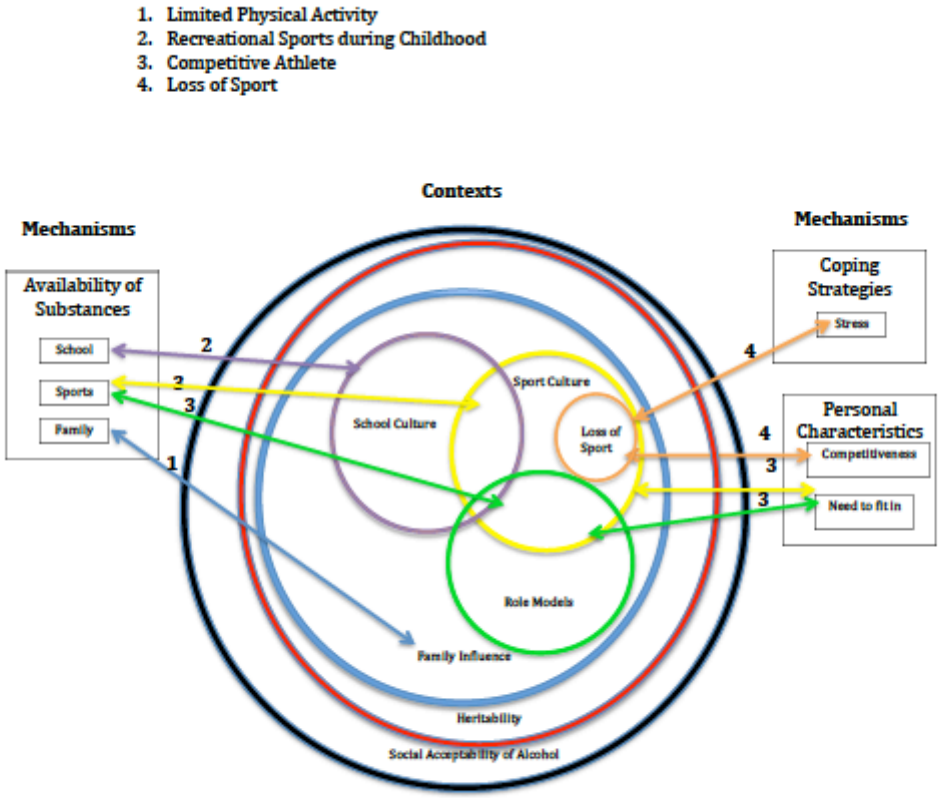

Figure 1 shows the relationships between the main contexts and mechanisms for the four groups of participants. The contexts are presented as they relate to one another, with some being subsets of the others. The outermost ring represents the context of social acceptance of alcohol as it had the most wide reaching effects; almost all of the participants abused alcohol at some point in their lives, it was the most common substance first used, and alcohol was the drug of choice for 10 of the 20 participants.

Heritability of substance addiction was described by all but one of the participants. The extent of the family history of addiction covered the spectrum from one relative to a large number of relatives on both sides of the family.

The presence of the other four contexts varied between the four groups. The following is a brief description of the relationships between these contexts and the main mechanisms for each of the groups.

Group 1 – Limited Physical Activity

When family influence was the reason given for only limited involvement in physical activity, the availability of substances from family appeared to be the main mechanism leading to the development of substance addiction. Although not limited to this group, when some form of dysfunction and/or abuse was described in the family, this appeared to be a factor in activating the personal characteristics of low self-esteem and the need to fit in.

Group 2 – Recreational Sports in Childhood

Several participants engaged in sports at a recreational level throughout their childhoods, typically encouraged by their parents. However, upon reaching high school, their limited attachment to sports was overshadowed by the more sedentary school culture, which became more influential. The new relationships and the availability of substances led to substance abuse and then addiction.

Group 3 – Competitive Athlete

The participants who were committed to their sports were most strongly influenced by the contexts of sport culture and the role models on their sport teams. These contexts appeared to activate the mechanisms of the availability of substances and the personal trait of a need to fit in.

Group 4 – Loss of Sport

When some of the competitive athletes lost their sport for varying reasons, the presence of the personal trait of competitiveness in the absence of an effective outlet for that trait, and the absence of coping strategies were activated leading to substance abuse and subsequent addiction.

Contexts

Context refers to the location or circumstance as well as a prior set of rules, norms and values, and the interrelationships among these components (Pawson & Tilley, 1997). The participants grew up in communities and families creating unique personal histories that formed their social context. Their participation in PA and sport added another dimension. The context that had the most widespread effect was the societal acceptance of alcohol.

Societal acceptance of alcohol.

"Alcohol is the world's most abused drug because it is the world's most socially tolerated drug" (Dupont, 2000, p 137). It is more widely used than any other abused chemical and is "the world's most devastating drug" (Dupont, 2000, p137). It is therefore not unexpected that alcohol was a substance abused by most of the participants and for 10 of them it was their drug of choice for abuse. The availability and acceptance of alcohol in society makes it difficult to avoid. Its use by role models such as parents and members of sports teams perpetuates the use and abuse of alcohol and was often the impetus to the decision by several participants to initially consume alcohol.

Acceptance of alcohol at home.

As the most widely used substance, it is not unexpected that alcohol has a place in many homes. For most of the participants, their first exposure to alcohol was in the company of their families. Alcohol use in the home created the first perception of alcohol use as socially acceptable. For example, Participant 10 was exposed to alcohol at a young age although he did not abuse it until many years later.

> Participant 10: I had my first drinks when I was, oh, probably 6 or 7, I'd have a glass of wine at dinner.

Participant 20's experience was different. Although she started drinking with her family at an older age than Participant 10, her parents supported and even encouraged her alcohol use.

> Participant 20: It was how I was raised, I'd been drinking since I was 13, it's normal nobody's ever said anything to me about it, right? So, I don't know what you're seeing and what your problem is, but this is normal. This is how you live, this is life this is real, right, it's, its fine…at 13 I was actually going to this bar. And it's funny, well not funny, but it is funny, because my dad would drive me there, knowing full well that I was going to drink and get drunk and dance and so he would drive me there and pick me up at midnight.

For those in recovery from alcohol addiction, the social acceptance of alcohol makes it difficult to avoid.

> Participant 2: Through my process of addiction and trying and attempting to be clean, I've done, I've done many rehabs, ah I think 5 or 6 in total, I can't even remember how many, so that tells you how many! Um but um but through that process um, because it is such a socially acceptable thing in [province], as well as with my family… And it [alcohol] was never really my[drug of choice], ah, thankfully because I meet youth at [agency] and ah, ah other various people that alcohol is their big thing. And it's everywhere, you know. Like it's so you know, I can avoid [part of town] and all the drug dealers and you know all that stuff, but how do you avoid booze?

Acceptance of alcohol in sports.

Sports teams often have implicit standards of behaviour, including substance use.

For example, Participant 16 described the culture of drinking on his hockey team in a competitive league.

> Participant 16: For senior men's hockey that I just recently started playing last year, um, drinking was a big part of it, actually. Like, after the games there would be a big cooler full of beer and on bus trips we'd drink on the bus the whole way back.

Participant 20's comment was indicative of the culture of drinking on her team where everyone was a willing participant in team drinking.

> Participant 20: … it was what we did, it, it went hand in hand with baseball. You didn't play ball without drinking, and you didn't drink without playing ball.

The widespread social acceptance of alcohol in some adult recreational sports is evident through what the participants referred to as "Beer League," where drinking alcohol was as important as playing the sport. As the name "beer league" implies, drinking was integral, not just accepted but encouraged. The participants provided examples of their participation in hockey and baseball beer leagues:

> Participant 9: It [drinking] carried on, but then I started playing slow pitch and stuff like that and it was a drinking team, like you'd drink in the dugout and hit a couple balls and you know, go to the after party with the guys to the bar or whatever. It was more of a social thing than actual baseball.

> Participant 12: I played baseball forever, um but it wasn't until about in my twenties that drinking was encouraged at baseball. We played, sigh, in well they call it a beer league, so everyone always took a cooler of beer to games and yeah if by the end of the game, we weren't intoxicated, then you weren't playing hard enough!

With alcohol so much a part of adult recreational sports, a problem is created for those who wish to be active in sports and yet abstain from alcohol use. Participant 14's drug of choice is alcohol and during her interview as she talked about her physical activity options following treatment, one choice would be softball. However, being new in recovery, she expressed concern about joining a team.

> Participant 14: I know that there's some leagues that, you know, you can play softball or slow pitch or whatever…but what I worry about that, is that a lot of those, um, leagues that I know of, you know, drinking is a big part of it…that can be a big thing involved in that, is the, you know, the drinking after or during. And that's, I want to be away from, you know.

The social acceptance of alcohol not only sets the stage for future alcohol use and abuse but its integration into so many facets of society creates a challenge for those wanting to live without it.

Heritability.

Classifying heritability as a mechanism or context presented a challenge. Although the predisposition to addiction is thought to be genetic, heritability appeared to act mechanistically. That is, for the 19 participants who described having a family history of addiction, their own addictions developed following the interaction with other contexts and mechanisms. That is, the predisposition to addiction may have existed but it only developed when substances were available and used in the company of influential people such as family members, peers at school and teammates.

The extent of substance addiction in the families varied; that is, a parent was afflicted, or addiction appeared to skip a generation, addiction existed on only one side or both sides of the family, the extent of addiction ranged from one or two relatives to multiple relatives. Most of the participants also had siblings but only a few of them were thought to have substance addictions. Some even described their siblings as having an aversion to substances as in Participant 14's description of her sister:

> Participant 14: … and my sister was much more like that. It's like I don't know if some people just, you know, they just don't have a taste for it [alcohol], or they just don't see what other people see out of it, you know. Even social drinkers…whether it's, and it's not a problem, their alcohol use. Just as, my mom has never cared for it. And my sister's much more like that.

At the treatment centre where the interviews took place, it is so rare to have a patient without a family history of addiction that anecdotally a doctor on staff said that when a patient cannot describe a family member with an addiction, "they have not looked hard enough."

Heritability as a genetic predisposition appeared through the interaction with mechanisms and other contexts and possibly influenced the participants' choice to use substances and the development of their addiction.

Family influences.

In this research, family influence is used to describe the family environment and the relationships amongst the family members. The descriptions of the family environments provided by the participants covered the spectrum from traditional two parent families that were secure and loving to what a couple of participants felt were chaotic lives with a single

mother in active addiction. Several participants described varying degrees of perceived "dysfunction" in their families, with some providing detail about the nature of the dysfunction and others simply describing their family as dysfunctional. Some participants talked about the role of sports in helping them to escape their family environments.

> Participant 17: It was an escape before, you know, it was the only escape I had…At that point, it probably was healthy because you know it gave, both my sister and I some time away from our family. Our family was very dysfunctional. … Um, a lot of mental health problems. My eldest sister um has borderline personality disorder, very bad. Um, so she was just, utter chaos…Like at home I never, there was always, watching over my shoulder because I always felt that I was doing something wrong.

Although Participant 8's parents started him in dirt biking when he was 3 years old, he said their level of support and interest declined; they stopped going to his races when he was about age 9. His participation in sports provided an escape from family and also served as his introduction to substance use.

> Participant 8: With Tylenol 3s, and then by the time I was 13 yeah it was every day, prescriptions were heavier… Yeah I could ride my bike and I was higher than a kite and I didn't hurt anymore, so I liked it a lot. …so I just used that, the drugs stuff and then I used my bike has an addiction. Like sports were an addiction for me too, because it was a way to run away…

Three of the participants experienced living in multiple family situations as a result of the dysfunction in their families. One participant lived with an aunt temporarily. Two of the participants were born to single mothers who had unstable living arrangements. Participant 3's interview began with him talking about his mother coming to take him to live with her once again, away from the home with his stepfather. He did not mention at what age or why he had stopped living with his mother. It was returning to live with her that marked the beginning of his substance use.

> Participant 3: It [substance use] wasn't at school; it was actually with my own family. Cause ah, when my mom came to, when my mom came to [province] to pick me up and bring me back to [city], she [pause] I remember her telling me that we're going to live this great life together and she wanted to see me grow up, and she wanted to see me graduate, and [pause] when I was introduced to [city], not only am I a country kid introduced to the city and I'm scared, I don't know anybody, I have family here, but I don't know any of my family. I have no friends here; it's all brand new. It was very scary, very intimidating. And then to find my mom's household as soon as we walked in, it was a party house...She would leave for days on end, she would be drinking, she'd come back piss drunk.

During his childhood, the only time Participant 5 enjoyed a period of stability was in his junior high school years while living with his uncle and his family. When his uncle's

marriage broke down, Participant 5 chose not to move with him from [city] and began living with foster families. It was in the foster homes that his substance use career began; the stage had been set during his early years with his mother. As an adult in recovery, Participant 5 has accepted his mother for who she is, but as a child, he had no positive comments about his life with her.

> Participant 5: Um, [pause] for a long time I was embarrassed, about being with the family I was with and I wished with all my might that I would be with another family and [long pause] yeah, it was just, it was just stupid. I, I always thought it was just stupid…Um, my mom's an alcoholic…

Mental illness.

Dysfunction in some families was the result of the presence of mental illness in the immediate family. For example, with a history of mental illness in her family, Participant 17 said that she and her three siblings were encouraged to go to counseling of their choice. She had developed an eating disorder but had not yet started abusing substances. Although her parents arranged counseling and then sent her to a residential treatment facility for eating disorders, Participant 17's problems escalated, ultimately leading to her substance abuse and addiction.

Participant 7, who as an adult was diagnosed with anxiety disorder and depression, provided the most extreme example of mental illness in a family.

> Participant 7: …the easiest place to start with would be 13. Um, I remember the first time I used drugs that my mother had attempted suicide the day before and had been taken away to a, the hospital in an ambulance and was placed in intensive care and we didn't know whether she was going to live or die. And I was, I had to go to school. I also had to tell my [younger] brother and sister what happened, um… She had attempted many times before, but this was the first time that I have a real picture of myself…

Abuse.

The majority of the participants experienced one or more forms of abuse by a parent. There were several examples of physical abuse but the most commonly described form of abuse was psychological maltreatment.

> Participant 4: His [father's] way was an open hand if you rebelled and so I got lack of hearing in one ear because of being swatted a couple of times on the ear.

> Participant 5: …my mom was very emotionally abusive, emotionally, mentally and physically abusive to me…

> Participant 19: Um, it [relationship with father] was good for the most part he didn't take any shit. …um more like psychologically abusive though, like

> you're stupid, you're never going to graduate, you're a loser, you're an idiot. Um, I don't know if that's because he never graduated.

> Participant 16: Ah, I wouldn't say he [father] would get angry, but he would definitely criticize me a lot, to where it really bothered me. Cause I was young and I wanted to be as good as the other [soccer] players, and when he criticized me he would bring up how good the other players were. And that's my dad, so I took that really hard and it would make me super angry, very angry.

Participant 20 was not explicit in describing the abuse from her father.

> Participant 20: …and, and my dad just has unhealthy ideas about things…there are no morals, um or there are boundaries and lines that should never be crossed, that were crossed.

Family relationships.

An important component of family influences were the relationships within the family. Although there was some mention of their relationships with siblings, more prominent were the participants' relationships with their parents and the influences that their parents had on their lives.

> Participant 3: I was always pissed off with my family. I was angry at them for a number of reasons. I hated my mom. So when, when I throw in all those elements, you know what, I probably would still continue smoking weed just so I could escape, right? It was an escape factor, too.

> Participant 17: We had parents that were very hard to please and we both [sister] found sports, as, you know, they'd be so proud of us. And when I couldn't do it [karate] anymore, they weren't proud of me anymore. I didn't feel like they loved me anymore.

Some of the participants made specific references to their fathers. Two participants who held their fathers in high regard described making some decisions to please their fathers. However, it was the negative relationships that other participants had with their fathers that seemed to contribute to substance use. For example, Participant 13 described his reaction to the behaviour his father displayed during his childhood.

> Participant 13: Ah, so glad he stopped to drink. He was my best friend when he died. Yeah. He was my, I loved my father but I didn't like the way you act. So he has a lot of regrets, what he did to me, so. I was the middle child, I was very sick when I was young; I was not able to help him. I'm not good too, with my hands.

Surrogate families.

For some participants who had problems while living with their family of origin, refuge was found by living with a surrogate family. Two participants had positive experiences while living with new families and both feel they benefitted from this period of

stability. Participant 5 described the first and only time in his life that he enjoyed stability and a healthy home environment; living with his uncle during his junior high school years. This relationship played a significant role in helping Participant 5 to change later in his life and recover from his addiction.

The most stable families described by some of the participants had loving and supportive parents, and good relationships with siblings. However, despite the apparently stable home environments, these families were unable to prevent the participants' substance addiction from occurring. Some families lost contact or chose to stop contact with the participants, considering the participants' behaviours as unacceptable when they were active in their addiction.

The context of family was given consideration because all of the participants had a family history, the first social unit to which they were exposed. The relationships within the family provided some clarity about the development of the participants' substance addiction and their journeys to recovery. Their home environments were presented as ranging from deprived to privileged, and from completely dysfunctional to secure and loving. While the dysfunctional aspects of families seemed to have more of a connection with the development of the participants' substance addiction, the more functional home environments did not prevent addiction from occurring. Negative relationships with family members, particularly parents, created the need to escape or the need for external comfort. Conversely, positive relationships with parents might not have prevented substance use and subsequent addiction, but the ongoing support from parents was always in the back of the participants' minds. They knew that they always had someone they could turn to for support. It was during recovery that the more positive home environments seemed to have a greater influence. However, all but two of the participants who came from the most difficult family backgrounds also had a family member(s) who was able or available to be involved in their recovery process.

Role models.

The most influential role models described by the participants were family members and those in the team environment associated with their sports.

Family.

The family environment provided the first role models for the participants. Included are members of the nuclear family, extended family, surrogate and foster families. The participants described both positive and negative role models.

The positive role models either curtailed or delayed the participants' substance use. As a preteen, Participant 17 developed an eating disorder. The influence of her family helped her to avoid substance use during the progression of her eating disorder and exercise addiction.

> Participant 17: I had known for a long time um about their correlation because of the eating disorder world. There is such a, you know, kind of like, hint, hint, nudge, nudge; if you do cocaine, if you do speed, you'll lose weight. And because I'd been raised very conservatively in [city] you know, drugs are bad, I had tried very hard actually to stay away from it, you know. I dabbled in the, you know, the laxatives, diuretics and all that stuff, but I was like no, like I'm not gonna touch the drugs, and I just, I just caved one day.

With a history of alcohol addiction in the family, Participant 1's father tried to protect his family.

> Participant 1: My dad, um protected us, our family, he never really let us see that side of, the world, which we're very fortunate for I think. Um, yeah, we didn't, yeah, we didn't, we were never, we were never around it. We knew that my dad's dad was an alcoholic. We knew that my uncle was an alcoholic. And, we just weren't around it.

After he started abusing alcohol, Participant 1 developed anger issues and accompanying undesirable behaviour. When he contrasted his behaviour to the way his parents lived, it added to his already negative self-perception. Participant 2 described his parents as adult children of alcoholics who did not learn to manage their feelings, passing along the inability to express or manage emotions. He dealt with his emotions initially through sports and then through substance use.

Some participants had parents who were active in their addictions and they shared a common reaction:

> Participant 13: …all the time I saw my dad he had all the beer in his hand...when he was drunk, he would get mad. So, I said I'm never gonna be like him.

Participant 12 started drinking in his teens; his alcohol and other drug use escalated in the years that followed but he stopped drinking when he recognized the positive outcome of his father's sobriety.

> Participant 12: Um, I had no control over anymore and um, my father was an alcoholic and he had quit 4 years before me and I saw what it had done to his life, and…my mom and his relationship, and I wanted it… I wanted health and, guilt free life, and a good relationship.

He is now 59 and had quit drinking at age 35. He was in treatment as a result of a recent relapse on heroin following a traumatic experience.

Participant 10 did not say that his father was addicted to alcohol, only that his father drank heavily. Drinking with his father started at a very early age when he was served wine on special occasions, and it continued as he got older.

> Participant 10: I knew that my father drank heavily and that also was the starting point for me as well with drinking, cause we didn't talk much and, but if he opened up a bottle of scotch, and we sat down, my tongue would loosen up and we would talk freely, and yeah, so.

Participant 11's first addictions an eating disorder and exercise addiction, were the result of her response to her father's heart attack when she was age 12.

> Participant 11: …Yeah, diabetes, heart disease, um, overweight, he ended up getting a leg amputated cause of his diabetes. Um, and I didn't want to be like my dad, you know, so I went to the other extreme. And thought in my, somewhere in my deluded brain, I was just like, this is how I need to be healthy, right? So my conception of all that has been messed up from since a young age, right?

Participant 5 and Participant 3 started using drugs after watching family members.

> Participant 5: …She's [mom] an alcoholic so there's lots of parties and stuff…I visited my mom, one of the boyfriends who…he was around for the longest…turns out he was a crackhead living in a crack den… So I'd rather just spend time with him just doing whatever he's doing, than not spending time with him. And um, it was curiosity again.

Participant 3 chose to leave his mother's home to move in with his aunt and older cousin into what he thought would be a healthier environment.

> Participant 3: … and I guess it was also a bit of glamour that I seen with it[selling drugs], cause when my cousin was selling, I seen all the different girls he had, and I seen the money that he had, and I seen that cars…I seen the different cars he would have, right?

The family role models appeared to have a substantial influence on many participants' substance use. For many of them, the family role models set the stage for future abuse and for those included in Group 1, observation of family role models led directly to their substance addiction.

Team.

The participants who were most involved in sports described the importance of feeling a part of their teams. For those who had worked hard to be a part of the team they did what they felt was necessary to be accepted. Often established behaviours were exhibited by the more experienced and usually older teammates. Other people affiliated with the teams also modeled influential behaviours, such as coaches and the parents of other teammates. The behaviours of these other individuals influenced some participants' decisions to try substances. The following quotations describe some of their experiences.

> Participant 1: Um, rookie [hockey team] parties, ah, going out to the bar when I was 16 years old…
>
> Participant 9: It's like the varsity hockey team or the varsity football team, or like the varsity soccer team, they're like the cool kids. And everybody sorta like looks up to them a little bit, you know what I mean? Even if you didn't look up to them, you did, right? Cause, like when I was younger, I looked up to them. But these are the kids that are you know, experimenting early. Cause they go to parties, cause they have their own parties, they throw their own parties
>
> Participant 16: It was definitely passed down because you feel like you have to live up to the older guys' expectations, there's a 3-year gap in between… we'd always be invited [to parties] and we really tried to live up to the, to the standards they were setting.

And a few years later, the trend continued when Participant 16 and his friends became the role models.

> Participant 16: Um, my group of friends, we were the older players and ah, everyone else kinda looked up to us which is kind of a scary thing …And the younger crowd, they didn't really drink, and they didn't really do any of that but as the years went on, they, they'd started drinking just as much as we did.

Only one participant made reference to the role of coaches regarding the team's substance use, providing examples of both a positive and negative role models.

> Participant 9: The coaches played like a role model role. Um, they, we tried to hide it from them, but they seen it. Um, like they're not our parents or anything, they can't, they might bench you for the game, right? But they, they didn't look too bad upon it. Like I know a couple of my friends got caught smoking weed before the game and they benched them for the whole game. So they were sitting in the arena, like their tie and suit and stuff but they weren't, they weren't in gear, but that's all they did, they never told the school, right?

Participant 9's experience in playing on the AAA baseball team was different. As a teenager travelling to out of town baseball tournaments, he observed the coach and some parents' behaviour.

> Participant 9: … and the parents would just drink and socialize while we all swimmed and burned off some extra energy. I know one of my coaches was a, yeah he was a drunk, big time drunk, he'd show up to the games still stinkin' like alcohol.

Role models also influenced some participants' perception of normal drinking as indicated in the following comments made by two of the participants.

> Participant 20: …we [the baseball team] wouldn't drink heavily, we would have maybe 3, 4 beers or something and you weren't allowed to drink during the games.
>
> Participant 9: My grandmother is like 84 years old so yeah, I think she was just drinking the beer, I don't think she liked it, she was just doin' it cause she was being sociable, right? Um, she'd have like 3 or 4 maybe beers.

While there were a few examples of positive role models that helped discourage or delay the initiation of substance use, most descriptions of role models pointed to an enabling of substance use. The experiences with sport affiliation generally tended to promote substance use.

School culture.

All of the participants were exposed to substance use during their school years but the influence of the school culture varied. Some participants indicated that a certain aspect of school culture was very influential in their substance use career, it was not mentioned by others. The positive influences of school culture came from strict or very structured environments. Participant 10 mentioned that his boarding school environment was strict and was successful in curtailing his substance use. Another participant said that he had been smoking and using drugs for a few years, but that he stopped while involved in an outdoor education program for one term.

> Participant 8: And ah, everyone that I know, that has gone through it [school based outdoor education program], like, I know hundreds of people that have gone through it, everyone says the same thing, it was the best thing ever. Everyone stopped smoking, everyone stopped drinking, everyone stopped.

He went on to say that upon returning to the regular school environment, he also returned to his substance using behaviours.

The negative influences in the school culture were typically the result of student interactions, particularly when changing schools. Participant 14 left the strict environment of a private school to go to a public high school where the comparative freedom through less structure and the bigger class sizes were conducive to substance using behaviours. One participant described the influence of new friends upon moving from elementary school to junior high school.

> Participant 2: It was cause all the people I was hanging out with…starting in grade 8, I started hanging out with a new group of friends, the cool kids.

Most of the participants described the beginning of high school as the time when their substance using began. For example, Participant 18 started abusing drugs and alcohol and ceased her sports participation when she started high school.

> Participant 18: So I swam a lot and then around that time, around 14, 15 um as soon as I got into middle school, high school, I stopped the sports. Um I lost all my confidence, like I didn't feel like I was good.

> Participant 9: I'm not really proud of it, but I was the one drug dealer, that was the only drug dealer that was at that high school for that whole time that I was there. So, I accumulated a lot of friends, but they weren't friends, they were more of, more ah, more associates than anything. Um, I thought they were my friends. But that's how I fit in, right? That's how I made the soccer team, that's how I made high school hockey team.

Only the stricter environments of the private schools and the inclusiveness of the outdoor education program appeared to provide a protective effect against the use of substances. In general, something about the context of their school cultures influenced substance use by many participants. For those participants in Group 2, the School Culture was considered to be the source of their substance addiction.

Sport culture.

Playing sports exposed the participants to a new culture, one that evolved as they moved through childhood and their teen years. While some aspects of culture are common across sport environments others are more sport specific. Some common factors include the social component and team atmosphere (applicable even in individual sports such as gymnastics or biking), the role of fans and attention from non-athletes, and the expected standards of behaviour and performance.

Social and team atmosphere.

Many of the participants, particularly those in team sports, experienced an abundance of substance use within their sport. Using substances was encouraged and supported by teammates and fans. Participant 15 mentioned that his perception of the link between alcohol and hockey stemmed from watching the winning team fill the Stanley Cup with champagne.

> Participant 15: …hockey players are known to drink beer after games. Um, so I don't know if that had anything to do with it [substance use], but alcohol has always been in my mind, has always been associated with hockey.

In some sport environments substance use was a part of every game. Participant 20 joined a women's competitive fastball team when she was 17. She had been drinking since she was 13 so she viewed the team's substance use as normal.

> Participant 20: Um, yeah, I mean we would smoke marijuana, ah, again usually it wasn't before the games cause it, you, we were passionate, and we took it pretty seriously, and you know, wanted to be present to be able to make the plays. We were a good team and, and we didn't want to affect that with the alcohol or drugs. But yeah, it was definitely something we did after every game…it's you know, around drinking and having fun and yeah, I, sports to me is all around spirits, alcohol.

With substance use being a part of the team culture, some of the participants who were the younger players on their teams felt the need to participate in order to be accepted. An example is the experience of Participant 1 when he was 16 and travelling on the team bus with his Junior A hockey team for the first time.

> Participant 1: I'm driving on the bus with 20 year olds that have alcohol in their bags. So it was, it was a new thing for me and I wanted to fit in, and I want to be um cool, know that kind of stuff. And so I partook in obviously drinking on the bus on the way up there.

The following quotation further demonstrates the culture of substance abuse on one team.

> Participant 1: So he [team owner] comes on the bus with flats of beer, like and I, I mean flats…he brings a bunch of girls on the bus and drugs, you know; pot, cocaine. I mean this is what they do to kids; here you go, thanks for winning.

The use of substances varied somewhat between sports according to Participant 9 who played baseball, soccer and hockey when he was in high school.

> Participant 9: …but the hockey was the worst. The hockey we experimented with multiple drugs and alcohol all the time…It's just everybody was ah experimenting with it. Um, the alcohol we'd steal from our parents obviously. Um, the marijuana and stuff was pretty easy to get. Um, cause I actually I did sell a little bit of it. Um, so we'd, we'd always end up smoking before and after the game and we'd also drink in the locker room.

Playing the sport and being a part of a team were important aspects of sport culture for most participants. However, as athletes playing competitive sports, the attention paid by those not on the team was also an important influence for some.

> Participant 1: Um, but it was ah you know the lifestyle was great. When you get to go and people give you everything and you know you're basically a rockstar in the community that you're playing in. I played in [province] when I was 20 years old and you know there was a lot of very rich people in the area and they'd give us money.

Some participants explained that many of the student fans and the athletes used substances together before and after games.

> Participant 9: Yeah, it was a big team thing, eh? And it, every student that came to our games was drinkin' too before the game, or smokin' weed. You'd

> see all the people in the stands, they were all our age, in our high school, right, and most of them, I, I'd say at least 25 percent of them were out back of the rink with us before the game and then after the game… Um, and ah, we always fit in at parties and stuff, like it was a hockey team right, so we were kinda like the life of the party and I, it just came hand in hand with drinking and substance abuse.

Two of the participants described the negative outcomes associated with the attention they received while playing hockey.

> Participant 15: And, and, and in previous relationships, I wasn't always faithful, um, I was a hockey player, you know, and that's, that's another thing with, with hockey is, is you're very popular, and all the girls tend to, to attract, you get attracted, or they get attracted to you because you're new in town, you're not from around there, you're new like um. So that's, you know, sex is an addiction of mine, too and that's something I've recently just recently found out.
>
> Participant 16: We thought we were with all that. And ah, yeah, I've been friends with the same people ever since and they're still drinking and they're still doing drugs. And, I, I think honestly, that, that atmosphere on the hockey team with all of us together and all the praise we got, and all the attention, lead us to a path of destruction.

Pain management.

Some participants described dealing with physical pain that resulted from their involvement in sports. Some were expected to play through the pain while others took advantage of the painkillers and other substances, which were described as being readily available. Participant 17, who developed an eating disorder and exercise addiction, learned to disregard physical pain while doing karate.

> Participant 17: … I did my, my black belt test with a severely broken foot, and it wasn't even wrapped up, it's just what we did, so, you know, the, the pushing through part was there. And, it just, it's not, tolerable when you don't, when I didn't have the physical fuel for it [anorexia], you know. Like at least when I was doing my test [black belt] I was eating properly and I was fueling myself so, you know, it was hard, but it was doable. Then, when I took the food out of the equation it just became an utter mess of like, I don't know what hurts more, my muscles or my heart.
>
> Participant 8: I found the drugs helped me last longer when I was riding so I didn't get as tired as easy…I didn't feel physical pain and stuff, so you could push your way through it…Um, mainly painkillers but there's everything involved. There was ecstasy, cocaine, drinking um but those were more the weekend things and stuff but there is everything involved there, yeah.
>
> Participant 9: Cause like it's just a, it's a man eat man world right? And I, we get a lot of harassment at work too, right? Like if, if you show any kind of like remorse or any kind of sympathy or anything like that, the guys'll just eat it.

The counsellor at the treatment centre described a similar culture to that experienced by Participant 9. He said that the perceived weakness of asking for help is a barrier to seeking assistance and that the term "gladiator" is often used to describe hockey, football and rugby. He explained that in these sports if an athlete is using painkillers and recognizes their use as a problem, it is unlikely that help would be sought.

> Counsellor: I don't necessarily use that term, in the gladiator sports, ah, the culture is not to admit weakness and so the culture is not to go out and ask for help. Ah, so your addiction may be developing all along but the culture of your sport isn't one, even though the help might be on the periphery, it might be there, if you go ask somebody for help, it may be there, but the culture says you better not go ask for help…that I think, can be a barrier certainly to people finding recovery, through more organized sort of, more higher end sports.

One participant described looking in her mother's medicine cabinet for something to numb the pain even though she had also learned to disregard physical pain, a "skill" that was apparent during her exercise addiction. Dealing with physical pain either by playing through the pain or numbing it with substances appeared to contribute to the development of addictions of several of the more athletic participants, categorized as competitive athletes.

Rough play and fighting.

The rough nature of a sport and/or physically rough play can take its toll on some athletes. Most of the participants who felt that their substance addiction was influenced by their experiences with rough play in sports had been hockey players. Participant 4 attributed his substance addiction to the trauma he experienced as a 13-year-old hockey player. Being taller and heavier than his peers, he was encouraged to use his size as a defensive player.

> Participant 4: …my life changed because of an incident on a hockey rink, I broke a kid's neck. I was one of the bigger players on the team and I chased a kid in the corner and hit him from behind, he went down face first into boards and snapped his neck.

Neither player recovered from the incident. The injured player was confined to a wheelchair and Participant 4 suffers from PTSD. This event took place over forty years ago yet Participant 4 was overcome with emotion while sharing the story.

Fighting was an issue that was problematic for two of the participants. In hockey, where fighting is often considered to be acceptable, not all players are comfortable with the expectation of fighting as part of their role on the team.

> Participant 1: And I'm 16 years old and he had a beard and I looked at him like, whoosh, like thank gosh I don't have to fight! And he came over, and this was, ah, you know, I remember like yesterday he came over and he dropped his gloves and I just looked at him and I just feared for my life. I was just, oh my gosh, what do I do. Cause he, I had never fought before. And just out of fear, I just started doing and it came natural kind of to me. Like it just, I was scared, I was fighting out of fear and that was it. I mean, I was 16 years old, I played very few shifts…

Even when athletes are fearful of fighting or find it distasteful, it is encouraged through reward and recognition.

> Participant 16: In our league, fighting, you weren't supposed to fight anyway so. But, I ah, everybody seemed ah, to grow onto this tough guy look that I'd given myself, and I liked the way people reacted and how they looked up to me for protection and stuff like that so…I didn't necessarily like doing it. I was good at it. Ah, the only times I liked doing it, was when I got praised for it and that's because I knew, ah, I was fitting in, I was getting praise for it.

> Participant 1: And he [team owner] goes, for every person that beats the shit out of one of those players, I'll give, each person will receive what's on this wall. That's $500… And I got into a fight in the 3rd period towards the end of the game so I got $500.

Although none of the participants played in the National Hockey League (NHL), the counsellor offered another perspective from his experience in treating players from the NHL who were involved in fighting.

> Counsellor: And ah, oddly enough, one of more overpopulated, the over represented pro athlete that we get in here [treatment centre], ah, is NHL enforcers that had to fight for living. Then the absolute fear that they describe in their sessions with me, of their absolute, overwhelming anxiety, throwing up before they were going on the ice cause they knew they were going to fight some six foot eight giant on the other side, ah and then when that fear was, the only way they could get on the ice for some of them, was to literally be high while they were playing.

The participants categorized as being a part of Group 3 described the context of sport culture as having a substantial influence on their substance use. The various aspects of sport culture including the social and team atmosphere, pain management, and rough play and fighting affected their decisions to initiate or continue use of substances.

Loss of sport.

Overall, the participants interviewed for this research were very involved in sports, with most playing at a competitive level. This meant that a significant amount of their time was spent in the company of their fellow athletes. When something happened to end their sports involvement, substances were often used to fill the void. The void was created by the loss of the sport itself and the losses associated with the connection to the team, an

important life goal, and the lifestyle of an athlete with its accompanying recognition by family, friends, the community and fans. When the loss of sport put an end to the pursuit of an important life goal, the impact of the loss of sport was greatest.

Substance abuse leading to loss.

For a few participants who were using substances during their sport careers, it was their substance use that led to the loss of sports. For them, substance abuse had become a part of the lives while they were still actively engaged in their sports.

> Participant 16: And my coach had called me and kicked me off the team, so, yeah. I missed out on a big part of what I really cared about and ah, it hurts now to think back that I chose that [substance use] over something I love to do. And it affected me like that because I was the nicest person ever when I wasn't, like antagonized or you know, hung over or upset about something that I had done when I was drinking. And ah, yeah, it's tough to think about.

> Participant 2: …in grade 12 when I started doing harder drugs not just pot and booze, it started to snow [ball]…and I was by far the best [basketball] player in the school my senior year, hands down 100 percent. Um, and in my mind, that was gonna have me make the team, no matter what. But they told me, they said if you don't have 60% in all your classes, you're not, you're not gonna be on this team. But I didn't believe them…I got kicked off of this team … And ah, ah I basically like had like an almost like a psychotic break of sorts…

Participant 15 ended his junior hockey career as a goalie on a sour note by using cocaine during an important tournament. Having reached the age of 21, this was his final tournament with the team and in the league.

> Participant 15: …me and another guy were using cocaine regularly, everyday. And we were ahead in the series two nothing and I remember one night we had gone and picked up quite a bit of cocaine. Um and we had some lines together and we had a game the next day. So he gave me the rest and he says here, hang on to this, and ah I'll see you tomorrow. That was the worst thing that could have happened to me because I used it all, and I didn't sleep that night. And I had a game the next day and ah, that was it. I, I couldn't stop after that, it was, we lost that game, we lost four in a row… my ego wouldn't let me say I can't play…

Loss of sport - leading to addiction.

For several of the participants their sport was the most important part of their lives. When their sport career came to an end for a reason not of their choosing, the loss was devastating. The effect of these losses has been long lasting and the use of substances helped to compensate for this loss.

Injury was one reason for loss of sport and Participant 11 provided a description of how it feels when an injury prevents sports participation. She had arrived at university on a sports scholarship after she had suffered an injury.

> Participant 11: …I had a pulled hamstring and um, I couldn't run, I couldn't do anything; I was so depressed, like I couldn't function. I couldn't do the day-to-day living.

Such an effect was longer lasting when the injuries put an end to the participants' sports careers. The loss was particularly devastating when the participant's only goal was to succeed in their respective sports, and often served as the impetus to the development of their substance addictions. Participant 4 was bullied by most of his teammates who were two years older. After he scored his first goal two of the boys made the attempt to befriend him and he took full advantage. Without a license, he joined them riding motorcycles and suffered serious injuries putting an end to playing sports.

> Participant 4: And that resulted in the beginnings of my addiction because when I came out of a coma, the doctor turned around and told me outright ah, you may never walk again. And so being a hockey player from age 5 'til 13, to be told that, was like the end of life for me. It was ah a moment where the trauma took me into um really not seeing a future. And ah, at the same time they were pumping me full of morphine and Demerol and codeine over the period of about 18 weeks…And ah, so I'm, I wanted to be in the NHL, that was the dream…it's more the, um, loss of, of future, the way I saw it at the time.

Participant 4's drug career progressed; he became an international drug trafficker that eventually resulted in a lengthy prison sentence. Now, with almost 30 years of sobriety, Participant 4 offers a drug related crime prevention program for youth.

Participant 10 rowed during high school, competing internationally until he suffered a serious injury.

> Participant 10: …so that was kinda the end of my rowing… Yeah, I was his [coach] star, and then I just got thrown in the garbage. I basically, I don't know, I just, didn't want to have anything to do with anybody or anything…I remember watching the Olympics and seeing the men win the gold in the eight, and I cried...the loss of being a part of the team, a loss of a dream, cause ever since, like I said…Olympics was my goal. Ah that's all I dreamed about when I was younger, is I'm going to the Olympics.

Although he had been drinking alcohol at home from a young age, and also drank socially in grade 12, it was after finishing high school, without competitive rowing and no plans or goals for his life, that his drinking escalated.

> Participant 10: …it was just social drinking on the weekends or, long weekend or whatever and then it became a daily thing, and then [pause], um, then at one point I just went over the top, I guess and I just couldn't go without it.

Injury was not the only reason that participants experienced loss of sport. Participant 6 did not want to stop dancing, however her parents, who had been paying for her dance classes since the age of 5, stopped financing her dance education when she reached age 18. She graduated from university but has never recovered from her inability to pursue a dance education.

> Participant 6: I had to go through the loss of dancing…when I became the age of 18, they [parents] stopped paying for my dance classes…for a long time it was my identity and I had to find something to replace it …that was all I wanted to do, was be a dancer. …So it had been my entire world, and then it wasn't encouraged to be a career… So, they [parents] paid for my arts degree but they wouldn't pay for my dance degree. Sigh, so um, I think I have some resentments around that like feeling like my parents kinda controlled that, and not having the guts to pursue it in another way.

Participant 6's substance abuse did not progress to the same extent as the other participants. Her marijuana use and then alcohol abuse escalated when her dance career ended. She was able to stop the abuse independently when she began pursuing another goal; a university degree. Now at age 33 she feels that she is still struggling with loss of dance and has not found another goal as meaningful as had been her pursuit of dance.

Participant 11 had an eating disorder and exercised compulsively but she refrained from using substances as a teen while she was focused on competitive sports. Despite being at university on a sports scholarship, that is when her substance abuse began. She had been raped when she was 16 and then again at university, the trauma put an end to her sports career. She described how the effects of the loss of sport became more pronounced.

> Participant 11: …got raped by guys on the football team and that drove me to act out in my addiction. I was running compulsively, I was drinking, I was taking pills and then I had a seizure. So, halfway through my last semester, my, you know, solution was to run back to [city]…so I dropped outa university…

In the years that followed her departure from university, Participant 11 has never again kicked a soccer ball, and her eating disorder and substance addiction escalated.

Loss of sport by choice.

Two participants made the decision to leave competitive sports. Participant 20 continued to play baseball in a recreational league, however Participant 1 completely gave up hockey. Despite having made the decision to leave their respective sports for lifestyle

reasons, neither was happy with the outcome; both discovered that leaving their sports did not eliminate the substance abuse problems.

Participant 1 gave up hockey after he had suffered three concussions within the span of one month, resulting in lingering problems. He also concluded that he was not good enough to play at a level where he could make something of his life.

> Participant 1: …so you know I loved hockey, that was my life and, you know when I, the day I had quit playing hockey was the day that, you know, that was, I'll remember the day as long as I live, it was probably one of the saddest days…And I didn't think at the time that that would transpire to my life after I was done playing hockey. I just thought it [drinking] would go away, but for me, it never did…. we never knew that ten years after I quit playing hockey that I [pause] have the problems I did with substance abuse and alcohol.

Drinking alcohol was so much a part of Participant 20's life that she was completely unaware that it was a problem. She grew up in a home where alcohol was heavily used. Her mother was active in her alcohol addiction and her father supported, even encouraged, Participant 20's alcohol use from the time she was 13. When she received a DUI, she was upset but did not recognize that alcohol was a problem. It was only following an intervention by her husband, that she thought was for her gambling, and once in treatment that she discovered she was addicted to alcohol.

> Participant 20: And um, that (DUI) weighed heavy on me for, you know, for quite awhile and, and it kind of impacted, I knew I needed to change my life, but I didn't know what that looked like. And I didn't realize that it was drugs and alcohol, I thought it was people and behaviours, you know, that I was, not necessarily that I was drinking all the time or that I was doing drugs, but ah, more like, the people that I was hanging out with, right?… So I ended up giving up fastball and deciding that I would, just play for the slow pitch teams…But yeah, but again, it was all around drugs and alcohol.

For the participants who lost or gave up their sport, substance addiction either escalated or was initiated to fill the void.

Mechanisms

In order to understand the role of PA and sport on the development of substance addiction, it is helpful to look at what prompted the behaviours that led to substance use and abuse. In some cases, the sport environment stimulated the desire and opportunity to use substances as a coping strategy, to enhance performance or just because they were there (opportunity).

During the early years of their childhoods, the participants in this study were not using substances, but when the context changed the mechanism(s) leading to substance use were activated. The behaviour to initiate substance use somehow progressed and

substance addiction developed. Some of the initial contexts might have been conducive to substance use but without the mechanisms being activated, the behaviour to use and abuse substances did not occur. In the context of family, the mechanism "availability of substances" might not have been activated but in a different context, such as sport culture, the availability of substances prompted use. It was only with the activation of the mechanisms that the behaviour took place.

A mechanism can be protective against or enabling of substance use. An example is the mechanism "relationship with teammates". When combined with the availability of substances the relationship with teammates will be protective if they discourage substance use, however, if the teammates support and encourage substance use then the relationship will be enabling.

The perceived mechanisms identified in the data include personal characteristics, coping strategies, availability of substances and relationships. These mechanisms predominantly enabled substance addiction; only in a limited number of situations were they described as being protective.

Personal characteristics.

The participants described various states or traits that have been categorized as personal characteristics. The characteristics, some of which are trait like, include low self-esteem or feeling inferior, the need to fit in, and competitiveness. Each of these traits had a tendency to become more pronounced in certain contexts. That is, they might have been evident earlier in the participants' lives but, as they relate to substance use, a change in the context activated some traits, which then resulted in a behavioural change, that is, the development of substance use. Just as the gunpowder did not ignite in some contexts, the personal characteristics as mechanisms were not activated in all contexts.

Low self-esteem or feeling inferior.

A number of participants indicated that they suffered from low self-esteem and feelings of inferiority. Participant 11 started drinking alcohol after leaving home to go to university.

> Participant 11: So, that I started probably mixing in alcohol with that [starting university] to socially fit in with people in my life.

Participant 20 had already been using alcohol, but after joining the ball team, recognized how it helped her to socialize.

> Participant 20: …I don't have real high self-esteem and, and I think where I felt confident was in ball because I knew I was good, and I was sought after

> which made me feel even better. Um, but the socializing aspect of it, you know, everyone wants to be liked and so the alcohol really helped me do that. Alcohol gave me the courage to be outgoing so that I could, you know, be accepted.

Not fitting in.

The need for social acceptance was a common reason given by many of the participants for their substance use. Several described feeling that they did not fit in with their families and/or their peers.

> Participant 11: …I was the only kid in my family that had brown hair, everybody else was blonde. Um, my dad was present in the birth room when I was born and not my 3 siblings, I was different, right? I would look to anything outside of myself for social acceptance…

> Participant 19: I've had a bit of ah, always had trouble fitting in. Um, so I was always kind of like the black sheep, everybody was popular or what I perceived to be popular. I didn't really have a lot of friends so it was it was a bit hard sometimes cause I got picked on… Still a little bit like I didn't fit in. Like my parents didn't really like me. I knew my mom loved me but, I didn't really, even to this day, I still feel like I'm not really a part of the family, I'm just there.

> Participant 20: …I would feel outcast and, and not liked, or, I was never as pretty, you know I was never thin enough, I was never all that stuff, right?

She went on to describe how she felt her status with her father was diminished following the birth of her brother. I asked if she thought this might have contributed to her feelings of inferiority and not fitting in.

> Participant 20: [long pause] Probably, I, I guess I never really thought of it? …So probably that competition that I had with my brother unknowingly probably made me feel like I was just never good enough, yeah, I guess I never thought of that, but.

The need to fit in clearly provided the motivation to use substances for some participants.

> Participant 19: I'd say a lot of it is social, I mean, if you see all your friends jumping off a bridge, would you do it too? Probably. That's how high is the bridge, is there water at the end of it and yeah I'd say it's a big part, is social for me it was.

> Participant 16: … so I guess when I would practice and try to get better, I was really just trying to fit in and ah, be a part of that praised group of people that the town always looked up to and ah. I always envied the better players because they got so much praise from the parents and, so once I became a good player, I kinda acted out in their ways [including alcohol use], and I ah picked on the people that were below me.

The counsellor indicated that enough people going through treatment report that they do not feel comfortable in the world and that using drugs and alcohol gave them a sense of social acceptance. He went on to say that some people did not identify with sports participation, eliminating that as an option for trying to feel accepted.

Competitiveness.

Competitiveness was a trait seen in many of the participants although how it related to their substance use varied. It was not mentioned as the reason for initiating substance use but it contributed to the continued use of substances or the volume used.

A number of participants described themselves as being overly competitive. Participant 15 provided a good example with his description of this trait.

> Participant 15: Sigh, not so much, no, but it [expectation to practice while sick] was expected of myself. I had, that expectation that I needed to be there, so that I can be good. I need to have that, competitiveness in me, and um, I always liked being, being a part of a team with a group of guys or kids, you know that we had a lot of fun, but winning was everything, right? Nothing, nothing, nothing beat, nothing was better than winning.

Being very competitive created feelings of unease for some participants. Participant 11 had said previously that fitting in was very important to her but her need to succeed was more important.

> Participant 11: …I remember in grade 10 when I was playing for [name] soccer team and [pause] sigh, I'd already been committed to my scholarship in the states…I felt like [pause] the team stunted my growth and my development as a player, so, I moved to another team in the league …Like the guilt and the shame of me leaving them [1st team], to go to them [2nd team], it just about like suffocated me and I just, couldn't even physically walk, because I felt so guilty for leaving that team.

Participant 8 felt that his competitiveness created a problem in the interactions with his friends while they were dirt biking but it was also the reason he continued in the sport.

> Participant 8: I think the competitiveness is what kept the drive in, a lot, so if I think, if I wasn't so competitive, like, I think there was over-competitiveness where there was a lot of tension between me and my close friends. That could have been avoided, like, if we had right communication. Um, but I think the competitiveness was good, to an extent…my cousins and all them that didn't have the sports were all in gangs. And they're the same age as me but half of them are dead now…they didn't have sports or anything so they got way more heavy involved, so…

In describing their competitive approach to sports participation, some participants made reference to either what they referred to as their "addictive personality" or sports as an addiction.

> Participant 6: I was the type of a kid where, sigh, um I was very motivated and I was very driven. Um, and I would take more, more, more, right? Kind of that addict personality, so you give me one dance class a week and I want more.
>
> Participant 11: …even when I was, you know, growing up, I played soccer, I played softball and I swam. So I'd swim in the mornings, depending upon the season, I'd do soccer or softball. As soon as that swimming was gone, something inside me said 'you need to run'.

When I asked why she had stopped competitive swimming at age 12, she explained:

> Participant 11: When I was 12, so it was gone because it was too much, like my mom decided you're doing way too much…and I was one of the top in the province, you know, I had every sport I did; I had to be at the top. And I got to the top, right?

The competitiveness of some participants was evident in their sports but it also affected their substance use and drug dealing.

> Participant 16: And the competitive side of me…it's not a healthy competitiveness…I brought that competitiveness to my drinking. I did, ah, I always wanted to be the one that can drink the most and the fastest and stuff like that, yeah.
>
> Participant 11: …I was committed to being a heroin and a crack addict for the rest of my life, and I wanted to be the best junkie that I could be…
>
> Participant 3: And I think by the time I was done grade 8, I was known as [pause] I don't know, like the number one weed seller in the west end. If anybody wanted weed they would always come to me.
>
> Participant 4: After school, by 18, I was one of the top 10 drug traffickers in this town.

Some participants were aware of the similarity between their drive in sports and their later substance use such as this reflection by Participant 2.

> Participant 2: But now being through all the substance abuse and, and recovery that I've been through, I look at it [sports] as ah, it was definitely my first addiction. I ah see many, many, many parallels ah, not to the extremes… something when you do substances, is the same thing that goes on in your brain as when like you hit the 3 pointer to win the basketball game. Do you know what I mean? Because I've done both and something there is the same, whether it's dopamine or whatever the hell. Ah [pause] there's there's there, it jives. Some, some type of the chemical stuff that goes on is, is very similar, in my in my experience.

When I asked the counsellor about the relationship between sports participation and the development of substance addiction he had the following comment.

> Counsellor: …we have some, we work directly with some sports organizations, so we work with the [association]. Ah, we work with some …junior hockey organizations as well, so we get referrals from people that have played high-level sports as a career. …there's a relationship in my opinion, there's a relationship between the adrenaline rush that, that, you know sports ah, can give people, ah, it's not just in spectator, you know, not, sort of just when you are doing it in front of a group of people, but there's an adrenaline rush to competition. Ah, I think brain chemistry wise, there's, there's a very similar to some of the rushes that would be experienced through alcohol and drugs.

Coping strategies.

Several participants mentioned that their coping strategies included sports and substances with the latter replacing the former as they got older. For a few others it was their sports participation that created the need for a coping strategy, a need arising from both emotional and physical pain. When forced to deal with difficult, stressful and often traumatic situations the coping strategy was the mechanism that was activated leading to substance use.

Abuse.

Several of the participants described experiencing various forms of abuse; most common were forms of psychological maltreatment where the abuser was either a coach or a parent. Two participants were the victims of sexual abuse as young boys. While the abuse did not lead directly to their substance use, this mechanism was activated later through the interaction with other mechanisms in a different context.

> Participant 13: Yeah, since ah, I was 11 years old, I was very all by myself since I was ah, abused by a pedophile. And my dad never knew, my mother knows but she never tell my dad, [chuckle], about it. And took me, last time I talk about it for the first time, that was in February, this year.

As Participant 5 explains, sexual abuse was just one aspect of his already troubled life.

> Participant 5: I guess as far as risk factors go, there's lots of them, you know, as I was growing up. You know with my alcoholic mom, um, being in care, there was ah [pause] how old was I when we went to [province]? But, I was pretty young and I got sexually abused out there, and then [pause] you know, all the risk factors [for addiction] were there.

Participant 11 described the abuse she suffered and its relationship to her addiction.

> Participant 11: Um, I had a couple of traumatic, 16 raped, um [pause] also peer pressure from [province] soccer and told I was too fat to play soccer, to play sports. Um, so abusive coaches and all that kind of stuff and it just pushed me deeper into my addiction, basically my eating disorder, right.

Stress.

A number of participants managed the stress in their lives by finding ways to escape or numb themselves. Sports were used as the initial coping mechanism, as described in the following examples.

> Participant 2: Um, so that being said, although I came from a very loving family, very well-off family, and all these kind of things, um the process of talking about what's going on inside and your emotional stuff was never really discussed or talked about. Um, it still even goes on today. They're able to go about their daily thing. They're not addicts. You know they didn't have stuff go on like I did. So they're okay too and that's their normal, right? But ah, through that process, I was never really able to express my emotional stuff, I was never really able to express how I felt. Um, and ah looking back on it a lot of like the anger and stuff, you know, outlet was through sports at the time.

> Participant 8: It [sports] provides ah, it provides protection at a young age, yeah, for sure. Um, I think it just masks the addiction, though. I think it just takes away the drugs but keeps everything else there all the, cause as you learn in here [treatment], the addiction is, isn't always all about the drugs, it's about all the, not being able to express yourself, the feelings and everything. I think it's just; it alternates drugs for sports, like it's another escape. It's, yeah, it gets you, it helps you to avoid what the real problems that are going on in life.

Several participants described their use of substances as a means of coping such as in the following examples.

> Participant 18: …the first time I ever drank alcohol, maybe it wasn't the first time, but I, I used, to try to numb out…I was trying to look for something to make myself feel better, yeah.

> Participant 14: …you know, I think I definitely started to use it as a, a coping mechanism. Um, when I was stressed at, with stresses at work or things that I was dealing with, you know, that would like, it started to be the thing that I would turn to.

> Participant 11: Um, my dad, [she corrected herself] my uncle passed away, alcoholic and when that happened, my addiction with the cocaine just doubled. And that continued for about a year, and I was still working, I was still doing ok with that, kept it all good on the outside. But the inside was just messed up and then my dad died…Um, so my father passed away and I turned to drugs and I couldn't maintain the career in the fitness industry because I was doing drugs on a daily basis. And about a year, not even a year after my dad passed away, I found myself at [name], another treatment center. Um, I went in there, completely willing and wanting to get well. Um,

> when I was there they addressed the drugs and the alcohol and they didn't have the support for my eating disorder…

Substances were used to cope with situations arising from some participants' sport involvement as described by these hockey players.

> Participant 15: … I can remember laying in bed, and, and sobbing, crying and, and thinking to myself, well you're just not good enough. You know, you'll never be good enough and, maybe, maybe smoking weed helped numb that. Um, but that's that's just making excuses I think, because I enjoyed it.

> Participant 16: …I was drinking to have fun to a certain extent, and then after a fight or I'd get angry or something, and I was just drowning, drowning my emotions and I wasn't drinking to have fun.

> Participant 1: … I turned to alcohol for a lot of the violence or the way of life that I lived. And you know you sit there at night after you play a hockey game and, and you know you're involved in a fight, can you knock them out or break their nose or something like that. And you're sitting there after, well what do you do? I mean, just sit there and, and you drink or to overcome the pressure of fighting…

Two of the participants had been competitive athletes and developed eating disorders during their teen years. After losing their sports, their eating disorders and substance use escalated.

> Participant 11: …I was just using drugs to stay skinny and numb out and not deal with my life.

Participant 17 lost her front teeth when she was a young teen, the result of a bone infection that she attributed to her eating disorder. She said that without permanent teeth, she was unable to continue training for her second-degree black belt in karate. She found solace in substance abuse in her late teens.

> Participant 17: … the real physical activity got shut down at that point, you know…wanting to numb, that nostalgic feeling of remember the good old days where I had, you know, I was good at something, I had a purpose…we found a new one in drugs and alcohol… I just caved one day. I was too tired, you know, I was too tired of doing the shit I was doing, I was tired of feeling crappy about myself. And I was like ah; I'll just try it. And it took, like a moth to a flame, I just was like, oh my god, this is fantastic. It took away all that shit that I been dealing with and it made me feel like I had those athletic abilities back.

Pain relief.

While being involved in sports, some participants had to endure pain during or after their events. They learned coping strategies; for some these were adopted at a young age. Various substances were used to help them manage pain. The following offer some good examples.

> Participant 17: …there was a lot of that, you know, just popping Advil and Tylenol and taking whatever we could, you know. I'd take it out of my mom's cabinet and stuff and take it with me, just so, so that you'd be okay, you know. And um, yeah, if I'd been able at age 12 to get anything stronger, I definitely would have…
>
> Participant 9: But like when they [military] tell us to like walk 13 km and with a rucksack on, booze helps, it numbs the pain.
>
> Participant 8: It was just so easy to get prescriptions [dirtbiking]. With Tylenol 3s and then by the time I was 13, yeah, it was every day…

He went on to describe how the use of prescription drugs masked the pain and led to careless riding. Although he did not provide any details other than to say it was their reckless riding and drug use that was the cause of his best friend's death, it was a traumatic event for Participant 8 at age 19. Escalated substance use was his means of coping with the emotional pain.

> Participant 8: …when I was 19 my best friend passed away and then, after that it [substance use] was everyday.
>
> Participant 1: …later on playing hockey, it was obviously the way I played [enforcer], I got hurt quite a bit. So I'd take a lot of painkillers when I was playing…before the games, even after the games depending on what was there. Um, so in order to play hockey you have to have lots of energy, so what do you do? Well you grab stuff that will allow you to perform at high level. Um whether it be ephedrine or, or anything we could get our hands on, I did.

After leaving the sport, Participant 1 continued to fight the demons that originated while he was playing hockey.

> Participant 1: …I used alcohol to numb…I think my depression and stuff like that came from the inhumane things that I did when I played [hockey].

The counsellor confirmed the use of substances by hockey enforcers to cope with both the physical and emotional pain that resulted from fighting.

> Counsellor: And for others [hockey enforcers], when it [the game] was over, the only way they could get to sleep at night, was to start taking Ambien sleeping pills, you know, drink, mixing all of the above, painkillers because their knee was sore or their head was sore or this was sore. Ah, mixing all that together to pass out.

Using substances as a coping strategy was a mechanism commonly described by the participants. The counsellor explained that an important component of the treatment for substance addiction is learning tools and strategies for coping.

> Counsellor: We're trying to develop a lot of tools, here, in addition to that and ah, you know, that might be yoga class, it could be a way to do that.

> Meditation could be a way to do that. Picking up the phone and talking to your sponsor is a way to do that. Going into group therapy and talking about what's going on or going to see your counsellor is a way to do that. Talking to some of your peers about what's going on, but physical activity is one of those many tools, ah, that we're trying to, you know, have people associate with health, wellness, recovery and sobriety.

Availability of substances.

The mechanism "availability of substances" was activated for most of the participants. That is, if substances were available, the participants in this study used them. They either began using as soon as the substances were available or later in a different context. When Participant 2 started junior high school his new friends encouraged him to try marijuana, which he did. Participant 7, on the other hand, knew that her friends used substances but it was only after her mother's latest suicide attempt that she took advantage of their availability. Overall, availability was the reason the participants' substance use began, with most starting at a young age. Ten of the participants were abusing substances by the age of fourteen, six were 15 or 16 and four were 18 or older. Nine participants first used alcohol, six first used marijuana and two used both at about the same time. Eighteen of the 20 participants were marijuana users at some point and 16 of them also used other substances. Two of the participants' abuse began with painkillers; one was prescribed and the other illicit. Only one participant started with lysergic acid diethylamide (LSD).

The availability of substances was from family, school, sports environments, or some combination of the three. The earliest availability was usually from the family with school and/or sports availability following. The only exception was Participant 4, whose substance use started with painkillers that were administered in the hospital following the injury that ended his sports career.

> Participant 4: … Um, my addiction to morphine, Demerol and codeine and was ah, my …and overdoing the amount of painkillers. So many kids and adults who go in for pain management and doctors give way too much, and then the patient learns how to suck more out of it. And that's what I did. Ah, instead of getting 4 shots a day, I was getting 6 or 7, depending on how bad things, I could make things look.

Availability from family.

The participants described availability from their family both in terms of having alcohol offered by their parents and having access to substances in their homes. Participant 10 was the participant who had the earliest recollection of a first drink. He described it as being offered by his family on special occasions such as Christmas and Thanksgiving.

> Participant 10: I had my first drinks when I was, oh probably 6 or 7, I'd have a glass of wine at dinner…we would have only just a little tiny bit but we were told to appreciate it and not abuse it, which backfired.
>
> Participant 20: … [friend] and I [age 10 or 12] were babysitting our younger siblings …And our parents had been drinking at their house first and then they went out to party and left us with the younger kids. And so all the bottles of booze were sitting on the table and, so we just dug our heels in and, had a few drinks…

A few years later at age 13, while camping with the same friend and their families, her parents offered alcohol.

> Participant 20: …our parents were doing B52 shooters and so they thought it would be fun to let us have these shooters, and so [name] and I had a bunch of B52 shooters with our parents and we felt pretty grown up.
>
> Participant 17: …if we're at watching a movie, my friends and I, at my parent's house, let's go steal something from the liquor cabinet, they'll never know. …It was kind of just like, because I waited until I was older, you know, 16, 17 that was kind of the age that, you know, my friends' parents and my parents were like okay you guys can have like you know, a cooler or something at the house, and I was hooked, I was just hooked right away. I was like this is fricken' awesome.
>
> Participant 12: Um, my parents bought me alcohol when I was [pause] 16, I think, going to parties, something, they would pick it up for me.

Participant 3's family was the only one to provide a substance other than alcohol. He was in grade 7 when the event he described took place.

> Participant 3: I was living in the same household as my auntie, my cousin was also driving [selling drugs] for my auntie, running errands for her, but he was also blazing [getting high on marijuana] a lot, too. So we would go out back and we do a bunch of blades [method of smoking marijuana using hot knives].

Availability at school.

Very common amongst the participants was the availability of marijuana at school and for some this meant the beginning of their substance use career. For most of the participants, availability coincided with the transition to high school; only two mentioned substance use in junior high school.

> Participant 2: Oh it was, oh, the very first time, I can tell you I, I remember clear as day. Ah, total peer pressure for sure, for sure for sure, for sure, 100 percent. It was cause all the people I was hanging out with. … And by about, I think it was in grade 8 was the first time I had smoked pot.
>
> Participant 12: Just at school, I was ah, when I started marijuana, there wasn't very many kids in our school that smoked pot, and I just tried it and, it was fun and I carried on… Yeah, just a friend had some, so I decided and, it's

> funny because I started marijuana at 13 and I didn't start cigarettes 'til I was 18.
>
> Participant 19: Yeah, my first year of high school…about half way through grade 9 I started smoking weed. Ah and became ah, almost a daily activity, it was like my new identity.
>
> Participant 14: Um, how did I get into substance use? I guess by the time high school kind of hit, you know, um, um, there was a lot of influences and that kind of thing. But you know, I was, you know, right in there I would say, you know, just experimenting and wanting to try like this.
>
> Participant 9: It's ultimately your choice whether you do it [marijuana] or whether you don't. But, having it [marijuana] pushed in your face all the time, or being available [high school] all the time doesn't really help your choices, you know what I mean?

Availability in sports.

The participants frequently described the availability of substances in their sports, particularly in baseball and hockey.

> Participant 20: …it [drug use] was everywhere [baseball]; it was all around…you could get whatever you wanted.
>
> Participant 9: Ah, just cause everybody else on the baseball team was started doing it…So yeah, like I can't even really remember a sport that I ever actually played for a frequent amount of time that I didn't actually use a substance of some sort…
>
> Participant 16: I did a little bit of drinking as well in the Bantam level [hockey] which is well, which is 14, 15. And yeah, through out that, it affected my sports greatly. Um I developed a very bad anger problem…Um, I was introduced to ecstasy first by some of the hockey friends actually and ah, it kinda picked up from there. I tried cocaine when I was drunk one time and ah I really liked it…
>
> Participant 9: Yeah, we'd just mix it into our water bottles. So some games [hockey] were pretty rough, but yeah, I started experimenting with alcohol in sports.
>
> Participant 1: ...when I started playing junior hockey in [year] and it was promoted, alcohol was...you know I was around it when I played professional, like minor professional hockey in [city]. I was around cocaine…I was around pretty much everything you can get your hands on.

Military.

Two of the participants had military careers in which they had similar experiences to those in other team sports environments. Participant 13 described an unsuccessful attempt by the Department of National Defence (DND) to deal with alcohol abuse in the mid 1990s

where there was a restriction applied to the availability of alcohol in the field immediately following an exercise. The availability of alcohol on the bases was not affected.

> Participant 13: So when I joined the military, alcohol and sports was the two main things in the military. Work hard, play harder, so until, and every time we do something, do an exercise, we do a challenge, a sport challenge, the reward was alcohol. ... we were doing a lot of sports every day, 5 kilometers a day, running on Friday was 10 kilometers, and every month there was 20 kilometers. We were in good shape, but we knew, after the run, alcohol. So, alcohol is everywhere in the Canadian armed forces, it's not a big secret.

> Participant 9: And then I joined the military and boy can I tolerate alcohol now. Um, maybe cause it's around me so much more…Yah, like drinking is the norm thing to do… And the beer calls at the end, they're just, they're nuts. It's like a bunch of college and university parties all combined into one huge massive pile of testosterone and drunkness.

Relationships with friends, teams and coaches

The participants described their relationships with friends at school and on sports teams. For the most part, the information shared about their relationships pertained to their substance use. The relationships with coaches were not directly related to substance use; rather, it was the participants' responses to their coach's behaviour that was notable and appeared to be linked to their substance use.

School friends.

Most of the situations described concerned the relationships with new friends who either introduced substance use or were accepting of it. In some situations, 'friends' were sought because of their shared interest in trying or using substances. It was likely due to the nature of the investigation that very few references were made to friends who offered a positive influence. However, one participant described a friend who encouraged her sports involvement. Their friendship began in grade 5 or 6 and lasted until high school, at which point they went to different schools.

> Participant 18: … I felt like I wasn't good at sports, I felt like I was kind of the slow one. I felt like I was the one holding back the team, I felt like people, just kind of pitied me because I was, I don't know, I was, I excluded myself from them, I was the quiet shy one. Um and then as I got older and I had this friend who was really, really, really good at sports, and she was popular because of that, I kind of found like a new confidence in myself.

Other participants described a time of transition when they connected with a new group of substance using friends but maintained a relationship with non-substance using friends. Participant 2 provided a good example of the influence of his new friends, 'the cool kids,' and how he maintained a relationship with his other friends.

> Participant 2: Ah, It was, it was the group of friends I started to hang out with. Ah, it was kind of more the social norm. But in this regard it was all um, um, it was all booze and, ah pot, majority. Um but ah, one thing led to another and, and I [after first using] never used for any reason other than effect. It was always effect, it was always to get high, it was always for the feeling that I would get.
>
> I had like a group of athletic friends and I had a group of friends like the party or friends. And that's kind of always the way I kept it through school, like I had the two groups of friends and they didn't really coexist with each other, they didn't comingle with each other.

More common were the situations where the participants and their friends were accepting of substance use. In some cases the participant knew that friends were using substances, which led to their use, while others started experimenting with substances together with their friends, and some others chose friends who were using substances.

> Participant 18: There'd be like 5 or 6 or us in a group, we all drank together. Um (pause) yeah…drinking started first and then the pot started after that…Um, even when I used pot actually, I remember my friend and I, [friend 3] and I, we would, we would ah smoke, every time we'd get high, we'd see if we could get higher than last time.
>
> Participant 17: Um, but then I started, yeah just drinking with friends and stuff, you know, like a normal teenager, I thought. But, um, I notice now that I was always the one to suggest it, you know, be like, oh we're doing this, we should drink while we're doing this, you know. You know, what are you doing this weekend, we should go to this party this weekend. Like always finding a reason to be drinking.
>
> Participant 7: …so across the street from the school, we used to stand there and we had a kind of little group and every single one of us was, ended up being addicted to something. Um, and there was about 20 of us.
>
> Participant 14: I definitely sort of took advantage of that, um you know, and how and got involved in, you know, hanging around people that were into doing the partying thing, drinking alcohol. Um, [pause] I'm not sure what sort of drove me to it. I was always kind of interested, I mean, not interested, but I mean I was always kind of, you know, [pause] a risk taker, maybe. That, that, you know and um, and I, I guess I also surrounded myself with people that were involved in that kind of stuff and um.
>
> Participant 4: Oh, I, you didn't hang out with anybody that didn't use, cause they were dangerous, cause they might turn you in. You know, so, it was a very different state then [1970s]. Now every kid feels, a lot of them, nothing wrong with marijuana. My days, we know the cops are on us, we know that, you know, you don't want any adults knowing about it. Although I did sell drugs to some very well known people in the city that were much older than me.

Teammates.

Most of the participants described positive relationships with their sport teammates. Two of the hockey players were treated badly by their teammates, which led either directly or indirectly to their substance use.

> Participant 16: Because growing up through sports, before I was on the AA team and ah, the more advanced levels, I was bullied by the same people that I became friends with. ...They bullied me about my weight and ah, my skill level throughout most of my, sports career. Um…Yeah I became everything that I hated, pretty much.

> Participant 4: I made the team, the guys treated me badly, pissing in my skates and doing all that shit they did, not passing the puck and not playing with me. It was like I was being shunned. Um, but two of the guys, after I scored a goal, that was it.

The friendship with the two boys did not survive after the motorcycle accident that was mentioned earlier. Participant 4 started high school no longer able to play hockey and as a drug user. He would see the boys at school but there was no contact.

Some participants found that their substance use adversely affected their relationships with their teammates.

> Participant 8: Um, mainly the reason why I stopped playing basketball, there was a lot to do with the dirt biking. But a lot of it had to do with; I wasn't allowed to smoke, on the basketball team. You couldn't be on the basketball team, so I quit the basketball team so I could be in the smoke pit. Yeah, so I just wanted to be with my friends and not feel outcasted or something. [pause] Addiction too, smoke was more important than basketball. I guess I figured basketball is going to end at the end of high school so why not, smoking's not.

> Participant 2: I recently ran into a friend of mine, [name], who I played sports with all these years. And they knew I smoked cigarettes, they knew I smoked pot, they knew I drank on the weekends, but I could run these guys lines, like I could out run them every time. Just brutally, just brutalize them. And he told me…[Participant 2's substance use] really aggravated him.

> Participant 16: Um, well, with my [hockey] team, it [drinking] wasn't well received by the players that really wanted to be there, and the younger kids, necessarily that ah, wanted to win and were more focused on that. With my group of friends, which ended up being the better players, ah, we were all focused on the parties and stuff, so it really affected the team and they were really upset with us a lot…

For the other participants who were involved in sports, their social life revolved around it and their teammates were their friends.

> Participant 1: Well it's [drinking] promoted. You're the, you're the life of the party. You're the guy that everybody wants to go out with.

Participant 9 reflected on the different relationships he had with his friends and teammates in different sports, baseball and soccer:

> Participant 9: So, when I got in baseball, I met a lot of good friends and ah, never kept one of them though. They were never really my friends, but see I was always a year older than the whole team. …I was 19 and they were all 18 and I bought the booze for the whole team. …But it seems my group of friends outside of the soccer, were the soccer team, right? …Yeah we're still really, really good friends. Um, he [best friend] still he still uses substances too. So like it just stuck with us, I don't know the extent of what substances he's using.

> Participant 3… I played more badminton competitively and there were people that were on the badminton team that were also smoking weed…one fellow who, who actually grows it out there, was playing badminton. And we would go out back and we would go and smoke some weed. And then there was my cousin that smoked weed too, right? So there'd be like a good a good few of us that were smoking weed, then we'd get back in there we'd go play badminton all red eyes.

> Participant 20: … alcohol was huge, right, for all of us, we, we had weekend barbeques, we had um, one of the ladies that we played with had a family farm, and ah, we used to go out there and have like big bush parties and stuff like that, so. …we did everything together, and, and pretty, it pretty much ended up consuming my life at that, at that age. Probably from about 17, 18 'til I was about 21, 22.

Coaches.

Only a few participants addressed their relationships with coaches and these pertained to the negative comments made by coaches about their skill level and/or weight. Both Participant 11 and Participant 16 became sensitive about their size and subsequently their diets; Participant 11 developed a serious eating disorder and exercised compulsively. When she was young someone in the soccer association told her that she was too fat to play soccer.

> Participant 11: …it was awful, awful...that stands out for me, right, in [pause] my compulsive behaviour. Verbally abusive, psychologically abusive coaches as you're growing up, right? At the time you don't think of it but when I look back on it I'm like, yup, that definitely had an impact on me, right?

She explained her situation further and how the coaches' comments contributed to her eating disorder.

> Participant 11: Oh, it got to a point where like, okay, I got the success, it was there, and then the degrading, even my coach in university wasn't the nicest guy. You know, he'd play you for 3 games and then sit you out for 5, no explanation. It was absolutely insane, you know and yeah, he also had an exercise addiction. …You know, if you could run, he'd praise you, if you were

> slow, he'd degrade you. Yeah, it was all about, you know body image, and his conception of what was healthy, and the joy of soccer was like, stripped from me.

Six years later, she has yet to kick a soccer ball.

Participant 16 was also subjected to comments about his weight and felt that they contributed to his decision to drink.

> Participant 16: And ah, yeah, it was tough, I never, I never realized how much effect it really had on me, I just kinda took the suggestions and tried to lose the weight. And ah, if I fell beyond that expectations and I didn't succeed, I would, it would beat me up pretty good. I'd beat myself up about it and ah. So not being the best player, I kinda resorted to the drinking and partying to fit in, more so than exceeding in ah, hockey and getting better at that.

The relationships with their friends, teammates and coaches were described as being instrumental in the participants adopting behaviours that led to their substance addiction. This occurred from being in the company of others who were using substances and by seeking the company of those who supported substance use.

Outcomes

The outcome of interest in this project is the development of substance addiction, however some other outcomes were noted that came about as a result of the development of substance abuse or addiction.

Sport performance and participation

The relationship between the initiation of substance use and the subsequent abuse while involved in sports resulted in different outcomes. In some cases the sport related outcomes preceded addiction whereas in others they coincided with the progression of substance addiction.

Negative impact on sport performance.

In hindsight, some participants recognized the negative impact that substance use likely had on their ability to perform in their sport. Participant 17 suggested that her eating disorder was the starting point for her addiction and led to the loss of the positive things in her life.

> Participant 17: Because it was something like, you know, that I was so confident in, I was so confident in my ability, my athletic ability (pause) growing up, and now I'm like, it is the most, I'm so terrified for someone to

> be witness to my athletic ability. But, at the same time it's like, that sort of happened with everything I was good at …all the things eventually that I, that made me proud, I threw away for my addiction. Just, it's weird too, I hadn't really actually thought about how the fact that physical activity was the first one I threw away.
>
> Participant 1: I still feel that if I would've been sober when I played hockey, I would have had a chance to make it.
>
> Participant 16: …I started using cocaine when I was about 18, 19 years old and that affected my hockey huge, and my sports.
>
> Participant 15: …I was 16, 17 and that's, that's really when my, my level started to drop a bit. Um, being a goaltender, my reaction speed was slower, ah, my stamina wasn't as high and it affected me, but I didn't realize that because I enjoyed the narcotic.

Enhance sport performance.

Participant 15 and Participant 12 had been using substances and then began to think that substance use enhanced their sport performance. After his Junior hockey career ended, Participant 15 continued to play in a men's recreational league. He had been using marijuana daily and cocaine on a fluctuating basis. Its use depended upon what was happening in his life. He describes the escalation of his cocaine use following the break up with his girlfriend.

> Participant 15: So I picked up more cocaine, and ah and then I started using it before hockey. And, my thought process was that, hey this stuff helps me play better. That was my thought process; that I had to use before I played or we'd lose. And I did that for 4 or 5 years. I can, I can remember, I went on a hockey tournament with this team to [city] and bringing stuff with me on the plane, because I had to have it there, and I didn't know if I could get it there, right? So I had to make sure that I had it on me, so we could play good, so I could play good. [Pause] And then I remember doing it in the dressing room in front of people.

Participant 12 was a competitive trampolinist who had started using marijuana when he was 13. He then started smoking it regularly including before performing routines, a pattern that continued throughout his teen years.

> Participant 12: And, I seem to think that maybe I was more, um, I don't know what the word is, [pause] more focused on it [routine]. Maybe I would be into it a lot more and give it a whole lot more thought than, than I would if I hadn't smoked pot. Yeah and thinking about it now, it's probably because, if I hadn't smoked, all the movements were so natural for me in a routine, whereas once I'd smoked pot, it wasn't quite so natural. Chuckle. That's how I would perceive it today. Then, I thought I was just, more into it.

Participant 11 describes her skewed perception of the relationship between her substance abuse and ongoing PA.

> Participant 11: Like there were so many times, I was teaching a spin class high on coke, like insanity, right? Like, or I'd go for a workout after a 3 day bender and go for a 6 mile run. You know, I was training for marathons and doing coke in between. …You know, you're keeping up your health, your fitness, so you're okay, even though you're doing heroin, it doesn't matter and those are my actual thoughts.

Loss of interest in sports.

For other participants, as their substance use increased their interest in sports decreased, a relationship that was seen in both competitive and recreational athletes.

> Participant 3: And it's one of those things, you can't really do dope and play badminton. While engaging in your physical activities you can for a certain amount of time but then it's only a matter of time when that goes downhill along with everything else, right? That's kind of what happened with me. [pause] I think it was probably throughout that year of grade 7, where, I was still participating in, in, well in gym class, but I just wasn't like getting involved with teams. I was just more focused on drugs at that point.

> Participant 19: It [Judo] was just not really doing it for me anymore, just, you know, going to hang out with my other friends and I wanted to smoke pot and I don't want to, it was too much to keep up with them, just getting tired of it overall and just didn't, ah.

> Participant 14: Oh, I was always active in sports as a child, for sure. Um, my parents were really about us being physically active and we and, to the point, we could choose an individual sport but we also had to choose a team sport as well. If we were going to do an individual sport like they liked the balance of that which I, I agree with actually. And I'd like my daughter to have that too in her life now. Um, but yeah I was involved, like I did all my, I was involved in swimming, I did all my levels, I finished them by the time I was, I finished them by the time I was 12. In fact I had to, because I had to wait that two year gap before I get to the next level, I never, I got involved in other things. Um, alcohol and drugs actually, which is why I never went back... so I was involved in swimming and then swim club at one point and then um, I was actively involved in softball for many, many, many, many years, too. Um, played that until probably the age of 13 as well…Again I think my substance abuse and um, um, I, I wasn't using when I was playing, um, I was still young um but when [pause] when I got older [high school] and other girls were continuing on in the sport, I, I didn't and I think because I was getting more preoccupied with drinking and smoking marijuana at the time.

As an adult, Participant 14 continued to maintain a level of physical activity, even once her addiction had taken hold. She explains how she combined exercise and alcohol use.

> Participant 14: But yeah, literally, um, you know, be doing some yoga or um, weight lifting or weights or um you know sit ups or crunches or whatever and literally in between sets of doing those I'd have, instead of water, I'd have a sip of my wine. It's crazy making.
>
> Participant 13: I stopped training since 2009…because my drinking…So since a year, we have a member card, for a gym, but never, we never go…. She [wife] asked me to go, to go, to go, ah, I don't want to go because I want to drink. That was my activities, drinking.
>
> Participant 16: And ah, that's, I started using cocaine when I was about 18, 19 years old and, that affected my hockey huge, and my sports. Every time I'd use ah, I'd have no motivation to play sports, I would just have motivation to go use more… I became lazy and complacent, and it didn't interest me as much as it did before. So, my level of interest in sports went way down once the drinking and drugs were introduced to me.
>
> Participant 8: As of my addiction, drug use and stuff progressed, I stopped riding [dirt bike] and then I stopped racing, stopped doing everything. By the end I barely rode my bike at all. …Um, it [drug use] made me really lazy and not really care… Um, we had really strict training, like workout, ride and stuff and I stopped doing that. And, like I would, rather do drugs than go workout…

Summary

The interviews with 20 people in recovery and the counsellor allowed me to capture a great deal of information about the role of PA and sport and the development of substance addiction. All of the participants appeared to be very enthusiastic in their participation and were very forthcoming as they shared their personal histories.

With no prior knowledge of who would volunteer, I was pleasantly surprised to find the diversity of sport involvement; both the variety of sports represented and the level of engagement, which ranged from limited recreational to international level competitions.

The participants' backgrounds included a variety of home situations, ranging from chaotic to stable and loving and supportive. Throughout their lives they dealt with mental health issues and different forms of abuse. Their substance addictions included a variety of drugs and alcohol and other addictions included eating disorders, exercise addiction, gambling and sex addiction.

Most of the participants had a positive attitude toward PA and sport and most intended to either continue to be active or to return to being active following treatment. This included the people with eating disorders who also had problems with exercise addictions; they felt that they had adopted a healthier approach to exercise and anticipated being able to maintain it after completing treatment. Three of the participants indicated

that while they have resumed activities, they have been unable to return to their original sport due to its association with their substance addiction.

For the participants who were part of the pilot study and have been in recovery for over a year, most have resumed active lifestyles except for two who have physical impairments. The main study participants were enjoying their participation in the activity program at the treatment centre. The most commonly mentioned planned activity was walking which is also the primary activity at the treatment centre.

The data gathered in this research made it possible to identify several contexts and mechanisms that will contribute to our understanding of what affected whom in what conditions, and offering preliminary answers to the research questions.

Chapter 5 Discussion

This study was undertaken to learn about the possible connections between PA and sport participation and the development of substance addiction. While involvement in sport and PA is generally considered to be positive, there are situations where involvement increases the risk of substance use, abuse and subsequent addiction (Bilard et al., 2011; McDuff & Baron, 2005; Taliaferro et al., 2010). With a paucity of research regarding the relationship between involvement in PA and sport, and the development of substance addiction, this research contributes to a preliminary understanding of the possible connections by focusing on the experiences of people in recovery from substance addiction.

Qualitative realistic evaluation (RE) was used to examine and identify the perceived main mechanisms associated with participation in physical activity or sports and the subsequent development of substance addiction. The research questions were:

1. What perceived mechanisms linked participation or non-participation in physical activity or sport with the development of substance addiction?
2. How do these mechanisms vary by context?
3. What different mechanisms are associated with different patterns in the development of substance addiction?

The objective of the project was to contribute to the body of knowledge by investigating the potential facilitative or protective role that PA and sport involvement may have played in the development of substance addiction from the perspective of a group of people in recovery from substance addiction. RE was chosen as the process for this research because it investigates behavioural change within complex social and cultural contexts taking into account the influence of pre-existing personal circumstances. This framework, which is suitable for complex evaluations, is being used increasingly to assess programs in healthcare settings. Although this research did not involve an intervention or program, RE was used as a means for organizing and examining the various aspects of PA and sport involvement and the development of substance addiction through the identification of mechanisms and contexts.

On the surface it appears that RE would clearly enable us to study the interactions between the mechanisms and contexts and the outcome of substance addiction; however, the process was not at all straightforward. The task of identifying mechanisms and contexts was far more onerous than I had originally envisioned. I was not alone with the challenge in categorizing the mechanisms, contexts and outcomes. Greenhalgh et al. (2009) describe their heated arguments during hours-long meetings as they worked toward the development of CMOs, indicating that the CMOs did not "fall out of the data" (p. 413). Other researchers have shared this struggle with the decision of whether to categorize

something as a mechanism, context or outcome "with the picture being further complicated when some outcomes became contexts for other mechanisms" (Hewitt et al., 2012, p 258).

In addition to the challenge of identifying mechanisms and contexts, another complication is that outcomes can result from the interrelationship of multiple contexts and mechanisms (Byng et al., 2005; Hewitt et al., 2012). Furthermore, the linear relationship implied by the prescribed formula C + M = O was, as Byng et al. (2005) described, a sequence that more often consisted of feedback loops where an outcome interacted once again with a mechanism. For example, Participant 10 was given alcohol as a young child and also drank socially as a teen but he did not abuse alcohol and addiction did not occur (O: no addiction). However, when he suffered an injury that ended his sport career (C: loss of sport), his drinking escalated (M: coping), resulting in substance addiction (O: addiction).

Working through the process of identifying mechanisms, contexts and outcomes might have been simplified if there were examples to draw upon. However, as Hewitt et al. (2012) indicate, RE is relatively new and therefore there are few examples of realist evaluations and syntheses available to guide a novice. Despite the challenges, RE provided a suitable means of examining the components and the relationships in this complex study of the role of PA and sports and how they might have contributed to the participants' substance addiction.

Mechanisms linking Physical Activity, Sport and Substance Addiction

The development of substance addiction is believed to have resulted from the participants' behaviours occurring through the activation of mechanisms. The mechanisms identified were personal characteristics, coping strategies, availability of substances and relationships. The interactions between these mechanisms and the contexts activated one or more mechanisms that led to substance use, abuse and addiction.

Personal characteristics.

The personal characteristics that the participants' reported as most relevant to their substance abuse were low self-esteem and feelings of inferiority, the need to fit in, and competitiveness. Some of these characteristics originated at birth whereas others developed and evolved through life experiences; that is, the influence and interaction with social contexts and the environment. It is impossible to know the origins of the participants' personal characteristics but it appears that they contributed to the development of their substance addiction.

Learning vicariously about substance use by observing adults, the participants described being curious to try it themselves (Bandura, 1977). The observation of adults using substances did not always immediately generate sufficient interest to imitate the behaviour but at some point in a different context, a mechanism(s) was activated and substance use was initiated.

The initiation of substance use during adolescence is commonly associated with feelings of inferiority and low self-esteem (Leonard & Blane, 1999; Van Hout and Connor, 2007). These often co-occurred with the feeling of not fitting in, an experience described by several participants, and seemed closely linked with the development of substance addiction.

Whether the need to fit in was short term such as for Participants 1 and 4, as the youngest players on their hockey teams, or a chronic condition as described by Participants 19 and 11, using substances was a common means of coping and gaining social acceptance. Brown (2012) distinguishes between belonging and fitting in with the former described as being accepted for who you are whereas the latter requires changing to be like everyone else. The descriptions of not fitting in, as provided by the participants, indicate that they were adopting the necessary behaviours to fit in because they did not feel as though they belonged. In her research, Brown (2012) described the feelings that children associated with not belonging; not belonging at school was difficult but not belonging at home was devastating. For the participants who felt they did not fit in with their families, this experience often carried through to other social environments. The cumulative effect of these ongoing interactions between the various social domains and individual characteristics (Szapocznik & Coatsworth, 1999) is unmet social needs. The relationship between unmet social needs such as the inability to connect with others and feeling alienated, are known reasons for pathological substance use (Hart, 2013)

While interviewing Participant 19, unlike the other participants, I was not enjoying his company; I felt that he was constantly trying to impress me. I wondered if this was how he presented himself in other social situations and anticipated him telling me about his difficulty fitting in socially. My suspicions were confirmed when he said that he often felt like a black sheep and that this is what led to his substance use. Participant 19's behaviour during the interview had a negative effect on me and I had to make a concerted effort to hide my reaction. If other people shared a similar reaction to mine during their interactions with Participant 19 and made their feelings known, his feeling of not fitting in would be reinforced. Participant 19's behaviour and responses are an example of the continuous

reciprocal interaction between cognitive, behavioural and environmental influences (Bandura, 1977; Kouimtsidis, 2010).

Competitiveness was another characteristic described by, or apparent in the stories shared by some participants who were involved in competitive sports. Some felt that the first sign of their addiction was the competitiveness they displayed when they always wanted to be involved in more competitive sports or activities than the ones in which they were enrolled. They referred to their drive as compulsive or addictive or indicative of an "addictive personality." Participant 2 and Participant 3 elaborated by describing sports as their first addiction; it provided a similar gratification that they later found in substance use. Moos (2007) suggested that "physical activity and substance use may both elevate mood and decrease anxiety, which may make them functionally similar and substitutable" (P. 539).

After they were no longer involved in their sport, a few participants described how their competitiveness carried through to their substance use careers; their competitive nature remained intact, feeding their substance abuse and addiction and trafficking careers. Only one participant felt his competitiveness acted somewhat as a protective mechanism; it kept him involved in his sport, a more positive way to occupy his time.

Mental health challenges.

The relationship between personal characteristics and substance use is not always clear. Individuals with psychopathology are thought to have an increased risk of developing addictions (Drobes et al., 2009; DuPont, 2000; Shaffer et al., 2004) and yet alcohol use might also be the result of interactions between personality traits and environmental variables (Leonard & Blane, 1999). Three of the participants described having mental health challenges prior to using substances and suggested that these traits might have provided the motivation to begin substance use. Another group of participants indicated that the development of psychological or behavioural problems seemed to result from their substance use.

Many of the participants who started using alcohol as adolescents described suffering from dysthymia, now referred to as persistent depressive disorder (American Psychiatric Association, 2013), one of the common sequelae experienced by people active in their addictions (Berczik et al., 2012; Shaffer et al., 2004; Swendsen & Le Moal, 2011). A study using rats showed the susceptibility of the adolescent brain to alcohol-induced damage increasing the vulnerability to negative affect and alcohol use disorders (Pandey, Sakharkar, Tan, and Zhang, 2015). For some of the participants, these disorders developed into more severe forms of depression leading to suicidal thoughts or suicide attempts. The

participants appeared to be caught in a vicious cycle of substance abuse and mental illness, particularly depression, with each exacerbating the other. Particularly detrimental was their inability to control their substance abuse as their depression worsened. Their substance use continued despite the negative consequences arising from it.

Involvement in PA and sports did have positive effects for some of the participants. PA has been shown to alleviate the symptoms associated with depression and anxiety (Donaghy, 2007; Kantomaa et al., 2008; Pichard et al, 2009). This was the experience of a few participants but they commented that the symptoms returned when they were no longer active. All of the participants who were in treatment found that their participation in the controlled PA program, particularly the walking, contributed to feelings of wellbeing. PA and sports might be good for addressing some aspects of mental health but might go awry in circumstances such as some sport cultures, inadequate or inappropriate social supports, or with unmitigated competitiveness.

Coping strategies.

Several participants attributed their substance use to their lack of suitable coping strategies. Although some mentioned that they initially immersed themselves in sports, once substance use was initiated it became the preferred coping strategy. The effects of the good feeling or the elimination of the bad feeling served as positive reinforcements for continued substance use (George et al., 2012; Gifford & Humphreys, 2007; Moos, 2007).

With already limited coping skills, the development of substance addiction became an additional burden. Already suffering from various traumas and stresses, most of the participants developed the sequelae commonly associated with active addiction; that is, deceit, guilt, shame and dysthymia all of which can prompt continued substance use (Berczik et al., 2012, Shaffer et al., 2004; Swendsen & Le Moal, 2011).

In addition to coping with emotional anguish, some of the participants were also dealing with physical pain. This can be a problem for people with substance addictions due to their potential difficulties in accurately interpreting pain sensations. There is evidence that coexisting pain and addiction can lead to decreased pain tolerance and, furthermore, that physical pain can be magnified disproportionately when accompanied by depression, anxiety or traumatic stress (Bailey, Gold & Hurley, 2010). This latter situation is potentially what was experienced by Participant 4 who was administered pain medication following a serious and traumatic injury. He attributes the development of his substance addiction to the combination of mental trauma and prescription painkillers administered during his hospital stay.

Some of the participants who were involved in sports had experienced a combination of trauma, stress and physical pain when their use of painkillers began. Whether or not they were using other substances prior to using painkillers, they felt the use of painkillers contributed to the development of their addiction. With the powerful effects of drugs on the body and mind, the altered learning processes and interoceptive effects, it is difficult to distinguish the pharmacological/physiological effects from the expectancy effects (Goldman et al., 1987; Redish et al., 2008). Identifying and categorizing the mechanisms and contexts in such complex situations was very challenging due to the potential for multiple interactions between the contexts and mechanisms, and feedback loops between mechanisms and outcomes. However, it seems clear for these participants that their somewhat reckless use of painkillers did interact with contexts making the availability of the substance a mechanism of addiction development.

The use of substances to cope extended beyond adolescence. Some participants described their hopeless feelings as adults and considered substance use as the only option for coping. "Self medicating" through substance abuse contributed to the cyclical relationship between substance use and poor mental health.

Availability of substances.

The initial source of substances, typically alcohol and marijuana, were family, school and sports. The description of excessive alcohol use in several families potentially normalized its use for some participants, creating positive alcohol expectancies even before consumption had taken place (Belles et al., 2011; Dupont, 2000; Jackson et al., 2014; Leonard & Blane, 1999). "The literature consistently supports socialization processes at work in alcohol use initiation, with greater alcohol use among those with higher perceived and actual parental alcohol use and favorable parental attitudes toward use" (Jackson et al, 2014, p213). Furthermore, observing parents and other adults using alcohol and drugs models how to obtain and use them (Jackson et al., 2014; Moos, 2007). Most of the participants described such observations and some indicated taking advantage of the liquor available in their homes.

Jackson et al. (2014) suggested that children offered small amounts of alcohol at home when they are very young are at greater risk of developing substance addiction. Participant 10 recalled being offered wine on special occasions from the age of 7 years old. As an endurance athlete, his use of alcohol during adolescence was limited to drinks with his father and a couple of beers with teammates at the end of regattas. It was only following

the loss of his sports career in the absence of other goals that his early exposure to alcohol appears to have contributed to his alcohol abuse.

Most of the participants described their initial substance use as being prompted by the availability of marijuana, alcohol or both at school and in sports. The majority reported behaviour and experiences consistent with the development of addiction, particularly early exposure. Most began their substance use careers during adolescence. With adolescents' greater affinity for risk taking and the willingness to try new things, (Leonard & Blane, 1999; Swendsen & Le Moal, 2011), it is the most common time of initiation of substance use (NIDA, 2010; Pandey et al., 2015). For the participants feeling the need to fit in and enjoying the positive feelings induced by the substances in the company of new friends or teammates, continued substance use was reinforced. Such biopsychosocial factors are known to be influential in the development of addiction (Shaffer et al., 2004).

Relationships.

The participants' substance use may have been influenced by their parents' alcohol and drug use but it was further impacted by relationships developed at school and in sports. The participants' relationships with their friends, teammates and coaches appeared to be very influential in the initiation and continuation of their substance use.

Many new relationships developed during adolescence, largely the result of changing schools to enter junior high or high school. At this stage of life, choosing to be in the company of new friends and peer groups with shared attitudes and behaviours (Christiansen et al., 1985; Goldman et al., 1987) can contribute to the influence of peers. This is the time in life when peer influence eclipses parental influence (Leonard & Blane, 1999; Swendsen & Le Moal, 2011). The company of new peers is among the many significant changes that characterize adolescence and can be an additional source of stress (Leonard & Blane, 1999). The presence of stress can intensify the salience of cues, such as the encouragement from peers for substance using behaviour reinforcing the behavioural response to the drugs and alcohol (Gifford & Humphreys, 2007). For the participants' who initiated substance use in the company of new peers at school, their feeling of acceptance likely contributed to their enjoyment of substances, the development of positive expectancies and continued substance use.

The traditional view of sport participation is that it provides a protective factor against drug use and abuse (Chen et al., 2004; Hoffman, 2006; Lisha & Sussman, 2010; Nanninga and Glebbeek, 2011). In addition to the positive feelings of wellbeing associated with PA, it is the association with those who have a negative attitude toward substance use

that is considered to be protective against drug and alcohol use (Chen et al., 2004; Donaghy, 2007; Korhonen et al., 2009; Moos, 2007). This was not the experience described by most of the participants in this study; most were involved in sports and all developed substance addictions.

Two of the participants, who only turned to substance use following their loss of sport, indicated that they had previously benefited from the protective effect of sport participation. Participant 8 felt that with her commitment to dance, she had neither the time nor the inclination to use substances. Participant 10 described benefits including association with positive peers and feeling a part of a team. He also experienced the alleviation of the symptoms of his depression, an effect consistent with previous research (Donaghy, 2007). However, after suffering an injury he was no longer able to continuing rowing in the men's eight. He was no longer a part of the team and the end of his dream. He would not achieve his goal of going to the Olympics.

The sample in this project included only those who developed substance addictions which limited the investigation of the presence of protective effects associated with sport participation. Although there were no comparisons with individuals who had similar sport experiences but who did not develop addictions, it does seem clear that access to substances in sports contexts where substance use is supported or encouraged poses considerable risk for the development of addiction for individuals who might have other predispositions or vulnerabilities.

Participants 2 and 8 started using substances while they were actively involved in sports and felt they did not benefit from the protective influence of their basketball teammates' negative attitudes toward their substance use. Both participants had other connections that appeared to exert more influence than the relationships with their basketball teams. Participant 2's substance use was initiated and escalated with non-sport peers. He perceived his basketball peers to be tolerant of his substance using behaviour due to his skill on the court. His potentially overblown perception of his value to the team might have limited the influence of team members on his substance using behaviour. Participant 8, who had experienced feelings of not fitting in, described feeling increasingly disconnected with his basketball teammates despite having played with them since elementary school. His substance use started and escalated in the company of his dirt biking teammates, an environment in which he felt accepted. Despite a basketball scholarship, he quit the basketball team in order to spend more time in the company of his substance using peers. Both of these participants described their increased focus on substance use and the strengthening of drug taking behaviour, which conflicted with their

sports involvement. Since both participants had previously described their sport participation as a coping mechanism, their escalating substance use was possibly influenced by the "pharmacologically-based reinforcing functions" of the drugs (Chen et al., 2004, p.898).

Other participants might have experienced a protective effect of their sport involvement against substance use when they were younger but if so, it was lost when they reached adolescence. It is the contention of Wichstrøm and Wichstrøm (2009) that sports competitions organized by age segregation has the potential to limit this risk. During adolescence the risk of substance use is increased through association with older peers (Wichstrøm & Wichstrøm, 2009). This was the experience reported by some of the participants who were involved in more competitive levels of sport; that is, their substance use began in the company of their older teammates. As their sport involvement was then accompanied by regular substance use at sport-related functions, the enculturation process continued. For some participants, substance use began to take priority over the sport involvement. Chen et al. (2004) described this as the disappearance of valued behaviours in the behavioural repertoire that often accompanies the escalation of substance use.

For the participants who were involved in recreational level sports, even where they described a high level of competence in sports, their commitment to or level of interest in sports was not sufficient to discourage substance use. After initiating substance use with non-sport peers they lost interest in sport participation, as it was overshadowed by time spent with their substance-using friends. This negative relationship between substance use and sport participation has been discussed in previous research and remains a concern for future public health (McCaul et al., 2004; Werch et al. 2003).

Some participants described their relationships with coaches and sport officials as contributing to their later substance use. Some coaches were described as having a harsh approach with young children, expecting them to play through pain and hide their emotions, potentially contributing to their poor coping skills and/or feelings of low self-esteem. Other coaches and sport officials made comments about participants' weight and suggested that weight loss would enhance their performance. As children or adolescents, Participant 16 and Participant 11 were influenced by these authority figures particularly when comments about weight exacerbated their already negative body concepts. In retrospect, they realized the impact that the abusive treatment had on their self-esteem and how the comments added to their vulnerability to disordered eating and subsequent substance abuse.

The participants perceived many mechanisms that linked their participation in physical activity and sport to the development of their substance addiction. It was never just one mechanism that was activated but always a combination of the interactions of their personal characteristics, their lack of coping strategies, the availability of substances, and their unsupported or unhealthy relationships that led to substance use.

Contexts linking Physical Activity, Sport and Substance Addiction

In RE, contexts refer to the pre-existing social milieux and prevailing conditions that interact with the mechanisms, triggering some behaviours and outcomes and inhibiting or modifying others (Pawson and Tilley, 1997). These include interpersonal relationships and organizational and group traits in social environments (Pawson and Tilley, 1997). The social domains such as family, school and sport organizations in which a person exists, all have an influence on the development of attitudes and expectancies which then lead to behaviours (Potenza, 2013). The contexts in this research that activated different mechanisms leading to substance addiction were identified as the social acceptance of alcohol, heritability, family influences, role models, school culture, sport culture and the loss of sport.

Social acceptance of alcohol.

Alcohol is a legal substance and can be used safely by many people; however, its widespread use and social acceptance are also the cause of numerous problems (Dupont, 2000). Its availability not only makes it typically one of the first drugs used by young people but its extensive use is responsible for more harm than from other drugs (Dupont, 2000). Dowsett Johnston (2014) refers to our "alcogenic" society to describe the common use and acceptance of alcohol throughout society, noting that it is very difficult to find functions that do not include alcohol. The widespread use of alcohol supports the development of positive alcohol expectancies prior to consumption of alcohol (Christiansen et al., 1985; Leonard & Blane, 1999). The participants' exposure to and use of alcohol was typical; they observed its use at home, developed positive use expectancies and used it later with their peers; 10 of the participants developed alcohol addictions.

Heritability.

Heritability is the genetic predisposition to substance addiction and although it appears to act mechanistically, its influence is better understood by the criteria associated with contexts; that is, a longer term effect and in this case one that cannot be changed. Nineteen of the 20 participants were aware of a family history of alcohol and/or other drug

use disorders. This put them at a greater risk of developing substance use problems than those without such a history (Acheson et al., 2014). According to Belles et al. (2011), "Children with high risk genotype may remain phenotypically inconspicuous, if not exposed to a risky environment" (p. 1091). That is, heritability alone was not responsible for the participants' substance addiction; rather it was the result of interactions with other mechanisms in certain contexts that led to the development of addiction. Genetic factors can significantly influence the decision to use substances (Acheson et al., 2014), the reaction to them and the development of addiction (DuPont, 2000; Erickson, 2007; Potenza, 2013; Redish et al., 2008; Shaffer et al., 2004). Dupont (2000) explains that the number of people in the family with substance addictions is linked to the severity and speed at which addiction develops; the more family members with addiction, the faster the development and the more severe the addiction. Therefore, heritability is, in itself, a complex context.

Family influences.

Family influences include the stability of the family and the relationships amongst the family members. The bonds between family members and the influence provided by the family environment can be partially explained by Social Control Theory (SCT). SCT refers to the synergistic effect of the four influences of emotional attachment, commitment to conventional goals, involvement in conventional activities and acceptance of moral standards (Hirschi, 1969), all of which can originate from the family environment. With a weakening of any of these four influences there is a vulnerability to deviant behaviour, including substance abuse (Hirschi, 1969). From the descriptions provided, only six of the participants' families appeared to demonstrate all four influences; the others varied, with between one and all four influences missing or compromised.

One of the main causes of weakened social bonds is families' lacking cohesion or structure (Moos, 2007). This was the situation described by a number of the participants, where the weakened social bonds were the result of parents with mental illnesses or substance addiction, parents who were absent or detached, and family environments where the sharing of emotions was discouraged. If social bonds are absent or weak, individuals are more likely to engage in deviant behaviour such as drug and alcohol use (Hirschi, 1969; Moos, 2007).

Through parental influence, most of the participants had some experience with a commitment to conventional goals such as achieving levels in swimming lessons, participation in races and tournaments, and school attendance and achievement.

Participants 3 and 5 experienced limited commitment to conventional goals except a commitment to school attendance; however, even the strength of their school bonds was weakened through their frequent moves to different schools. A low level of school bonding is a factor that has been shown to influence substance use (Goldberg & Elliot, 2005).

Most of the participants described having been involved in conventional activities such as recreational PA and sport programs from the time they were young children. This connection has the potential to provide a connection with positive peers but as with the experience of some participants, it does not prevent substance use. The potential for substance use was greater for the few participants who had only limited involvement in conventional activities, creating ample unstructured free time. Compensating for boredom or filling free time can prompt drug experimentation and other deviant behaviour (Alexander, 2010; Van Hout & Connor, 2007).

A number of the participants were exposed to psychological maltreatment (PM) in their families. More than physical or sexual abuse, PM is a strong predictor of substance abuse (Spinazzola et al., 2014) and is also linked to relational insecurity and negative self-perception (Leonard & Blane, 1999; Moos, 2007; Spinazzola et al., 2014). This provides a possible explanation for the frequently mentioned mechanisms of lack of confidence and the need to fit in.

Some of the participants described positive relationships with their families but these were not sufficient to prevent substance use. However, these positive relationships with one or more family members were recognized as either contributing to the decision to seek treatment for substance addiction or as providing support and assistance throughout the recovery process. Moos (2007) offers the explanation that some positive family influences will contribute to an abstinent lifestyle through processes such as strengthened social bonds, encouraging alternative activities to substance use, and contributing to the development of self-esteem and coping strategies.

Role models.

The role models who were most influential in the lives of the participants were their parents or other adult family members, their friends or schoolmates, and their teammates in sports. The participants' decisions to imitate the behaviour of these role models were contingent upon their evaluation of the behaviour (usually in terms of whether it leads to social acceptance), the anticipated consequences, and on the importance of the person modeling the behaviour (again, in terms of social acceptance). More attention was given to the behaviours of models who were perceived as having pleasing characteristics, a finding

consistent with the effectiveness of modeling as it is described in Social Learning Theory (SLT) (Bandura, 1977). A good example was Participant 9 who felt he did not fit in in middle school and, upon entering high school, chose to become the drug dealer after observing the "popularity" of the previous dealer, the one who had sold him his first substances. Poor social skills and the influence of peer groups are common reasons for adolescents to initiate substance use (EMCDDA, 2009; NIDA, 2010). Several of the participants who were desperate to fit in willingly adopted substance-using behaviour to gain acceptance by substance using peers. The deviant behaviour became the connection rather than a real social connection with peers whom the participants referred to as "misfits".

As adolescents, the participants were more likely to model parental alcohol and substance use if they had a good relationship with their parents. According to Leonard & Blane (1999), in alcohol and drug using and abusing families, strong bonds with parents are expected to increase children's vulnerability to substance use. This was the situation for Participant 20 who initially described feeling a connection to her father and was always trying to win his approval. She imitated his behaviour by drinking alcohol, a behaviour that he seemed to encourage by providing rides to and from the bar when she was a young teen.

Parents' attitudes toward their children's alcohol use have been shown to influence the children's alcohol use. Evidence suggests that as parents become more relaxed about their maturing adolescent's alcohol use, use escalates (Zehe and Colder, 2014). The participants whose parents either served or purchased alcohol for them when they were underage is suggestive of their parents' relaxed attitudes toward their alcohol use prior to reaching legal drinking age.

The group with the greatest known risk for the development of substance abuse and addiction is children with addicted parents (Acheson et al., 2014; Belles et al., 2011; Dupont, 2000). In addition to the genetic influence of substance addiction, it was the role modeling provided by parents who were using or abusing substances that contributed to the enculturation of some of the participants to a lifestyle supportive of substance use. Observing a parent with an alcohol addiction can lead to the development of alcohol expectancies prior to personal drinking experience (Christiansen et al., 1982; Christiansen, Smith, Roehling, and Goldman, 1989; Leonard & Blane, 1999; Moos, 2007). Having one of their parents, or another influential adult family member, in active addiction appeared to have influenced the development of some participants' positive substance use expectancies, such as wanting to have fun, as the reason for initiating alcohol or drug use. This was

precisely the situation described by Participant 3 when he wanted to have what his cousin had; that is, girls, money and the things that money can buy or the positive outcomes of drug dealing and drug use.

Conversely, when the observed behaviour resulted in what was perceived to be a negative outcome, such as Participant 5 describing his mother's partying as "stupid" or Participant 13 saying he did not want to be like his father, they chose not to emulate the modeled behaviour. Their evaluation of their parents' behaviour had them avoid the behaviour and the aversive outcomes (Bandura, 1977). However, having only been exposed to the negative parenting practices associated with their parents' heavy drinking they were still vulnerable to substance abuse later (Leonard & Blane, 1999). In different contexts, these mechanisms were activated and their substance use began. Participant 5 was prompted to use alcohol when he was encouraged to drink by his group of friends; the mechanisms of peer relationship influences and the need to fit in were activated. The military culture, including the availability of alcohol, contributed to Participant 13's alcohol use and subsequent addiction. Although Participant 5 and Participant 13 initially described having negative alcohol use expectancies, these were replaced by positive expectancies in a different context. Expectancies can change with increasing age, drinking experience (Christiansen et al., 1982) and broader exposure.

The role modeling by the older members of the participants' sports teams reflected the social side of the sport that often included drinking and drugs. When they were the younger members of the teams, the participants were eager to be accepted into the peer group and adopted the preferences, values, and behaviours already established within the team. When they observed the older teammates' drinking and drug use, and were then encouraged to participate, they did so willingly.

The participants in this research discussed the influence of the various role models in their lives. The majority of the role models described by the participants influenced their substance use and their poor coping strategies, but this was to be expected given the topic of discussion. However, there were also descriptions of positive role models, particularly family members who modeled the behaviour that helped the participants in their recovery from addiction. The most notable was Participant 5's description of his uncle, the single positive role model among his many negative role models.

School culture.

Most of the participants spent a significant amount of time at school and many found that school culture played a substantial role in the development of their substance addiction.

Connections with the school environment can be fostered by the situations in the other contexts of people's lives (Hoffman, 2006). For example, for those whose home lives were unsettled, school provided an escape. Participant 2 found sanctuary in school sports and several other participants enjoyed the social environment at school. For the participants who felt they did not fit in, the high school culture provided the opportunity for new connections, often in the smoke pit or with other students who were willing to use substances.

Two participants attended private schools that had strict environments and where sports involvement was encouraged, environments that were protective against substance use. Participant 14's departure from this controlled environment to return to public school resulted in her decision to take advantage of the available substances and she subsequently dropped out of sports. Transition to new school cultures that include more and different people is recognized as a common time to initiate substance use (NIDA, 2010). Changing schools was the reason given by several participants for their decision to initiate substance use and is explained by the activation of the mechanisms: the need to fit in, the availability of substances, and relationships with new friends.

Sport culture.

Sport culture encompasses a variety of factors. In this research the sports atmosphere, pain management, and rough play and fighting emerged as important aspects of sport culture.

The sport atmosphere described by the participants as most conducive to the development of addiction was one that was social, included substance use, and where athletes were treated with something like celebrity status. The introduction of alcohol into their sports typically occurred when the participants reached adolescence. Their enculturation occurred through alcohol use by older teammates and/or the adults affiliated with their sports teams.

Terry-McElrath & O'Malley (2011) refer to previous research that shows children with delinquent histories are likely to drop out of sports before reaching high school, leaving those who remain in sports as more likely to conform to social expectations. Therefore, they might perceive alcohol used socially with a team as part of the development of friendships and social bonding (Korhonen et al., 2009; Terry-McElrath & O'Malley, 2011). Such was the experience of the participants who described the progression and escalation of their substance use in the company of teammates throughout adolescence. This pattern is consistent with research indicating that alcohol use increases with age for those involved in

team sports (Terry-McElrath & O'Malley, 2011) and that those who are involved in sports are more likely to use alcohol and binge drink (Goldberg & Elliot, 2005; Hoffman; 2006; McDuff & Baron, 2005; Wichstrøm & Wichstrøm, 2009). It is likely then that those who remain involved in sports past the onset of adolescence are more prone to conform to the social expectations within the sport context. This might make them particularly vulnerable to the effects of substance use and abuse.

Several of the participants described how the availability and regular use of drugs and alcohol with teammates increased the appeal of substance use in these contexts. Goldman et al. (2006) explain this as the development of positive expectancies when the availability and use of substances co-occur with everyday stimuli, in this case sports participation. Several participants further described how the positive effects of the substance use in this context overshadowed their concerns about the risks of using substances.

Some sports and types of sports are known to have a positive association with particular substances (Bilard et al., 2011; McDuff & Baron, 2005; Taliaferro et al, 2010). The association between alcohol use and team sports is unequivocal (Terry-McElrath & O'Malley, 2011; McDuff & Baron, 2005) and was evident in the team sport experiences described by the participants. Baseball and hockey were the sports mentioned most frequently by the participants as having the most prevalent use of alcohol with one saying "alcohol and sports [hockey and baseball] go hand in hand." Many of these participants played multiple team sports but they described the alcohol use as most prominent in hockey and baseball.

Participant 20 came from a home where alcohol use was encouraged and her alcohol use was well established when she joined a fastball team. Having already developed positive alcohol expectancies, she embraced the culture of drug and alcohol use on the team. With the change in context into the sport culture, her substance using choices were reinforced particularly as she found substance use contributed to her feelings of confidence and acceptance by the team.

Other participants shared Participant 20's experience as they continued playing their sports as adults in what many referred to as the "Beer League." A widely used but little documented term, beer league refers to a sport culture that embraces, or even centres around, alcohol use. These participants described the importance placed on beer drinking while playing the game, where the quantity consumed was as important as the game. Remaining active in their sports into adulthood meant their alcohol use continued or escalated. This is consistent with Barry and Piazza's (2010) finding that drinkers of all ages

tend to be more physically active than their non-drinking peers, and that participation in athletics is related to increasing alcohol use over time (Hoffman, 2006). As one participant expressed, the abundance of alcohol use by these recreational teams creates a barrier for those who would like to play the sport but do not drink, particularly if they are early in their recovery from alcohol addiction. A similar observation by Barry and Piazza (2010) led to their cautionary approach to prescribing physical activity to reduce alcohol use. This has also led to the establishment of adult recreational baseball games affiliated with the 12-step community. In keeping with their culture of anonymity no documentation could be found to describe these events. I know of their existence only through speaking to people who have been involved in such leagues.

Another known relationship is between competitive high intensity sports, especially team-based, and the vulnerability to addiction (Terry-McElrath & O'Malley, 2011). Two of the participants described their experience in the military, an environment that could be categorized as a team-based, high intensity environment. Due to the availability of alcohol, and frequent binge drinking, substance abuse and substance addictions are widespread in the military. Research supports this assertion with studies indicating that not only is excessive drinking common among the military but that there is a greater incidence of binge drinking among heavy drinkers than in the civilian population (Stahre, Brewer, Fonseca, and Naimi, 2009; Skomorovsky and Lee, 2012).

The participants who played hockey described another aspect of the atmosphere that influenced their substance abuse: the support and encouragement of fans and non-athlete peers. They described how their alcohol use escalated at post-game celebrations and with the encouragement of both teammates and peers, their substance use expanded. Taliaferro et al. (2010) indicated that marijuana and cocaine were drugs more typically used by non-athletes, however, this was not the situation described by four of the hockey players in this study. They described the use of cocaine as being popular on their teams; it was used at parties and became the drug of choice for two of them.

Some of the participants who had described feelings of low self-esteem, noted how much they savoured the recognition and popularity that accompanied their roles as hockey players, including attracting the attention of girls at parties and when they travelled to tournaments. The attention given by members of their own or other communities fueled their egos, and with inflated egos came inappropriate behaviour such as belittling younger teammates, participating in alcohol fuelled fights and infidelity. One participant attributed his recent diagnosis of a sex addiction to such past behaviour.

The positive or preventive influences on substance abuse in the sport culture described by the participants were limited. Participant 8's involvement in dance with its full schedule did not allow time for substance use and Participant 10's alcohol use while on a rowing team was limited to small amounts at the end of regattas. Participant 10's experience was consistent with the suggestion that alcohol and drug use are not as likely to occur in endurance sports (Wichstrøm & Wichstrøm, 2009).

In situations where positive peers were described, they did not seem to wield sufficient influence to protect against substance use. The participants who continued to play on "clean" sports teams had already made connections with other substance using peers and these connections became more important over time.

Overall, for this group of participants, involvement in sports did not provide the anticipated protection against substance use. For them, the time spent in organized and structured sport-based activities, particularly during adolescence, tended to encourage substance use. The use of alcohol by those involved in sports is consistent with previous research (Hoffman, 2006; Terry-McElrath & O'Malley, 2011); however, the use of marijuana, cocaine and other drugs is not. The participants described the use of marijuana and cocaine in the company of their teammates almost as frequently as they described alcohol use. The prevalence of substance abuse in sports settings discussed by the sample suggests that the rates might be under-represented in extant literature. Minimally, the prevalence of substance abuse in sports contexts poses heightened risk of addiction for individuals who are vulnerable for other reasons.

Pain management.

Injury and pain are common occurrences with sport participation and the participants described how they learned to manage pain in their sports. Some learned to play through pain, disregarding any discomfort, with or without the use of painkillers. A few participants who had developed eating disorders described forcing themselves to exercise regardless of how poorly they felt, raising the question of whether their earlier experiences of playing through pain exacerbated the condition. Having to exercise versus wanting to exercise is characteristic of exercise addiction (Berczik et al. 2012). The participants who had eating disorders also developed exercise addictions; feeling worn down from these combined effects contributed to their substance use and resulting substance addictions. Having already developed one addiction, they were vulnerable to the development of other addictions (Goodman, 2008; Redish et al., 2008; Shaffer et al., 2004).

Some participants not only described a culture of recreational drug and alcohol use in their sports but also the abundant use of painkillers. As a hockey enforcer, Participant 1

described using "everything" combined with alcohol in order to sleep, the same pattern of substance use and availability used by enforcers in the NHL to manage pain (Branch, 2014). For Participant 1 and some other participants who were dealing with feelings of not fitting in and other stresses, the availability of substances to manage pain created another vulnerability to addiction. The presence of multiple risk factors increases the likelihood of the development of substance addiction (Szapocznik & Coatsworth, 1999).

Rough play and fighting

Two of the participants who had played hockey described the rough nature of their sport, including their role in fighting. Neither liked fighting but they enjoyed the recognition of competently performing the role. Despite the negative emotions associated with hurting other people, the reward of recognition reinforced the behaviour. Participant 1 ended his hockey career following injuries including multiple concussions, but it was the guilt stemming from hurting others and coping with lingering emotional pain that contributed to his ongoing alcohol abuse. Branch (2014), in his account of Derek Boogaard's life as an NHL enforcer, details the toll that fighting takes on hockey players, the connection between physical and emotional suffering, the availability of substances, and their acceptance in sport culture, all of which contribute to the development of substance addictions.

Loss of sport.

Many of the participants who were actively involved in sports experienced either a temporary or permanent loss of sport. The participants attributed their loss of sport to injury, their substance use, or a decision to leave the sport. Substance addiction resulted from either the traumatic end to a sports career due to injury, leading to substance use to cope with the loss; or when substance abuse actually brought about the end of the sports career. The connection between the sudden end of competitive sport participation and later use of substances has been shown previously (Pichard et al., 2009). Some of the participants indicated that their loss of sport was connected to the development of their substance addictions.

Participant 10 and Participant 17 felt that their involvement in sport provided a protective mechanism against substance use, particularly for Participant 10 who also suffered from depression. Following the loss of his sport, he had to contend with the short-term physical pain from the career-ending injury and the longer lasting and more devastating emotional pain from the loss of his sport, still evident twenty years later. For him, the loss of sport also took away the beneficial effects on his depression. He lost being a part of the team and was no longer working toward an important goal. Goal setting is

considered to be one of the protective influences of sport participation (Moos, 2007), however, for some of the participants the end of their sports career meant the failure to achieve an important life goal. The inability to continue working toward their singular goal was devastating. The absence of another important alternative goal was described as an important factor contributing to addiction for some. The role of sport-related goals and the resulting effects when achievement is not possible would be an interesting topic for future research.

Participant 17 attributed the loss of sport to her eating disorder. The resulting and lingering health problems from the eating disorder prevented her from returning to her sport. With her eating disorder uncontrolled, she developed an exercise addiction, and then substance addiction. For Participants 17 and 10, the loss of their sports and their lack of appropriate coping strategies resulted in substance abuse and ultimately substance addiction.

For other participants it was the substance use behaviours that led to the loss of their sports. Two of the participants described how their escalating drug use influenced their perceptions of how drug use was altering their sports performance. At the time he was using drugs, Participant 12 felt that smoking marijuana increased his focus while executing his routine on the trampoline. Participant 15 was convinced that cocaine was enhancing his goaltending, and felt he had to use it before each game. Repeated use of a drug can lead to aberrant learning influencing future behaviours associated with its use (Torregrossa et al., 2011). Such were the experiences of Participants 12 and 15. A number of other participants also commented that in retrospect, after their time in treatment, their drug use had adversely affected their sport performance and was the likely cause of missed opportunities.

Increased substance use can lead to a loss of interest in previously valued activities (McCaul et al. 2004; Werch et al., 2003) and the progressive magnification of positive use expectations can lead to a greater focus on substance using behaviours (Jones et al., Leonard & Blane, 1999; Reich et al., 2010; Torregrosa et al., 2011). This was the experience described by several participants resulting in some ending their sports participation.

Although Participant 20 had not lost interest in fastball, when she felt she needed a lifestyle change and concluded that this involved escaping the company of her competitive team, she quit. She failed to recognize that her drug and alcohol use were potentially the source of the problems in her life. Pichard et al. (2009) suggested that intense PA can increase vulnerability to addictive behaviours and that there is a possible correlation

between intense PA and substance use. Participant 20's alcohol and drug use had escalated in the company of her competitive team, but then remained unchanged following her move to a recreational team. Therefore, it is possible that the intensity of the sport contributed to her substance abuse but that the social acceptance of alcohol in the sport culture allowed it to continue in a less intense sport environment.

The seven contexts identified as linking PA and sport participation to substance addiction were the social acceptance of alcohol, heritability, family influences, role models, school culture, sport culture and loss of sport. For this group of participants, it was never just one of these contexts but some combination that activated the mechanism(s) that led to substance use and subsequent addiction.

Influence of Contexts on Mechanisms

Any response to the question of how the mechanisms vary by context is not straightforward. Multiple risk factors and the activation and interaction of multiple mechanisms appeared to lead to substance use and the subsequent development of substance addiction for these participants. Isolating the effects of contexts on mechanisms is a challenge due to the coexistence and influence of multiple contexts and the interactions between many of the mechanisms and contexts; however some patterns emerged in the lives of the participants.

Heritability.

The influence of heritability appeared to follow the activation of mechanisms although it is possible that in association with other mechanisms, heritability contributed to some participants' choice to use substances. The process of addiction following use varied among participants with addiction developing soon after their first use for some and for others, several years later as circumstances (contexts) changed. Substance addiction does not always develop quickly; it can take years before it occurs (Torregrossa et al., 2011). Through some combination of contexts and mechanisms, the heritability of addiction appeared to contribute to the use, abuse and development of addiction for these participants.

Social acceptance of alcohol and availability of substances.

The social acceptance of alcohol and the availability of substances are two contexts that influence the development of addiction through the interaction with other mechanisms and contexts. The social acceptance of alcohol created awareness and availability of alcohol

use for most of the participants, the substance first used by many of them. Substance use often began when substances were first available and then escalated in each new context. For example, if substances were first available in the family environment, even if they were not used extensively, use could escalate at school or in sports.

Family influences.

According to Social Learning Theory (SLT) some traits originate at birth and then influence how an individual interacts with the environment (Bandura, 1977). Consequently, these interactions contribute to further evolution of the characteristics or traits. Traits such as low self-esteem and the need to fit in were mechanisms activated for several of the participants. Their origin and development are unknown but there are some possible explanations. When the family influences included negative experiences, such as psychological maltreatment (PM) and poor parental modeling, the participants' personal characteristics of low self-esteem and the need to fit in were activated, leading to a need to cope. Also possible is that with their self-described desire to always achieve, some participants were simply unable to meet their own self-imposed standards of behaviour. When individuals feel they have failed by not achieving the standards they have set for themselves, they look for other ways to cope (Alexander, 2011). As coping mechanisms, some participants found sanctuary in their sport participation, and for them it was a short-term escape that was ultimately replaced with substance use. Other participants only used substances as coping mechanisms. It is unclear whether access or awareness of better coping strategies might have served a protective effect, but is worth considering in the future.

Role models

The influence of role models often interacted with the participants' personal characteristics and led to the development of relationships in each new context. When the participants felt the need to fit in, apparently popular people influenced them and prompted the imitation of their behaviours. The resulting acceptance and encouragement by the new peer groups reinforced substance-using behaviours. What appeared to be missing for this group of people were the influence of positive role models and the development of positive relationships that might have shielded them from some substance using behaviours. It is unknown whether or not positive role models were present. If there were positive role models, they apparently did not influence these participants.

School and sport cultures.

The personal characteristics of low self-esteem and the need to fit in which may have been influenced by family relationships appeared to be activated in the contexts of school and sports. That is, these traits might have existed for the participants early in their lives but their entry into new schools or onto new sports teams is what seems to link these characteristics to vulnerability to initiation of substance use. With the often increased availability of substances in the new environments and the development of new relationships, the participants were influenced to initiate substance use. Even the participants who came from apparently secure family environments found they felt the need to fit into the new contexts, providing the motivation for substance use.

Loss of sport.

Loss of sport seemed to adversely affect the personal characteristics of self-esteem, the need to fit in, competitiveness, and the ability to cope. Also affected were relationships between the participants and their sport contacts when the participants were no longer a part of the team. The loss of sport either led to substance use, or if it already existed, an escalation of existing substance use.

Through the apparent influence of the contexts of heritability, social acceptance of alcohol, availability of substances, family influences, role models, school and sport cultures and loss of sport on the mechanisms, and through various interactions, substance addiction developed for each of the participants. Participation in the sport environment is thought to provide protective factors such as positive role models, the development of self-efficacy, coping skills, goal setting or the positive use of time (Moos, 2007). While some or all of these might have existed in the sports environments of the participants, they did not prevent substance use or the development of substance addiction, suggesting that even if they are present, such positive factors are not sufficient to overcome other contextual and mechanistic risks of addiction. Together the current results suggest that there is a need to explicitly attend to inherent cultural risk factors, such as the availability of substances, adult role modeling, and supervision.

Mechanisms and patterns in the development of substance addiction.

In this research, the outcome of substance addiction was the common characteristic of the participants. For them, substance addiction developed as a result of the activation of different mechanisms in different contexts. Although the path to addiction was unique for

each individual, some patterns emerged. The following configurations of contexts and mechanisms were identified as those most strongly and consistently associated with the development of addiction.

Contexts		**Mechanisms**	
	Sub Contexts		**Sub Mechanisms**
C_1 Social Acceptance of Alcohol		M_1 Personal Traits	$M_{1.1}$ Low Self-esteem
C_2 Heritability			$M_{1.2}$ Need to Fit In
C_3 Family Influence			$M_{1.3}$ Competitive
C_4 Role Models	$C_{4.1}$ Family	M_2 Coping Strategies	$M_{2.1}$ Stress
	$C_{4.2}$ Team		$M_{2.2}$ Pain Relief
C_5 School Culture		M_3 Availability	$M_{3.1}$ Family
C_6 Sport Culture			$M_{3.2}$ School
C_7 Loss of Sport			$M_{3.3}$ Sports/Military

Grouping the participants according to their PA and sport experience and involvement resulted in the following patterns of contexts and mechanisms. The contexts and mechanisms were included if they were shared by the majority of the participants in each grouping and the most influential contexts and mechanisms in each pattern are presented as boldface.

1. Limited physical activity

(Participants 3, 5, 7, and 13*)

$C_1 + \mathbf{C_2} + C_3 + C_{4.1} + M_{1.1} + M_{2.1} + \mathbf{M_{3.1}} + {}^{*}M_{3.3} = O$

***This mechanism was unique to Participant 13, however it has been included because he felt it was a significant factor in the development of his substance addiction. From the descriptions provided by the two participants with military backgrounds, the military might be a domain of concern based upon their descriptions of the deeply enculturated practices and beliefs associated with substance use in the military.*

2. Recreational sport as a child

(Participants 14, 18, and 19)

$C_1 + C_2 + C_3 + \mathbf{C_5} + M_{1.1} + M_{1.2} + \mathbf{M_{2.1}} + M_{3.1} + \mathbf{M_{3.2}} = O$

3. Competitive Athlete

(Participants 1, 8, 9*, 15, 16 and 20)

$C_1 + C_2 + C_3 + C_{4.1} + \mathbf{C_{4.2}} + C_5 + \mathbf{C_6} + \mathbf{M_{1.2}} + M_{1.3} + \mathbf{M_{2.1}} + {}^{*}M_{3.3} = O$

4. Competitive athlete followed by loss of sport

(Participants 2, 4, 6, 10, 11, 12 and 17)

$C_1 + C_2 + C_3 + C_{4.1} + C_5 + C_6 + \mathbf{C_7} + \mathbf{M_{1.3}} + \mathbf{M_{2.1}} + M_{2.2} = O$

The most influential contexts across the four patterns appeared to be the social acceptance of alcohol, heritability, and family influence. The context of social acceptance of alcohol affected all of the participants. Heritability was included as it appeared in the family histories of 19 of the 20 participants. There is no clear indication of when the genetic influence came into play but with evidence of a family history of substance addiction it must be considered as contributing to the development of their substance addiction.

Within family influence, negative family relationships such as the presence of abuse and any other form of dysfunction, were usually mentioned by participants who also had the traits of low self-esteem and the need to fit in. This suggests that family influence played a role in the activation of these mechanisms. The participants who had low self-esteem and the need to fit in appeared to be vulnerable to connections with and acceptance by people or groups that showed interest in them. Often these people or groups were not positive influences and typically led to the participants' substance using behaviours.

The majority of the participants were involved in competitive sports and it was the influence of the sport culture and the role models that appeared to play a prominent role in the initiation and continuation of substance use. Some of the participants had used sports as a coping mechanism, which was then replaced with substance use. Others, in the context of sport, used substances to cope with both stress and pain. With many of the participants also feeling the need to fit in, and with the availability of substances in the sport environment, substance use began.

Limited physical activity.

The participants in the first pattern described their backgrounds as lower socioeconomic and suggested this as the reason for their limited opportunities to be involved in PA and sports. When they were given the opportunity to participate in PA and sports all enjoyed the activities with some having more success than others. Their participation in PA and sport, which was confined to school based programs and unorganized play, came to an end during early adolescence. The absence of parental support for their PA combined with the limited involvement in the activities prevented the development of significant social connections. The absence of strong and healthy bonds with PA and sport or any other outlet left them vulnerable to deviant influences to which three succumbed. Participant 13 was the exception as he tried to make a positive connection in his life by joining the military. His vulnerability in the context of sport (military) culture and the availability of alcohol contributed to the development of his alcohol addiction.

Recreational sport as a child.

The second pattern includes the participants who were involved in recreational sports as children. Their parents enrolled them in sports programs from an early age and continued to encourage their participation. Just as with the first group, some of these participants experienced dysfunction in their families and then felt the associated low self-esteem and the need to fit in. They had varying experiences on their sport teams, feeling accepted on some and not on others. Generally, they enjoyed their sport experiences but their sport involvement represented just one part of their lives and was not a focal point. The connection with the recreational sports programs did not appear to be sufficient to prevent the development of other connections with negative influences, such as the relationships that developed with peers at school. Upon entering high school, each of these participants was influenced by the culture, connecting with substance using peers and preferring to spend time in their company, using substances, as opposed to continuing with physical activities. One exception was Participant 18 who had an eating disorder and in addition to her substance using friends she also spent time in the company of other girls who were obsessive about exercise. Her involvement with physical activity waxed and waned as her substance use varied.

This group of participants had all been exposed to substance use in their homes but it was the activation of the mechanism of availability of substances at school that led to their regular substance use. Their regular substance use during adolescence increased their risk of developing substance addictions, a development that occurred in subsequent years.

Competitive athletes.

The third and fourth patterns describe the development of substance addiction for the participants who were competitive athletes. These patterns are more complex as they include the interactions of more contexts and more mechanisms than the first two patterns. Once again, the family influences affected many of the participants but it was their involvement in sports that played a more prominent role. Where they had the traits of low self-esteem and/or the need to fit in, the contexts of sport culture and loss of sport appeared to be the most influential in the development of substance addiction.

The third pattern includes the competitive athletes who embraced sports from the time they started as young children. Although the level of interest waned for some as their substance use escalated, they continued with their involvement in some form. Each of these participants experienced the feeling of the need to fit in, chronically or just at a critical time when joining a team. When the sport culture supported substance use and role models set the example of substance use, the need to fit in was activated. With the

availability of substances at team events, substance use became a part of the behavioural repertoire in the company of teammates and often took on more importance than the sport. Participant 1 was the only one who chose to leave his sport, a decision that followed the development of his addiction. The decision was made due to ongoing injuries and his concern about future career prospects as a hockey player.

Competitive athletes with loss of sport.

For those who were competitive athletes and experienced the loss of sport, the loss did not always precede substance use but it was the context in which abuse occurred. All but one of the participants in this group ended their sports careers by the end of high school; the exception was Participant 11 who was in university. The reasons for their loss of sports included trauma, injury, loss of funding or being cut from the team.

Although for each participant there were other influences that contributed to the development of substance addiction, the end of their sports career was very significant. It did not always lead directly to their addiction but the loss of sport was mentioned in their interviews as a very upsetting and significant negative event in their lives. The mechanism activated was the need to cope with the loss of a very important activity that occupied much of their lives. For some it also meant the end of a dream. As a very competitive group of people, their drive to achieve the singular goal was all consuming. When the goal was lost, their focus was often misdirected as some participants undertook other activities to compensate for the loss of sport, including escalating substance use. Decades may have passed since their loss of sport and yet for a few, it is a loss that they have not yet overcome.

These patterns are generalized to provide an overview of the development of substance addiction in the lives of these participants. The variations in the patterns demonstrate that "what works for whom in what situation" is certainly not uniform. With so many factors in the various contexts and mechanisms and their interactions, it is difficult to pinpoint exactly how substance addiction developed. However, commonalities emerged as represented by the patterns identified and these provided some insight into the role that PA and sport played in the development of substance addiction for this group of people. The frequency with which the participants mentioned feeling that they did not fit in was notable. This appeared to be a key factor in initiating and continuing substance use. For those involved in recreational sport, sport involvement was typically replaced by spending time in the company of substance using peers. However, for those more committed to sport, their substance use was more likely to begin and continue as part of their enculturation in the

sport environment. The substances mentioned as being most frequently used by the athletes were alcohol, marijuana and cocaine.

Conclusions

This study examined the lived experience of people in recovery from substance addiction to consider the role that their involvement in PA and sport may have had on the development of their addiction, positive or negative. The social acceptance of alcohol and the heritability of addiction in their families appeared to have substantial influence on most of the participants' initial use and then the development of addiction. Most of the participants indicated that at some point in their lives they lacked appropriate coping strategies for dealing with stress and they turned to substance use for relief. It was also very common for the participants to feel that they did not fit in. For those who were involved in sports, these feelings existed regardless of their level of success in sports and tended to contribute to their substance use. Sport participation is traditionally thought of as providing protection against substance use but those who mentioned associating with positive peers in sports, the peer influence was not effective in preventing or discouraging their substance use. Generally, for these participants, substance use was often initiated and continued in the company of their sport teammates, with substance use including alcohol and other drugs such as marijuana and cocaine.

Limitations

The sample studied in this research involved people who have a substance addiction and were currently in treatment or recovery. Therefore, the results are limited to the role of PA and sport only for those people who did develop substance addiction. It is not possible to comment on the role that involvement in PA and sport might have on those who did not develop substance addiction, even if they were exposed to the same contexts and/or mechanisms.

A convenience sample of people with substance addictions who are in treatment at a private treatment facility may have different characteristics than those who did not seek treatment or those who obtained publicly funded treatment. Some of the participants in the pilot study represent the latter, but the majority of the study participants attended a privately funded treatment centre and they might not be representative of all patients seeking treatment for substance addiction. Drawing the sample from a single treatment centre might result in a sample with more in common than a sample drawn from multiple types and locations of treatment facilities.

Participants' views of their involvement in PA and sport and their substance use history was based upon retrospective re-interpretation. Not only is this process subject to human error and contradictory recollections, the recollection could have been further limited by the participants' level of introspective insight and forgetting the mental processes that led to the outcomes (Hammersley, 1994). The validity and reliability of the data might be further challenged both by the length of the reference period, and whether the participants were under the influence of substances during the periods being recalled (Brener, Billy, and Grady, 2003, Hammersley, 1994).

Overall the participants were a very active group with only a few who had limited periods of PA during their youth; none had avoided PA. Therefore, it is not possible to comment on people who chose an inactive lifestyle.

The results are limited by self-selection bias, as only those who volunteered to participate were included in the research. However, care was taken to include all who volunteered both to honour their willingness to contribute to the research, and to maximize the sampling.

The use of RE has led to a very lengthy thesis. It would not be possible to do justice to RE and this complicated phenomenon without the explanations and the detail around the contexts and mechanisms.

Delimitations

The use of RE for this research was not evaluating a program but focused on a specified outcome, substance abuse. This not only restricted the use of the technique but severely limited access to examples to guide the process.

Recommendations for Future Research and Interventions

This research project attempted to fill a gap in the literature regarding the relationship between PA and sport involvement and the development of substance addiction. The lack of empirical evidence dictated the need to conduct an exploratory project. However, now with some evidence of possible connections, a quantitative project focused on specific sports and teams could shed more light on the subject.

The perspectives of people who were involved in sports and did not develop substance addiction could be gathered through further qualitative investigations. Such an examination would help determine if there were protective mechanisms in the contexts described by the participants and shed light on their experiences, which might include using and abusing substances and not developing substance addiction, or not participating in substance use. Information might also be gathered regarding the interactions of the

contexts and mechanisms among participants who shared the sport and PA contexts, but not necessarily any of the others.

It would also be interesting to gather the perspective of people who have a family heritage of substance addiction, but did not develop substance addiction, and who were involved in the same sports as the participants to determine what influence the sport culture had on them.

Some potential interventions within the sport environment have been identified that would be worthy of exploration[1]. The first would be to develop substance free sport environments to protect younger athletes by removing this source of exposure or availability of substances. Another aspect would be to provide education for coaches to understand how their own attitudes, behaviours and comments can have life-long effects on their athletes. Finally, witnessing the lasting effects of loss of sport by some former athletes, the development of goal setting to include goals to be achieved inside and outside of sports might help prevent the devastation that accompanies the loss of sport.

[1] The Australian Drug Foundation has developed a program called Good Sports; http://goodsports.com.au/about/ has been established to address the key health issues of alcohol, smoking, obesity and mental health.

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Appendix 1 - Pilot Information Letter and Consent

The Role of Physical Activity and Sport for People with Substance Addiction: a realistic evaluation study.

Research Investigator:
Laurie de Grace
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Supervisor:
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Professor Faculty of Physical Education and Recreation
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Background

- The connection between substance addiction and participation in physical activity and sport is not clear. I am interviewing people who are currently in recovery for substance addiction where recovery is defined as complete abstinence of substance use. I would like to know about your experiences with participation or non-participation in physical activity and sport.
- We would like to know what things encouraged or facilitated the development of your addiction. We are also interested in what things might have discouraged or prevented the development of your addiction. In particular, we are interested in what you think about physical activity and sport in either of these roles.
- The results of this study will be used for my Master's thesis.
- The results might also be published in journals and presented at conferences. They might also be shared with health care workers at workshops. Your written consent will authorize me to proceed with the interview and use the data as outlined above.

Purpose

The purpose of this study is to determine if there is an association between physical activity and sport, and the development of substance addiction. Investigating through the first hand experience of people dealing with substance addiction will provide some insight into the role of PA and sport, and the possible connections with substance addiction.

Study Procedures

- Participation in this research project is limited to one interview. It is expected to last one hour.
- The interview is about understanding your experiences. Therefore, you are the expert.

- I will ask you questions about both your use of substances and your participation in physical activity and sports.
- Two audio recorders will be used to capture our conversation. This is to assist me with transcription following the interview.
- I may also record some notes to assist me with the transcription

Benefits

- Participating in this study might help you to understand how you think about physical activity and sport and influence your participation in future activities.
- Responding to some questions might provide the opportunity to talk about issues that you have not previously thought about or discussed.
- The benefit to us from your participation is that we will better understand the role of physical activity and sport in your life and if it was connected to the development of your substance addiction.

Risk

- You might feel uncomfortable responding to some questions. They might bring up uncomfortable emotions. This might help you by providing the opportunity to talk about issues not previously addressed. However, if you feel very uncomfortable, please let me know.

Voluntary Participation

- Participation in this study is voluntary.
- You do not have to answer all of the questions that I ask. If there are any questions that you do not want to answer, please let me know. All responses are optional. If at any time during the interview you would like to withdraw, please let me know and I will stop the interview. I will not include any information that you have already provided without your consent. There will be no consequences if you choose to withdraw from this study.

Confidentiality & Anonymity

- I will use the results of this study for my thesis. I may also use it for publications in professional and applied journals, presentations to local, national and international conferences, and workshops presented to health care workers.
- I will use first names or pseudonyms in the written report and I will remove all identifying information such as other names and locations during the transcription of the data.
- If you would like to see a copy of the final report, please let me know and I can share it with you.
- The data will be kept confidential with only my supervisor and I having access to the data. This means that anonymity can be guaranteed.
- The data will be kept in a locked filing cabinet in the lab for a minimum of 5 years following completion of research the project. At the appropriate time it will be destroyed in a way that ensures privacy and confidentiality.

- We may use the data we get from this study in future research, but if we do this it will have to be approved by a Research Ethics Board.
- Your consent will authorize me to proceed with the interview and use the data as outlined above.

Further Information

- If you have any further questions regarding this study, please do not hesitate to contact either Dr. Wendy Rodgers or me.
- The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615."

Consent To Participate in this Optional Research

My signature on this consent form means that:

- This optional study has been explained to me. I have been given the chance to discuss it and ask questions an all of my questions have been answered to my satisfaction,
- I have read each page of this form,
- I am aware of the risks to me of participating in this optional study,
- I voluntarily consent to take part in this optional study

Name of Participant (Print)	Signature of Participant	Date (yyyy-mm-dd)

Appendix 2 Main Information Letter and Consent

The Role of Physical Activity and Sport for People with Substance Addiction: a realistic evaluation study.

Research Investigator:
Laurie de Grace
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Supervisor:
Wendy M. Rodgers, Ph.D.
Professor Faculty of Physical Education and Recreation
University of Alberta
E4-01 Van Vliet Centre
Edmonton, AB T6G 2H9
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wendy.rodgers@ualberta.ca

Background

- The connection between substance addiction and participation in physical activity and sport is not clear. I am interviewing people who are currently undergoing treatment for substance addiction. I would like to know about your experiences with physical activity and sport. The Program Director invited me to recruit participants from people currently undergoing treatment at Cedars at Cobble Hill.
- We would like to know about the development of your addiction. We are also interested in what things might have discouraged or prevented the development of your addiction. In particular, we are interested in what you think about physical activity and sport in either of these roles.
- The results of this study will be used for my Master's thesis.
- The results might also be published in journals and presented at conferences. They might also be shared with health care workers at workshops. Your written consent will authorize me to proceed with the interview and use the data as outlined above.

Purpose

The purpose of this study is to determine if there is an association between physical activity and sport, and the development of substance addiction. Investigating through the first hand experience of people dealing with substance addiction will provide some insight into the role of PA and sport, and the possible connections with substance addiction.

Study Procedures

- Participation in this research project is limited to one interview. It is expected to last one hour.

- The interview is about understanding your experiences. Therefore, you are the expert.
- I will ask you questions about both your use of substances and your participation in physical activity and sports.
- Two audio recorders will be used to capture our conversation. This is to assist me with transcription following the interview.
- I may also record some notes to assist me with the transcription.

Benefits

- Participating in this study might help you to understand how you think about physical activity and sport. This might influence your participation in future activities.
- Responding to some questions might provide the opportunity to talk about issues that you have not previously thought about or discussed.
- The benefit to us from your participation is that we will better understand the role of physical activity and sport in your life and if it was connected to the development of your substance addiction.

Risk

- You might feel uncomfortable responding to some questions. They might bring up uncomfortable emotions. This might help you by providing the opportunity to talk about issues not previously addressed. However, if you feel very uncomfortable, please let me know. If you feel the need for immediate assistance to manage these feelings, the Program Director will be close at hand and available to speak with you.

Voluntary Participation

- Participation in this study is voluntary.
- You do not have to answer all of the questions that I ask. If there are any questions that you do not want to answer, please let me know. All responses are optional. If at any time during the interview you would like to withdraw, please let me know and I will stop the interview. I will not include any information that you have already provided without your consent. There will be no consequences if you choose to withdraw from this study.

Confidentiality & Anonymity

- I will use the results of this study for my thesis. I may also use it for publications in professional and applied journals, presentations to local, national and international conferences, and workshops presented to health care workers.
- I will use first names or pseudonyms in the written report. I will remove all identifying information such as other names, locations and the name of the treatment centre during the transcription of the data.
- If you would like to see the final report, please contact the Program Director. I will send him a copy of the final report to share with the participants.

- The data will be kept confidential. Only my supervisor and I will have access to the data. This means we can guarantee anonymity.
- The data will be kept in a locked filing cabinet in the lab for a minimum of 5 years following completion of research the project. At the appropriate time it will be destroyed in a way that ensures privacy and confidentiality.
- We may use the data we get from this study in future research, but if we do this, it will have to be approved by a Research Ethics Board.
- Your written consent will authorize me to proceed with the interview and use the data as outlined above.

Compensation

- You will receive a $10 credit for use in the onsite store.

Further Information

- If you have any further questions regarding this study, please do not hesitate to contact either Dr. Wendy Rodgers or me.
- A Research Ethics Board at the University of Alberta has reviewed the plan for this study for its adherence to ethical guidelines. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615.

Consent To Participate in this Optional Research

My signature on this consent form means that:

- This optional study has been explained to me. I have been given the chance to discuss it and ask questions an all of my questions have been answered to my satisfaction,
- I have read each page of this form,
- I am aware of the risks to me of participating in this optional study,
- I voluntarily consent to take part in this optional study

Name of Participant (Print)	Signature of Participant	Date (yyyy-mm-dd)

Appendix 3- Counselor Information Letter and Consent

The Role of Physical Activity and Sport for People with Substance Addiction: a realistic evaluation study.

Research Investigator:
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Supervisor:
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Professor Faculty of Physical Education and Recreation
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wendy.rodgers@ualberta.ca

Background

- The connection between substance addiction and participation in physical activity and sport is not clear. I am interviewing people who are currently undergoing treatment for substance addiction. I would like to know about their experiences with physical activity and sport. The Program Director invited me to recruit participants from people currently undergoing treatment at Cedars at Cobble Hill.
- We would like to know what things encouraged or facilitated the development of patients' addictions. We are also interested in what things might have discouraged or prevented the development of their addictions. In particular, we are interested in what you think about physical activity and sport in either of these roles.
- The results of this study will be used for my Master's thesis.
- The results may also be used for publications in professional and applied journals, presentations to local, national and international conferences, and workshops presented to health care workers. Your oral consent will authorize the research staff to proceed with the interview and use the data as outlined above.

Purpose

The purpose of this study is to determine if there is an association between physical activity and sport, and the development of substance addiction. Investigating through the first hand experience of people dealing with substance addiction will provide some insight into the role of PA and sport, and the possible connections with substance addiction.

Study Procedures

- Participation in this research project is limited to one interview which is expected to last one hour.
- This interview is about understanding the experiences of the patients with whom you have worked. Therefore, you are the expert.
- I will ask you questions about the patients' use of substances and participation in physical activity and sports.
- I will be using audio recorders to capture our conversation to assist with transcription following the interview.
- I may also record some notes to assist me with the transcription.

Benefits

- Participating in this study might help you to understand how you think about physical activity and sport and influence your participation in future activities.
- Responding to some questions might provide the opportunity to talk about issues that you have not previously thought about or discussed.
- The benefit to us from your participation is that we will better understand the role of physical activity and sport in patients' lives and if it was connected to the development of their substance addiction.

Risk

- Responding to some questions might bring up uncomfortable interactions with patients. Although this can be beneficial by providing the opportunity to talk about issues not previously addressed, there is a risk that it can be upsetting. If you feel the need for assistance to manage these feelings, the Program Director will be close at hand and available to speak with you.

Voluntary Participation

- You are under no obligation to participate in this study, participation is completely voluntary.
- You are not obliged to answer all of the questions that I ask so if there are any questions that you would prefer not to answer, please let me know. All responses are optional. If at any time during the interview you would like to withdraw, simply inform me and I will terminate the interview. I will not include any information that you have already provided without your consent. There will be no consequences if you choose to withdraw from this study.

Confidentiality & Anonymity

- I will use the results of this study for my thesis. I may also use it for publications in professional and applied journals, presentations to local, national and international conferences, and workshops presented to health care workers.
- I will use first names or pseudonyms in the written report and I will remove all identifying information such as names of patients, locations and the name of the treatment centre during the transcription of the data.

- If you would like to see the final report, a copy will be provided to the Program Director which he can share.
- The data will be kept confidential. Only my supervisor and I will have access to the data. This means we can guarantee anonymity.
- The data will be kept in a locked filing cabinet in the lab for a minimum of 5 years following completion of research the project when appropriate will be destroyed in a way that ensures privacy and confidentiality.
- We may use the data we get from this study in future research, but if we do this it will have to be approved by a Research Ethics Board.
- Your written consent will authorize me to proceed with the interview and use the data as outlined above.

Further Information

- If you have any further questions regarding this study, please do not hesitate to contact either Dr. Wendy Rodgers or me.
- The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615.

Consent To Participate in this Optional Research

My signature on this consent form means that:

- This optional study has been explained to me. I have been given the chance to discuss it and ask questions an all of my questions have been answered to my satisfaction,
- I have read each page of this form,
- I am aware of the risks to me of participating in this optional study,
- I voluntarily consent to take part in this optional study

Name of Participant (Print)	Signature of Participant	Date (yyyy-mm-dd)

Appendix 4- Pilot Interview Guide

Thank you very much coming. I really appreciate you using your free time to participate in this research project.

The purpose of this study is to test the interview guide which will be used to investigate the relationship between physical activity, exercise and sport, and substance addiction for people undergoing treatment for their addiction. Through this interview we hope to gain your views on the topic and understand your experiences with physical activity, exercise and sports.

I would like to find out if there is an association between your activity background and your substance use career.

I would like to know what things you think encouraged or facilitated the development of your addiction. I am also interested in what things you think might have discouraged or prevented the development of your addiction. In particular, I am interested in what you think about physical activity and sport in either of these roles.

This interview is about understanding your experiences. Therefore, you are the expert. Anything you would like to tell me on this topic would be greatly appreciated. If there are any questions that you do not feel comfortable answering there is no obligation to respond. Also, if you want to stop participating at any time, just let me know and we will stop.

Definitions:

Physical Activity: Activity that comprises all types of muscular activity that increase energy expenditure substantially.

Sport: An activity involving physical exertion and skill in which an individual or team competes against another or others.

Do you have any questions before we begin?

Participant Number: _____

Participant Name: _____

Interview Date and Time: _____

Pilot Interview Guide

1) In the context of this study regarding the role of physical activity and sport for people with substance addiction, please tell me about yourself?
2) What was your previous experience with physical activity and sports?

3) I am interested in knowing about your substance use career.
   a) Please tell me how it started.
   b) What influenced your continued use of substances?
4) I would like to learn about the people in your life who influenced your choices regarding substance use and participation in physical activity and sports.
   a) Let's begin with your family, please tell me about them.
   b) What about friends?
   c) Others?
5) Summarize what has been said about substance abuse, and PA and sport. Is anything else that you would like to tell me that might be important to my understanding of this topic?

Thank-you very much for your time.

Appendix 5- Main Study Participant Interview Guide

Thank you very much coming. I really appreciate you using your free time to participate in this research project.

The purpose of this study is to investigate the relationship between physical activity, exercise and sport, and substance addiction. Through this interview we hope to gain your views on the topic and understand your experiences with physical activity, exercise and sports.

I want to know about your experience with the physical activity program during treatment. Then we would like to find out if there is an association between your activity background and your substance use career.

I would like to know what things you think encouraged or facilitated the development of your addiction. I am also interested in what things you think might have discouraged or prevented the development of your addiction. In particular, I am interested in what you think about physical activity and sport in either of these roles.

This interview is about understanding your experiences. Therefore, you are the expert. Anything you would like to tell me on this topic would be greatly appreciated. If there are any questions that you do not feel comfortable answering there is no obligation to respond. Also, if you want to stop participating at any time, just let me know and we will stop.

Finally, as with everything that happens here, your participation will remain confidential. Your name and any other identifying information will not be shared with anyone. When I write up the findings, first names will be used. If you would like me to use your name, I will, otherwise you can choose a pseudonym for me to use.

Do you have any questions before we begin?

Definitions:

Physical Activity: Activity that comprises all types of muscular activity that increase energy expenditure substantially.

Sport: An activity involving physical exertion and skill in which an individual or team competes against another or others.

Participant Number: _____

Participant First Name: _____

Interview Date and Time: _____

Main Study Participant Interview Guide

1) Tell me about yourself?
2) Please tell me about your involvement in the physical activity program during treatment.
3) What was your previous experience with physical activity and sports?
4) I am interested in knowing about your substance use career.
   a) Please tell me how it started.
   b) What influenced your continued use of substances?
5) I would like to learn about the people in your life who influenced your choices regarding substance use and participation in physical activity and sports.
   a) Let's begin with your family, please tell me about them.
   b) What about friends?
   c) Others?
6) Summarize what has been said about substance abuse, and PA and sport. Is anything else that you would like to tell me that might be important to my understanding of this topic?

Thank-you very much for your time.

Appendix 6- Counselor Interview Guide

Thank you very much coming. I really appreciate you using your free time to participate in this research project.

The purpose of this study is to investigate the relationship between physical activity, exercise and sport, and substance addiction. Through this interview we hope to gain your views on the topic and understand what you have heard from patients about their experiences with physical activity, exercise and sports.

I would like to know what things you think encouraged or facilitated the development of their addiction. I am also interested in what things you think might have discouraged or prevented the development of their addiction. In particular, I am interested in what you think about physical activity and sport in either of these roles.

This interview is about understanding experiences. Therefore, you are the expert. Anything you would like to tell me on this topic would be greatly appreciated. If there are any questions that you do not feel comfortable answering there is no obligation to respond. Also, if you want to stop participating at any time, just let me know and we will stop.

Finally, as with everything that happens here, your participation will remain confidential. Your name and any other identifying information will not be shared with anyone. When I write up the findings, first names will be used. If you would like me to use your name, I will, otherwise you can choose a pseudonym for me to use.

Do you have any questions before we begin?

Definitions:

Physical Activity: Activity that comprises all types of muscular activity that increase energy expenditure substantially.

Sport: An activity involving physical exertion and skill in which an individual or team competes against another or others.

Participant Number: _____

Participant First Name: _____

Interview Date and Time: _____

Counselor Interview Guide

1) Please tell me about the patients' involvement in the physical activity program during treatment.
2) Tell me about patients who have had no previous involvement in PA and sports.
3) For those patients who have experience with physical activity and sports, what information about these experiences have they shared?
4) I would like to learn about the people in their lives who influenced their choices regarding substance use and participation in physical activity and sports. Please tell me what you have heard.
5) Summarize what has been said about patients' substance abuse, and PA and sport. Is anything else that you would like to tell me that might be important to my understanding of this topic?

Thank-you very much for your time.