Possible effectiveness of a novel multimodal school-based program, EMPATHY, to reduce substance misuse in youth: A mixed methods intervention

by

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Abstract:

Substance misuse in Canada is a major individual and public health issue, with evidence suggesting that in many cases it starts during youth. Reducing rates of misuse is therefore important. In 2013, an estimated 3.1 million Canadians over the age of 15 used at least one of 6 illicit substances (cocaine/crack, cannabis, heroin, hallucinogens, ecstasy, or speed) during the past year. When cannabis is excluded from analysis of substance use rates, 2% of Canadians over the age of 15 reported use of at least one of the remaining 5 illicit substances; however, the rate of use by youth 15 – 19 years of age (5% of total population of this age group), and young adults between the ages of 20 – 24 years (6% of total population of this age group) was substantially higher than use reported by adults (1% of total adult population). Further, youth and young adults reported more harms associated with their own illicit drug use at a higher rate than adults (8%, 8%, and 2%, respectively). According to these statistics, harms associated with youth substance misuse has resulted in 4 times the consequences of those observed in the population of individuals 25 years and older.

Alcohol continues to be the most prevalent substance used with 21.9 million Canadians (76%) reporting use in the past year. In youth between the ages of 15 – 19, a total of 60% reported past year use and this rate increased with age to 83% of 20 – 24 year olds. Although a decrease is noted with the transition from youth to adult, a relatively high rate of use continues to be observed with 77% of Canadian adults over the age of 25 reporting use in the past 12 months. Canada's Low-Risk Drinking Guideline has recommended a maximum of 2 drinks per day (10 per week) for women, and 3 drinks per day for men (15 per week) to reduce potential health risks by managing consumption of alcohol. Despite these limits for safe use of alcohol, 21% of Canadians exceeded safe consumption and were at risk of chronic health consequences, while an additional 15% were

at risk of acute health consequences. Further, youth between the ages of 20 – 24 exhibit the highest prevalence of overconsumption of alcohol in 2013, followed by those 15-19 years of age, and adults over the age of 25.

There is evidence suggesting substance use problems in adulthood stem from age of first use, meaning substance use in youth may be a predictor of future substance use disorder development. In addition, prolonging abstinence from alcohol until at least 18 years of age decreases future risk of alcohol-related problems in adulthood both on an individual and general population level.

Interestingly, up until the mid-1980s, youth engaging in risky substance use were often treated with existing adult models despite awareness since the mid-1950s of the difference in treatment needs of youth. Often, these methods were confrontational and aggressive as a way to counter ambivalence to change or resistance to treatment. Although widespread awareness of differences in substance use between youth and adults began in the 1980s, most of these age-specific programs did not actualize until the mid-1990s.

Evidence to date has not found methods to reduce youth use of alcohol and drugs that can be administered to large populations. Therefore, there remains a compelling need for a program to reduce these rates. The primary goal of this PhD program is to examine if a novel school-based approach in a large population of youth (more than 6,000) is effective. It is based on the Empowering a Multimodal Pathway towards Healthy Youth (EMPATHY) program, and examines a novel form of screening, brief intervention, and referral to treatment (SBIRT). To fully understand the context of treatments for substance misuse it is necessary to briefly review similarities and differences between adult and adolescent treatments which introduces the need for novel solutions for youth. This is then followed by an examination of long standing approaches to

determine what has been effective in the past. The most studied approaches are those used with adults with alcohol use disorder

Preface

This thesis is an original work by Deena M Hamza, the PhD candidate. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board on December 5th, 2013, ethics protocol number Pro00041063.

Portions of Chapter 2 were published as: Hamza DM, Silverstone PH (2014). A Systematic Review of Treatment Modalities for Alcohol Use Disorder. Journal of Substance Abuse and Alcoholism 2(3): 1023.

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Because some sections are based on publications there is occasional repetition of information in different chapters.

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"You either sink or swim"

– Dr. Peter Silverstone

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"If you start to sink, we'll pull you up by the collar to try again"

– Dr. Andy Greenshaw

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Finally, this thesis is dedicated to you, the reader.

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Chapter 1: Need for novel solutions for Youth

1.1 Scope of the Problem: Youth Substance Misuse

The use of substances by youth between 11 – 18 years of age continues to be concerning (Canadian Center on Substance Abuse, 2014; Elgar & Pickett, 2012). More specifically, youth between the ages of 15 – 24 years exhibit the highest rate of substance misuse compared to any other age group (Elgar & Pickett, 2012; Levy & Williams, 2016; Pilowsky & Wu, 2013). Indeed, substance use during adolescence has been suggested to alter brain development, particularly in regions associated with impulse control, motivation, and cognition (Carney et al., 2012; Curtis et al., 2014; Levy & Williams, 2016; Mitchell et al., 2016; Squeglia et al., 2009). These delays have also been suggested to negatively impact academic and social capacities, increasing the likelihood of school drop-out and antisocial behaviour (Elgar & Pickett, 2012; Levy & Williams, 2016; Pilowsky & Wu, 2013; Squeglia et al., 2009). Within Canada it is estimated that 25% of Grade 7 students engage in alcohol use, and subsequent binge drinking (12.9%), and this increases to 86% in Grade 12 (with 68.3% binge drinking) (Elgar & Pickett, 2012). In addition to a large majority of Grade 12 students using alcohol, it is estimated that 50% of this age group has used an illicit substance (Elgar & Pickett, 2012). Substance misuse increases the risk of chronic conditions, such as liver disease and cancer, as well as acute outcomes, such as injuries and need for emergency medical assistance; while also causing social issues, such as victimization, crime, violence, and motor-vehicle collisions (Beck & Heinz, 2013; Landgraf et al., 2013; Sarasa-Renedo et al., 2014). Despite the clear need for effective prevention and intervention programs to reduce the onset of substance use disorders and associated negative consequences, there is a paucity of information regarding the best standardized approach and content that is effective with youth. Therefore, the key

hypothesis being tested in this thesis was that a multimodal intervention can alter the risk of youth developing abuse of drugs and alcohol.

Before discussing this, it is very important to understand the existing literature across a range of areas relevant to this approach. Since much of this is adult literature, and has primarily been focused on alcohol abuse, this literature is examined as well (in Chapters 2 and 3). For this reason, the following chapters explore some of the key background evidence leading to this proposal, as well as potential treatment pathways. These include existing evidence about treatment modalities available; understanding the theoretical underpinnings and how they may be relevant to future treatment plans; and the relative impact of inpatient versus outpatient treatments.

1.2 Treatment of youth with existing adult models

In the past, treatment of youth substance misuse occurred in adult settings; however, there are clear differences in how or why youth engage in alcohol or drug use (White et al., 2002; Winters et al., 2011). One prominent difference is youth proneness to binge drinking, or consuming 5 or more drinks in one occasion (Miller et al., 2007; Winters et al., 2011). Further, it has been suggested that youth are more vulnerable to external influences, such as peers (Nash et al., 2005), and are more reward seeking and motivated without thinking critically than adults (Conrod et al., 2008; Crews et al., 2007). There is also some evidence that youth who engage in substance misuse are more likely to have concomitant psychiatric conditions than adults (Brown et al., 2005; Wolitzky-Taylor et al., 2012). Because of these factors, programming that addresses these specific differences is crucial in order to prevent, intervene early, and/or treat youth substance misuse.

1.3 Similarities in treatment settings for youth and adults

Interestingly, the treatment modalities and settings for adult treatment of substance use disorders are relatively the same for youth (Winters et al., 2011). More specifically, treatment settings are both on an inpatient or outpatient basis, and severity of symptoms guide which model is most appropriate (i.e. inpatient for youth needing medical intervention, 24 hour supervision, and with severe emotional problems) (Winters et al., 2011). Further, as with adult treatment, most follow a stepped-care approach in which treatment increases in intensity as symptoms increase in severity (Breslin et al., 2002; Winters et al., 2011). For example, initial treatment begins with brief intervention for early symptoms, followed by a more intense outpatient treatment program (Breslin et al., 2002; Tanner-Smith, 2013; Winters et al., 2011; Winters, 2016). Intense outpatient treatment is also an option for youth, and the format is the same with adults in which the individual spends the majority of the day in a treatment program, returning home at the end of the day (Winters et al., 2011). Residential and intense inpatient programs are also treatment approaches used with youth (Godley et al., 2007; Hair, 2005; Winters et al., 2011).

1.4 Similarities in treatment modalities between youth and adults

As with program approaches found in adult treatment of substance misuse that are used with youth, the treatment modalities, or therapeutic techniques, used are also common across these age groups. Cognitive behavioural therapy (CBT) and motivational interviewing (MI) are the most researched approaches; however, unlike past approaches, MI focuses on building therapeutic alliance through positive regard, empathy, and non-judgement rather than aggressive confrontation (Hogue et al.,

2014; Miller 1983; Rollnick & Miller, 1995, Winters et al., 2011). MI focuses on specific substance using behaviours and the potential harms and consequences associated with use (Hogue et al., 2014; Rollnick & Miller, 1995; Winters et al., 2011). CBT focuses on a more broad approach, allowing the individual to examine how thoughts lead to feelings, which lead to behaviours, and how to interrupt the cycle of maladaptive actions (Beck, 1979; Hogue et al., 2014; Winters et al., 2011). Further, a contingency management approach in which youth are rewarded for improvement in maladaptive behaviours is also used with adults (Lussier et al., 2006; Stanger & Budney, 2010; Winters et al., 2011). In addition, youth are able to participate in self-help modalities, such as Alcoholics Anonymous (AA), and it is estimated that approximately 2.3% of AA members in North America are under the age of 21 (Alcoholics Anonymous, 2008; Kelly & Myers, 2007; Winters et al., 2011). The therapeutic community approach is also evident in youth treatment programs, specifically those that are long-term, such as residential or intensive inpatient (Jainchill et al., 2005; Melnick et al., 2007; Winters et al., 2011). Pharmacotherapy is also a method of treatment with youth exhibiting symptoms of severe substance misuse or comorbid conditions; however, research into the effectiveness of this method is limited (Deas & Thomas, 2001; Deas et al., 2005; Winters et al., 2011).

1.5 Recommended program components for youth

One review on treatment approaches has suggested a guideline of components that should be included in any program applied to youth dealing with substance misuse (Winters et al., 2011). A brief summary of key points is listed below:

- Screening for youth to have a clear picture of possible issues experienced

- Services from multiple care providers (i.e. school, primary care, and mental health) should be available for support
- An approach involving those in the youth's life (i.e. parents, guardians)
- Services that are developmentally appropriate
- Staff with capabilities to help multiple needs of youth
- Services that are sensitive to both culture and gender
- Continuity of care model – support beyond program completion
- Gathering of data from programs to assess effectiveness of program (i.e. measure outcomes)

During the process of reviewing exiting literature to find gaps or areas requiring further research, it was interesting to come across recommendations by the American Academy of Pediatrics, the Substance Abuse and Mental Health Services Administration, and the National Institute on Alcohol Abuse and Alcoholism, for the immediate implementation of "SBIRT" into routine medical care for youth (Mitchell et al., 2013; Yuma-Guerrero et al., 2012). Upon further examination of this 3-tiered model – Screening, Brief Intervention, and Referral to Treatment – there appeared to be an abundance of literature referring to this approach as comprehensive and ideal from a public health standpoint; however, little practical evidence of its effectiveness in reducing substance misuse for youth is known. This is really interesting since three prominent organizations have recommended its immediate use, but there is no formal evidence-base guiding this decision. However, upon reviewing SBIRT protocols, it is apparent that components of this approach fit into the guidelines suggested (Winters et al., 2011) as essential to any substance use treatment program administered to youth. The only review to date assessing SBIRT within two

optimal settings for reaching the largest number of youth, primary care clinics and schools, has concluded that not enough research has focused on SBIRT as a 3-step program, and often Referral to Treatment is not assessed at all and, because of this, it is premature to recommend its widespread use (Mitchell et al., 2013). Further, each study used in this review incorporated different screening tools and brief interventions, making generalizability of results very challenging, if not impossible (Mitchell et al., 2013). More recent reviews essentially reiterated these findings, but specifically for implementation of SBIRT in primary care clinics (Beaton et al., 2016; D'Souza-Li & Harris, 2016).

The opportunity to be a part of the EMPATHY (Empowering a Multimodal Pathway toward Healthy Youth) team was ideal since the project is a school-based SBIRT with the primary focus of reducing symptoms of depression and suicidality in students in Grades 6 – 12, but also assessed youth substance misuse among other mental health concerns (Silverstone et al., 2015).

While numerous studies have been conducted to examine aspects of SBIRT, specifically screening of adolescent substance misuse and subsequent brief intervention, this topic is far from being exhausted as a research area. New studies are needed to identify the optimal setting for SBIRT implementation focusing on school-based projects as this appears to be an under-researched option compared to primary care implementation, despite being a setting frequented regularly by adolescents. Further, there is limited information on the challenges and successes when implementing SBIRT in school settings, whereas there is an abundance of literature discussing barriers when administering this 3-tiered approach within primary care clinics. In addition, detailed information on youth at risk of a substance use disorder seems to be lacking, specifically the

severity of the disorder in relation to age and gender, as well as detailed information on affirmative responses to screening questions reported by youth. This information is paramount since understanding reasons why youth engage in substance misuse will help target future programming initiatives. Finally, feedback from students on a universal resiliency program is needed to draw insight into factors that are perceived to be valuable from the perspective of the participants.

The present PhD thesis aims to provide valuable research into the areas mentioned above and to potentially close gaps in literature on the topic of adolescent substance misuse, specifically using the SBIRT approach. In addition, this information may assist future program development that may also be cost effective, supporting public health and economic needs. Nonetheless, before understanding the potential application of the proposed program, it is important to understand the existing adult literature, particularly in terms of treatment modalities, theoretical underpinnings, and most effective setting and methods of interventions. Since much of the existing literature is in the area of alcohol abuse, this is the primary focus for further understanding.

Chapter 2: Treatment Modalities for Alcohol Use Disorder

Alcohol use disorders are a major health concern that challenge affected individuals and society in general. Large numbers of individuals in the developed world exceed research generated ranges for low-risk alcohol consumption, and this is associated with an increased prevalence of chronic conditions, such as liver disease and cancer, as well as acute outcomes such as injuries and need for emergency medical assistance for alcohol toxicity (Beck & Heinz., 2013; Sarasa-Renedo et al., 2013). In addition, higher-risk alcohol use leads to increased rates of social issues, such as fetal alcohol spectrum disorder, motor-vehicle collisions, violence, and crime (Landgraf et al., 2013; Sarasa-Renedo et al., 2013).

Many interventions have been created for alcohol use including inpatient, outpatient and residential treatments with a variety of theoretical bases (Dermen et al., 2014; Drummond et al., 2014; Finney et al., 1996; Kamara & Van Der Hyde, 1997; Mdedge & Watson, 2013; Muncie et al., 2013; Ratta-apha et al., 2014; Rosenberg & Davis, 2014; Spyra & Rychlik, 2013). Understanding the theoretical approaches used in treatment allows for a discussion of empirical management practices that may be part of a typical care pathway from initial detoxification to long-term relapse prevention.

In considering the literature, a total of 345 meta-analyses on alcohol use disorder were identified. It is not intended that this section is a complete review of the literature of alcohol abuse in adults, as this is beyond the scope or aim of this thesis, and therefore after consideration of all titles and abstracts, there were 3 meta-analyses that were identified as the most rigorous and useful to form the basis for some level of understanding the literature in this area (Figure 2.1).

Figure 2.1 Flowchart of main search strategy for meta-analyses on treatment for alcohol use disorder

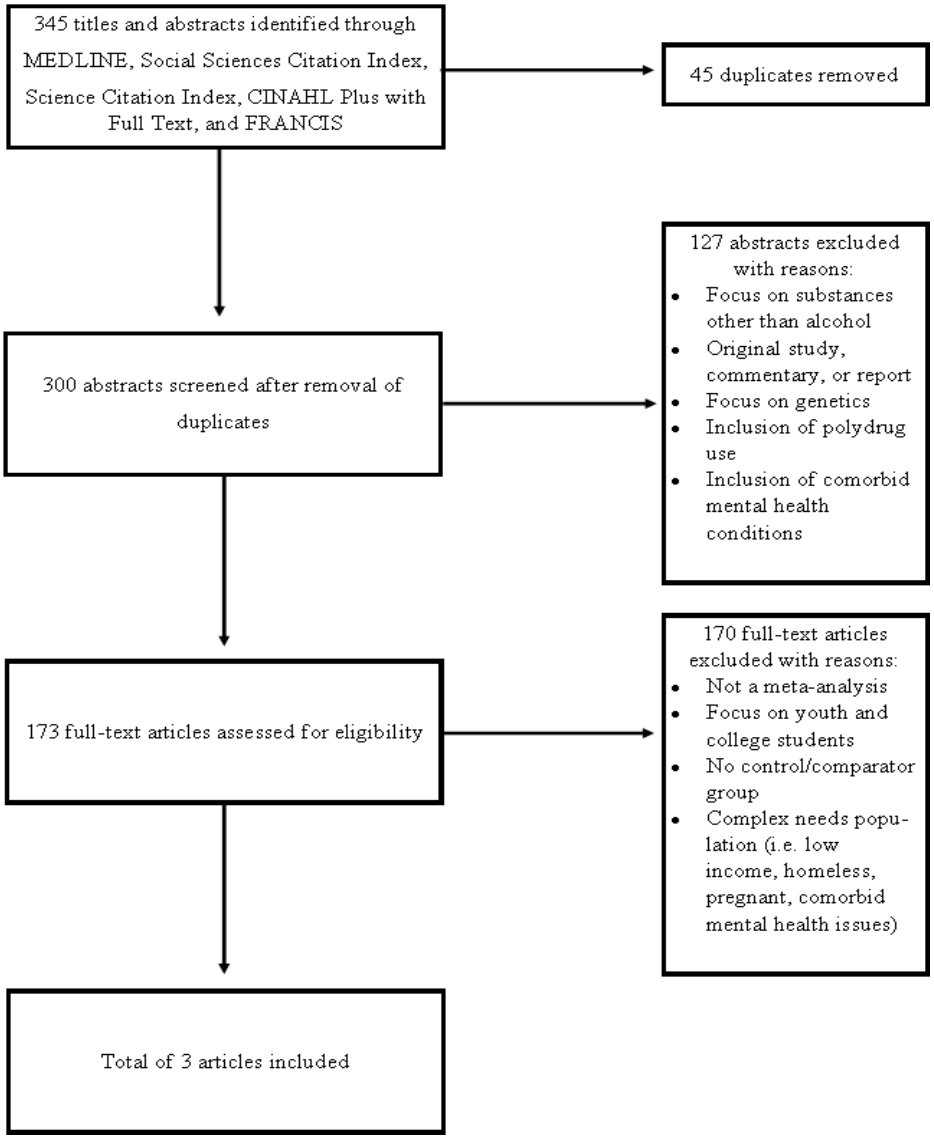


Figure 2.1 Legend

This flowchart displays the search strategy when locating meta-analyses on the treatment of alcohol use disorder following PRISMA guidelines (Moher et al., 2009)

2.1 Treatment Approaches for Alcohol Use Disorder

It has been suggested that treatment programs for alcohol use disorders are more successful if they incorporate primary social and psychosocial concepts that normally avert engagement in substance abuse (Bowen et al., 2009; Moos, 2007a; Schneekloth et al., 2012). Fundamental concepts promoting adaptive behaviour and resiliency, including social control, behavioural economics/behavioural choice, social learning, and stress and coping models, may best enable effective resolution of substance use disorders. It is therefore helpful to understand the similarities and differences between these theories before discussing treatments.

2.1.1 Social Control Theory

Social control theory views conventional societal rules as motivation for individuals to consistently demonstrate adaptive and prosocial behaviour (Lu et al., 2013; Moos, 2007a; Vermeersch et al., 2011). Treatments for alcohol use that incorporate elements of social control theoryoften focus on developing a bond or support network for the individual (Intravia et al., 2012; Vermeersch et al., 2011). This bond may allow for the development of strong motivation to play a supportive and cooperative role within society while abandoning past antisocial and deviant values, such as substance misuse. A firm sense of monitoring and structure is required for social control to ensure that inevitable regressions are identified and modified efficiently and accurately (Brorson et al. 2013). Treatment programs that incorporate monitoring and structure may enable acquisition of conventional societal rules more rapidly than treatment programs that lack supervision.

2.1.2 Behavioural Economics/Behavioural Choice Theory

Behavioural economics or behavioural choice theory is based on the assertion that an individual's rational choice is grounded in seeking attractive rewards and outcomes from behaviour (Lahno, 2007; Skidmore & Murphy, 2011). Under this model, a lack of engagement in protective and prosocial activities is a significant contributor to any form of deviance, including substance use disorders, and personal choice dictates relative value of behaviour (Lahno, 2007; Moos, 2007a). When behavioural economics is applied to alcohol use disorders, involvement in spiritual or religious groups, sports, career, education or other goals provide the individual with the opportunity to choose to connect in prosocial activities while reducing the probability of exposure to substance use (Cerasoli & Ford, 2014; Schlimme, 2010). Further, the core reasons that individuals engage in alcohol misuse are thought to be lack of alternatives that provide comparable reward, limited exposure to prosocial environments, personal preferences, and value appraisal (Moos, 2007b; Skidmore & Murphy, 2011).

2.1.3 Social Learning Theory

Social learning theory proposes that behaviour is the result of an interaction between the individual's environment, experiences, and past behaviour (Burkett & Young, 2012; Hanna et al., 2013). Treatment based on social learning theory focuses on environmental observation and imitation of behaviour as processes needing modification (Burkett & Young, 2012). Alcohol use continues by means of behaviour that is socially influenced, and similarly, abstinence will occur if promoted through social means (Akers & Lee, 1996; Astudillo et al., 2013; Mutschler et al.,

2013). Alcohol use treatment programs targeting maladaptive thought patterns or cognitive scripts associated with usage may attempt to restructure the individual's attention, observation, and subsequent imitation of deviant behaviour.

2.1.4 Stress and Coping Theory

Stress and coping theory suggests that harmful use of substances is the result of feelings of estrangement and distress stemming from work, school, family, and friends (Moos, 2007a; Terre, 2011). Individuals who have low self-confidence or do not have appropriate coping skills when dealing with problematic situations are more likely to resort to substance use as an escape from undesirable feelings (Aldridge-Gerry et al., 2011; Kuo, 2011; Moos, 2007a). Adversity, such as various forms of abuse and other trauma may lead to self-medicating through substance abuse, particularly alcohol use (Ford et al., 2010; Moos, 2007b; Ullman et al., 2009). Treatment approaches that target an individual's coping mechanisms provide alternatives to current reactions to life (Bowen et al., 2009; Moos, 2007a; Terre, 2011). This is typically done through drawing attention to situations that are high risk and reshaping responses in order to build self-efficacy and self-confidence (Allen & Leary, 2010; Moos, 2007a; Terre, 2011).

2.2 Empirically Supported Treatment Modalities

There are a number of treatments for alcohol use that incorporate aspects of these theoretical concepts. Some of these modalities are empirically supported and can occur along the longitudinal course of treatment.

2.2.1 Detoxification and pharmacological treatments

The initial step toward abstinence from alcohol use often begins with detoxification and involves pharmacological approaches (Blondell et al., 2010; Blondell et al., 2011; Kosten & O'Connor, 2003; National Institute of Drug Abuse, 2009). Detoxification is the removal of harmful toxins, such as alcohol, opioids, or other substances from the body in order to establish a baseline of temporary abstinence (Blondell et al., 2010; Kosten & O'Connor, 2003).

Naltrexone, acamprosate, and disulfiram are among the most widely used medications for prevention of relapse of alcohol use, as well as being used along with benzodiazepines for initial treatment during detoxification (Diehl et al., 2010; Douaihy et al., 2013; Kranzler et al., 2009; Martinotti et al., 2010; Mason & Heyser, 2010; Pettinati et al., 2009). Naltrexone is an opiate antagonist that may be used in the long-term treatment of alcohol dependence. It is thought to reduce alcohol consumption by decreasing cravings and blocking associated feelings of euphoria (Angres & Bettinardi-Angres, 2008; Center for Addiction and Mental Health, 2012; Douaihy et al., 2013; Krupitsky et al., 2012). Acamprosate reduces the severity of the symptoms of withdrawal that often accompany alcohol dependence (Douaihy et al., 2013; Center for Addiction and Mental Health, 2012; Mason & Heyser, 2010). Disulfiram impedes the metabolic processes that break down alcohol in the body. As such, an aversive reaction occurs when alcohol is consumed (Center for Addiction and Mental Health, 2012). Disulfiram is used in cases of chronic alcohol consumption and in situations in which avoiding alcohol may be challenging, such as special occasions (Center for Addiction and Mental Health, 2012), and shows promise of treating individuals with concomitant psychiatric conditions (Barth & Malcolm, 2010).

A meta-analysis of 64 randomized, placebo-controlled clinical studies on naltrexone and acamprosate, conducted over a span of 39 years (1970-2009), found both medications to be efficacious in the treatment of alcohol use disorder; however, each medication targeted different alcohol-related outcomes (Maisel et al., 2013). Results on abstinence indicate that acamprosate had a positive impact, more so than naltrexone; however, naltrexone was more effective in the reduction of heavy drinking in comparison to acamprosate (Maisel et al., 2013). Similar effects are reported for craving outcomes for both naltrexone and acamprosate; but, when combining the two alcohol-related outcomes, heavy drinking + craving, naltrexone demonstrated a more positive impact than acamprosate (Maisel et al., 2013). In essence, neither medication can be used to treat the full spectrum of alcohol-related outcomes, but evidence from this meta-analysis promotes the use of naltrexone to moderate heavy drinking and craving, while acamprosate is better suited to moderate abstinence (Maisel et al., 2013). This study has a few limitations: most trials on naltrexone took place in the United States, while most trials on acamprosate took place in Europe and demographic factors may have produced biases in the literature (Maisel et al., 2013). In addition, all individuals were receiving some form of psychotherapy, meaning trials did not have a pure no-treatment control group (Maisel et al., 2013). This, too, may have produced results that could have affected overall outcome measures.

2.2.2 Brief alcohol interventions

Brief alcohol interventions (BAI) are intended to encourage harm reduction in individuals who are engaging in high risk alcohol consumption (Skewes & Gonzalez, 2013; Xiang, 2013). Traditional

therapy and counselling is a long-term process; however, BAI are short "one-on-one" sessions that focus on reduction of alcohol consumption rather than abstinence as the primary goal (Skewes & Gonzalez, 2013). This short duration, combined with a more acceptable approach to continued drinking, provides at-risk individuals with knowledge and tools to change their consumption (Sharp & Atherton, 2006; Xiang, 2013). BAI is an opportunity to motivate clients to move along the path from contemplating change to developing an action plan by educating them on the harms associated with consumption of alcohol, including personal and social hazards (Sharp & Atherton, 2006; Xiang, 2013) (Figure 2.2). Stepped-care interventions for alcohol use often begin with brief interventions, and these increase gradually in both duration and intensity depending on the progress of the individual (Bischof et al., 2008).

Figure 2.2: Prochaska's Stages of Change Transtheoretical Model

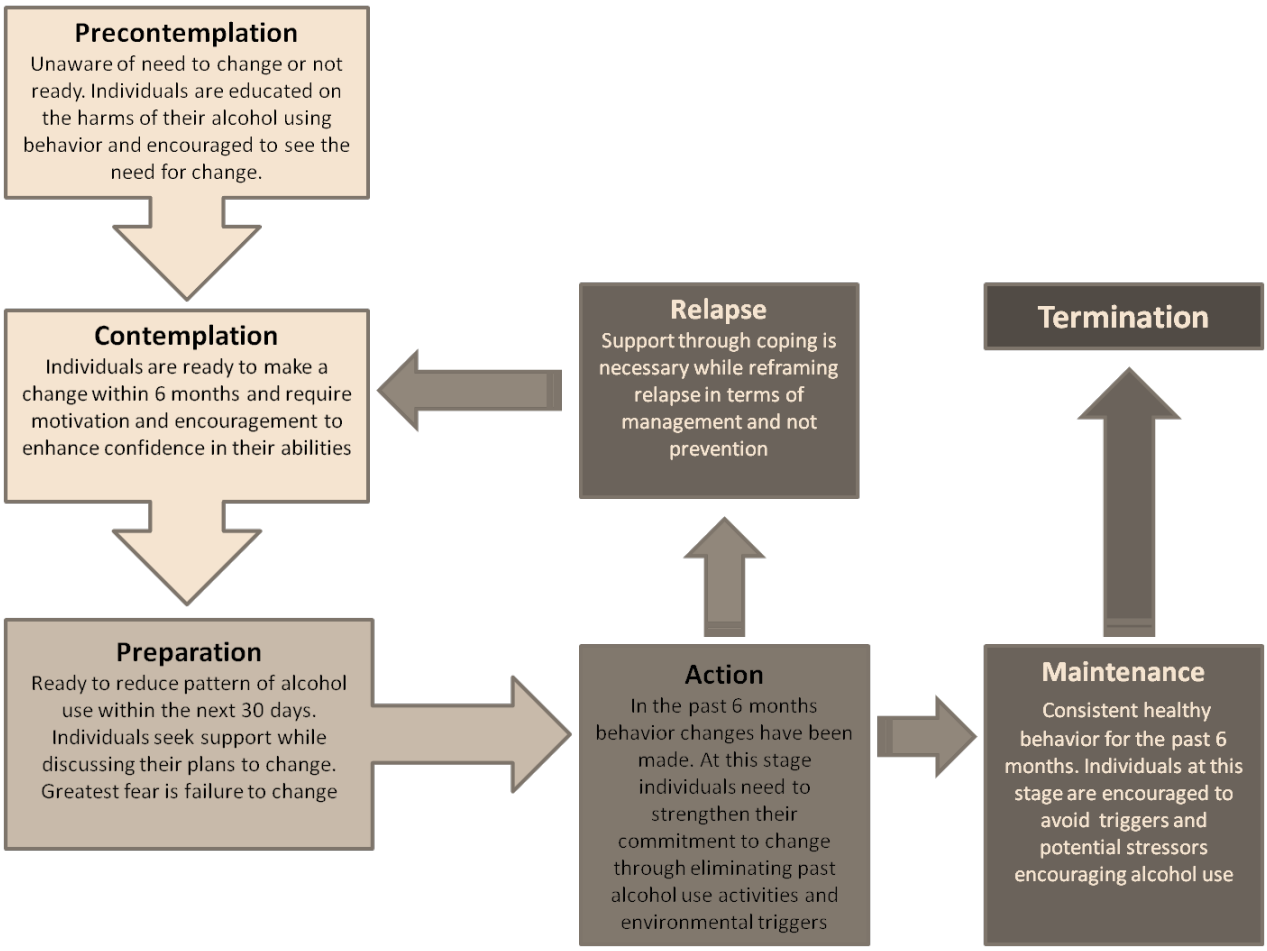


Figure 2.2 Legend:

This figure is of Prochaska's stages of change model which can be related to the process of changing alcohol misuse behaviours during treatment for alcohol use disorder. Brief interventions have been found to be an effective initial step in treatment, encouraging individuals to move from the Pre-contemplation stage into the Contemplation stage of change.

To understand the impact of BAI on alcohol use disorders, a meta-analysis of 34 studies was helpful, as it allowed comparisons of BAIs to a control group (non-treatment seeking), and 20 studies comparing BAI to extended treatment (Moyer et al., 2002). These studies incorporated brief interventions with no more than 4 sessions; however, the criteria for extended treatment was not provided (Moyer et al., 2002). When comparing BAI to no treatment, a small to medium effect size (aggregate: 0.14 – 0.67) was noted toward the positive impact of BAI on alcohol-related outcomes (number of drinks, days abstinent, problems as a result of drinking, dependence symptoms) (Moyer et al., 2002). At 3 month follow-up and beyond, BAI continued to increase in effect size; however, not for individuals with severe alcohol use disorder (Moyer et al., 2002). In contrast, comparing BAI with extended treatment, no significant effect size was noted shortly after treatment; however at the 3 – 6 month follow-up, extended treatment demonstrated a higher effect size (0.42) for reduced consumption of alcohol, indicating a positive impact outweighing BAIs (Moyer et al. 2002). For the other alcohol-related outcomes, the effect size (0.06) between BAI and extended treatment are relatively homogeneous (Moyer et al., 2002). Although insightful, this meta-analysis is difficult to generalize because populations sampled may not be diverse and therefore unrepresentative of the general population, and the components of each BAI and extended treatment trial are highly heterogonous. In addition, focusing on optimal duration (time/number of sessions) of BAIs in future meta-analyses will benefit this area of research greatly.

2.2.3 Harm reduction and low-threshold interventions

The harm reduction, or controlled drinking approach, is an extension of some forms of brief alcohol interventions although, for some, this approach may be the final form of therapy. The

unique component of this approach is the tolerance for continued involvement in undesirable behaviours, such as alcohol misuse (Whiteside et al., 2010). Proponents of harm reduction believe human habits exist on a continuum and the shift from severe and harmful habits to neutral and positive habits occurs gradually, varying based on individual goals and preferences (Karoll, 2010; Tatarsky, 2003).

While harm reduction as a principle allows for decreased negative consequences and provides an alternative to abstinence-based programming, solid evidence of effectiveness is lacking (Room et al., 2005; Skewes & Gonzalez, 2013; van Amsterdam & van den Brink, 2013). Our search for meta-analyses on this topic yielded 19 studies for harm reduction and 431 for controlled drinking. Only one meta-analysis attempted to specifically examine the effects of controlled drinking (termed managed alcohol in this study) on alcohol-related outcomes, such as dependence symptoms, or problems as a result of alcohol consumption (i.e. legal, family, employment, interpersonal relations); however, out of the 23 eligible studies, 21 did not provide a comparison with managed alcohol programmes, 1 included participants under the age of 18, and one did not evaluate managed alcohol modalities (Muckle et al., 2012). Randomized controlled trials or controlled trials evaluating the effect sizes of managed/controlled drinking compared to no-treatment, and traditional abstinence programs are needed, but where ethically possible. Meta-analyses and systematic reviews on this topic will allow for accurate data synthesis, and possibly the ability to provide treatment recommendations based on effect sizes reported.

2.3 Outpatient Treatment

Outpatient treatment services for substance use disorders are very similar to inpatient and residential programs; however, the central difference between the two is the structure and environment in which programming is implemented (Gifford, 2013). Unlike residential care, outpatient programs allow the individual to engage in daily treatment for substance abuse while maintaining responsibilities to family, employment, and education (Gifford, 2013). The flexibility to attend outpatient sessions offers relative anonymity and may be an attractive feature (Gifford, 2013).

Outpatient care does not have the same structure as residential programs, which remove the individual from their environment and consequently reduces potential triggers that promote substance use (Ford & Zarate, 2010; Gifford, 2013; Makdissi & Stewart, 2013). Personal responsibility, self-efficacy and self-confidence are personality factors that may be required to continue toward successful recovery despite remaining in one's environment (Ford & Zarate, 2010; Gifford, 2013; Makdissi & Stewart, 2013).

Beyond structural and environmental features, psychosocial components for outpatient and residential care modalities are relatively similar (Mojtabai & Graff Zivin, 2003). In both approaches, individuals participate in self-help support groups such as Alcoholics Anonymous (AA) and individual counselling with elements of cognitive behavioural therapy, motivational interviewing and enhancement, mindfulness meditation, contingency management and community reinforcement strategies (Hallgren & Moyers, 2011; Stasiewicz & Stalker, 1999). Peer support and

counselling are integral components aiding recovery from substance use in both residential and outpatient programs allowing individuals to learn prosocial and adaptive life skills promoting sustained sobriety (Hallgren & Moyers, 2011; Stasiewicz & Stalker, 1999).

The flexibility and anonymity of outpatient care services may be an appealing alternative to residential treatment; however, some studies have suggested that outpatient services are ineffective for individuals with more severe forms of alcohol use disorder involving a higher rate of craving (Bottlender & Soyka, 2004); while in other studies, individuals with severe alcohol use disorder demonstrate successful outcomes (Bottlender & Soyka, 2008). Personal factors such as motivation to change, social stability and concomitant psychiatric conditions appear to influence differing outcomes noted in these studies (Bottlender & Soyka, 2004; Bottlender & Soyka, 2008; McLellan et al., 1983).

2.4 Inpatient and Residential Treatment

Inpatient care involves detoxification for individuals who are dependent on substances, such as alcohol, and have been unsuccessful at practicing abstinence and achieving sobriety through outpatient services (Blondell et al., 2011; Ford & Zarate, 2010). Inpatient care has the added benefit of removing the client from their environment, which avoids unnecessary triggers and subsequent relapse while incorporating psychosocial treatments to help regulate alcohol consumption (Ford & Zarate, 2010; Makdissi & Stewart, 2013). Inpatient modalities often view substance use disorders through a medical lens and may provide pharmacological methods paired

with brief interventions and are usually used in conjunction with general or psychiatric hospital admissions (Mojtabai & Graff Zivin, 2003).

Residential treatment programs, like inpatient services, remove individuals with substance use disorders from their environment but for a longer duration ranging between 21 days to one year (Gifford, 2013). Positive outcomes of residential treatment include: increased rate and duration of abstinence; lower unemployment rates; reduced use of medical services for emergencies; and reduced interactions with law enforcement (Ford & Zarate, 2010).

In a recent review we have examined outcomes, comparing outpatient treatment to that of inpatient/residential treatment (Hamza & Silverstone, 2015). We did not find any significant differences in outcomes for most groups, with the only consistent factor for successful outcomes being the length of time individuals remained in a program: in general, the longer the time the better the outcome (Hamza & Silverstone, 2015). This generalized statement about treatment duration should be viewed with caution (Hamza & Silverstone, 2015). Studies on alcohol use disorder do not follow a standardized format and the heterogeneity of methodology, including outcome measures of interest, challenges accurate synthesis of available data (Hamza & Silverstone, 2015). Meta-analyses and systematic reviews focusing on alcohol-related outcomes, such as abstinence or dependence symptoms, for inpatient and outpatient care settings are needed (and based on severity of alcohol use disorder) in order to evaluate the appropriateness of treatments based on client characteristics.

2.5 Psychosocial modalities

2.5.1 Cognitive behavioural therapy

Cognitive behavioural therapy (CBT) views maladaptive behaviour patterns as the result of inaccurate and distorted patterns of thought (Angres & Bettinardi-Angres, 2008; Berking et al., 2011). Social learning is the theoretical basis for CBT in which the individual has learned alcohol using behaviour and has developed positive cognitions associated with use (Moos, 2007a)

One meta-analysis evaluating the effects of CBT on alcohol and illicit drugs was found; however many of the studies incorporated a higher proportion of cocaine and opiate users than individuals with alcohol use disorder. Studies investigating the influence of CBT on alcohol-related outcomes will benefit from comparing an experimental group (CBT) with a no-treatment control group.

2.5.2 Motivational interviewing and enhancement therapy

Motivational interviewing (MI) allows the client and therapist to establish a working alliance through positive regard, empathy, and support in order to examine the client's feelings of uncertainty toward changing their behaviour, including substance misuse (Miller & Rose, 2009; Rubak et al., 2005). Incorporating feedback in the form of counselling; recognition of personal responsibility; providing advice and options for change; and promotion of self-efficacy are core components of the assessment process that are not usually involved in MI (Angres & Bettinardi-Angres, 2008; Miller & Rose, 2009). The inclusion of an assessment component to MI, otherwise

known as “drinker’s check-up,” in combination with principles of motivational interviewing, creates the counselling approach known as motivational enhancement therapy (Hettema et al., 2005; Miller & Rose, 2009). Motivational enhancement therapy (MET) encourages alcohol users to move toward harm reduction or abstinence (Angres & Angres-Bettinardi, 2008).

Our search for meta-analyses on MI or MET yielded 1 result; however this study encompassed all addictions and was not specific to alcohol alone. Future studies implementing a control group and disseminating critical factors or components of MI/MET encouraging positive alcohol-related outcomes would be beneficial.

2.5.3 Twelve Step Facilitation – Alcoholics Anonymous

Many self-help approaches to substance use disorders are modeled after Alcoholics Anonymous (AA) in the format of twelve-step facilitation (TSF) (Angres & Bettinardi-Angres, 2008; Moos, 2007a). TSF views substance use disorders as a disease rather than a condition that can be reduced and eliminated through modification (Donovan et al., 2013). These approaches emphasize avoidance of alcohol use through meeting attendance, requesting assistance, finding a senior member to be a mentor through the process, engaging in social groups, and focusing of physical health (Donovan et al., 2013). AA and other TSF programs provide peer support for those with substance use disorders through a cooperative fellowship, while encouraging healing through identification with the inner addict and submitting oneself to a “Higher Power” (Angres & Bettinardi-Angres, 2008; Dossett, 2013; Moos, 2007a). The only requirement to participate in AA is the desire to be sober and learn positive life skills from the bonds established through the AA

fellowship (Alcoholics Anonymous World Services, 2013). Further, AA caters to diverse populations, implements simple language to ensure relative ease in understanding program content and offers free membership to everyone (Alcoholics Anonymous World Services, 2013; Donovan et al., 2013). The formation of strong bonds with similar peers, sponsorship, and attendance at regular meetings are engaged in at a personal pace and are key aspects of TSF (Donovan et al., 2013; Dossett, 2013; Groh et al., 2008). Some research studies have suggested that TSF treatment is comparable to MET and CBT in promoting abstinence (Groh et al., 2008; Moos, 2007a).

However, there are many criticisms of TSF approaches. For example, it has been suggested that admitting the disease of alcohol use disorder may degrade one's already low level of self-confidence and self-esteem (Donovan et al., 2013; Karoll, 2010). Further, identification with the disease may discourage individuals to seek assistance in achieving sobriety. Another criticism of TSF is the definitive meaning of spirituality within this program. A commonly cited example is that AA places fundamental importance on submitting to a Higher Power, which one may assume is God (Angres & Angres-Bettinardi, 2009; Dossett, 2013). In some cases, assumptions related to the core idea of relinquishing power to a Higher Power produces a barrier for health care workers when recommending treatment programs for clients (Donovan et al., 2013; Dossett, 2013). It appears reluctance to refer non-Christian individuals to TSF programs is related to the incompatibility with core features of this treatment modality (Dossett, 2013). When discussing the elements of TSF treatment, some researchers include religiosity in their description (Moos, 2007a). This is further complicated as AA literature claims to promote a broad idea of spirituality, yet incorporates specific religious practices, such as the Lord's Prayer or Serenity Prayer at the end of sessions (Dossett, 2013). As such, some categorize AA as a quasi-religion, and therefore not

consistently applicable to diverse populations. Another criticism of the need to submit to a Higher Power is that in doing so one becomes powerless (Donovan et al., 2013; Dossett, 2013). For many individuals with substance use disorders, relinquishing power may be associated with trauma experienced in the past, creating additional feelings of victimization and helplessness (Donovan et al., 2013; Dossett, 2013).

A current meta-analysis evaluating the outcomes of randomized and nonrandomized involvement in AA is warranted in order to gauge the impact of this self-help modality.

2.6 Literature summary

There exists an abundance of literature regarding treatment modalities for alcohol use disorders. It is difficult to apply results from individual studies to develop optimal treatment strategies for diverse populations. For example, when discussing alcohol use disorders, it is unclear what components of a treatment pathway are necessary and sufficient to produce positive outcomes for specific populations. Long term prospective studies including sustained remission as an outcome for each approach are lacking, with most literature reporting outcomes within the first year post-treatment. In addition, studies on alcohol use disorder do not always incorporate a control or comparator group. Further, many studies implement self-reporting measures, decreasing the validity and reliability of data collected, while increasing the potential for social desirability bias. Variations in design and demonstrated difficulties in reproducing results across study sites contribute to the challenge of developing treatment guidelines from available research. Future studies may benefit from the creation of a standardized methodology for evaluating treatments for

alcohol use disorder which will enable accurate and systematic comparison of variables impacting outcome.

Given the prevalence of alcohol use in the general population, clarification of effective care pathways in the treatment of alcohol use disorders remain necessary and have the potential to positively impact both individuals and society. Unfortunately, current research limitations are such that it is not possible to conclusively determine the most effective forms of treatment.

Chapter 3: Treatment of Alcohol Abuse - Comparing Inpatient and Outpatient Programs

Broadly, the treatment for alcohol use disorders occurs in two settings: inpatient and outpatient. This is relevant to the present thesis since an outpatient program is proposed. However, if the literature demonstrates that this is inferior to inpatient or residential approaches, then it may not be appropriate to consider such a program. It is important to also recognize that research on inpatient and outpatient treatment programs attempt to identify "active ingredients", or program features, that increase the probability of successful completion of treatment along with sustained recovery (Moos, 2007a; Moos, 2007b; Nienhuis & Perron, 2008; Weisner et al, 2000). Such information is also important to program development in youth. In terms of follow-up measures, long-term studies examine the probability of abstinence up to 12 months post-treatment as a gold standard. This milestone has been identified as a time of transition from formal care to independence, and one that is both meaningful and allows comparisons between studies (Arbour et al., 2011). Therefore, any program in youth should also identify changes over at least a 12-month period.

It is clearly relevant to understand the strengths and limitations of inpatient and outpatient substance use treatment programs, both for fiscal reasons (inpatient programs are much more expensive) and because this may allow further identification of potential gaps within the health care system. This is vital considering the substantial shift in treatment away from inpatient care. This has been seen clearly in the United States, where a marked reduction in inpatient care from 55% of care to only 10% occurred over a 12-year period (from 1990-2002), with this taking place

primarily to promote reduction of health care costs (Shin et al., 2011), with impacts on outcomes being very secondary.

3.1 Definition of Inpatient and Outpatient Care

The terms inpatient and residential treatment are used interchangeably in some studies (Burdon et al., 2007; Shin et al., 2011), and in the present article the term "inpatient" will be used to refer to alcohol use treatment programs in which the individual is removed from their primary environment and required to reside in the care facility. Therefore, outpatient care encompasses programs offering treatment with individuals returning to their primary environment each evening, or upon completion of the session.

3.2 Comparison between Inpatient Care with Outpatient Care

3.2.1 Key elements of Inpatient and Outpatient Care

Inpatient programs are heterogeneous and care facilities may differ on theoretical underpinnings, duration of treatment, intensity, care setting and level of commitment. The universal feature of specialized long-term inpatient care programs for alcohol use is the removal from the primary environment to restructure social and physical surroundings which will support successful recovery (Corrigan & O'Gorman, 2007; Ilgen et al., 2005; Nienhuis & Perron, 2008). Inpatient care may be provided within a hospital or clinical setting, or inpatient care facility.

Care in hospital settings may include medically assisted detoxification and management of withdrawal symptoms (Ilgen et al., 2005). Inpatient hospital-based care is best suited for individuals who are at high risk of developing life-threatening withdrawal symptoms, have severe psychiatric conditions or are in need of 24-hour medical supervision (Corrigan & O'Gorman, 2007). For individuals without these conditions, inpatient treatment in non-hospital settings provides structure and intense programming without an emphasis on medical stabilization (Nienhuis & Perron, 2008). Unlike hospital-based care, inpatient facilities may require a period of abstinence before acceptance into the program (Rosengren et al., 2000). It has been suggested that inpatient programs are best suited for individuals who experience chronic relapses, are dependent, or do not have adequate support from their social environment (Corrigan & O'Gorman, 2007; Shand et al., 2003). There is also considerable evidence that those with severe alcohol use disorders benefit the most from intense monitoring (Corrigan & O'Gorman, 2007; Kaskutas et al., 2004; Weisner et al., 2000; United Nations, 2002).

Some inpatient programs utilize directed learning and structured daily routine, or provide a holistic program known as the therapeutic community (TC) in addition to care as usual (Shand et al., 2003). Most inpatient facilities include education specific to substance use, such as relapse management, for shorter periods of care (between 1-3 months), while inpatient TC approach incorporates psychoeducation in other social dimensions, such as assertiveness training, for longer-term care (ranging from 3 – 12 months) (Shand et al., 2003; United Nations, 2002). This longer period of inpatient care allows clients to participate in the management and operation of the facility encouraging collaboration and mutual support skills within a prosocial environment (Shand et al., 2003).

However, it needs to be recognized that the year following treatment requires considerable life changes as the individual shifts from inpatient care, which provides a safe and secure environment, to independence in the "real-world" with potential alcohol use triggers (Carter et al., 2008). Relapse rates are often noted to be more prevalent within this 12-month transition period with nearly 60-80% of individuals relapsing within 3-4 months after leaving an inpatient program, indicating the importance of long-term care including aftercare programming (Bottlender & Soyka, 2004; Carter et al., 2008). A potential barrier influencing relapse rates in aftercare programming may be caused by internal or structural obstacles preventing commitment and active participation (Carter et al., 2008). The transition from inpatient care to less structured aftercare approaches requires individuals, who may be in the process of developing human capital (i.e. abstinence self-efficacy, or the belief in internal resources to maintain sobriety, and coping skills), to relearn the structure of a new setting and cultivate trust and alliance with new support staff and peers (Hanson et al., 1994). Mechanisms enabling successful SUD treatment outcomes are thought to be related directly to client-provider relationship, linkage services (i.e. transportation, childcare), and matched treatment programs, so entering a different program outside of previous treatment may not be encouraging (Shin et al., 2011; Stein et al., 2009).

As with inpatient programs, outpatient care is heterogeneous and may differ in duration, intensity and care settings. Outpatient programs are more versatile in that they may be stand-alone treatment, or can be supplementary aftercare following inpatient treatment. These programs may target individuals with low severity of alcohol use disorder, those with social and environmental stability, or those who prefer (or require) to maintain family and career obligations (Ilgen et al., 2005; Nienhuis & Perron, 2008). As health care priorities center on increasing accessibility to

treatment programs and reducing costs, creating outpatient programs that are similar in outcome to inpatient programs may have the potential to reduce costs without sacrificing efficacy (Nienhuis & Perron, 2005; Schroder et al., 2013; Shin et al., 2011). More traditional outpatient programs can also be made more flexible by being accessible at various times of the day, or during weekends.

Intense outpatient, or day hospital care, is an approach that models long-term inpatient treatment (Nienhuis & Perron, 2008; Weisner et al., 2000). Sessions may occur in a hospital or clinical setting and the structure often involves group psychoeducation for the greater part of the day, at least five days per week (Ilgen et al., 2005; Nienhuis & Perron, 2008). Psychoeducation does not differ greatly from sessions offered in inpatient care, and both approaches include therapeutic work through mutual support and relapse prevention. Intense outpatient care can have a similar daily structure as inpatient care, and is usually predetermined for the individual, leaving little room for obligations outside of treatment (Nienhuis & Perron, 2008). Additionally, day hospital, while reducing health care expenditures, is still costly – nearly twice as much compared to traditional outpatient programs (Weisner et al., 2000).

Another difference from an inpatient program can be that outpatient programs do not routinely provide individual therapy, and that 12-step involvement may be strongly encouraged but not mandatory (Bond et al., 2003; Donovan et al., 2013; Jenkins & Tonigan, 2011). Traditional outpatient, also called standard outpatient, is less intense than day hospital and provides ambulatory, or short-term, services (Ilgen et al., 2005). These services can occur in a variety of settings such as community mental health clinics or patient-run support groups where the care needs of the client dictate the intensity of the program (Ilgen et al., 2005; Weisner et al., 2000).

Other outpatient programs, such as 12-step self-help approaches, are available along with novel formats such as phone or computer based interventions (Khadjesari et al., 2011; Schroder et al., 2013).

In conclusion, there are multiple overlapping styles of treatment, and apart from the obvious difference in that individuals in inpatient/residential programs are not living in their own house, there are no other clear consistent differentiating factors.

3.3 Significant Features of Treatment

Significant features of inpatient and outpatient care, such as duration of treatment, goal intensity, and structure of care setting, psychoeducation, therapeutic alliance, and human capital may all contribute to increased probability of positive post-treatment outcomes. The potential influence of each of these is examined.

3.3.1 Duration of Care

The duration of engagement in substance use treatment programs greatly influences post-treatment outcomes with some studies finding length of stay (LOS) to be the most significant predictor of successful recovery (Arbour et al., 2011; Deane et al., 2012; Gottheil et al., 1992; Stein et al., 2009). Other studies find LOS to affect sobriety indirectly through encouraging entrance into supplementary aftercare programs (e.g. Zenmore & Kaskutas, 2008). The precise LOS that produces the best outcome is relatively unclear; however, it appears a minimum of 30 days of

hospital-based inpatient care, and 3 months of non-hospital inpatient care (i.e. residential) significantly improves success rates 12 months post-treatment (Corrigan & O'Gorman, 2007; Deane et al., 2012; Gottheil et al., 1992; Kelly et al., 2012; Magidson et al., 2011). A study of 367 adults in abstinence-based inpatient "caring community" for substance use disorders (SUDs) found the duration of inpatient treatment to substantially impact commitment and participation in aftercare programs (Arbour et al., 2011). Over 70% of individuals who successfully completed more than 80 days of inpatient treatment had better post-treatment outcomes at 6 months than others who completed 25 days or less (Arbour et al. 2011).

Day-hospital and traditional outpatient programs are variable in duration with some lasting a few months, while more intense programs are usually of shorter duration (Bottlender & Soyka, 2004; Brown et al., 2011; Kaskutas et al., 2004; Kolodziej et al., 2012). In a study of 668 randomized and 405 self-selected participants, treatment outcomes of day-hospital were compared to traditional outpatient care at 6 months post-treatment (Weisner et al., 2000). Day-hospital and traditional outpatient groups involved mandatory attendance and bioverified abstinence (i.e. urine, blood, breath tests) during the course of the 8-week rehabilitation study (Weisner et al., 2000). Both groups were involved in the same therapeutic structure including supportive group therapy, relapse prevention and off-site 12-step attendance, but day-hospital consisted of many more sessions (104 vs. 24) over 8-weeks of treatment (Weisner et al., 2000). Participants who were randomized displayed similar improvements in outcome measures after completion of either method; however, those with mid to high psychiatric severity had higher rates of abstinence after day-hospital compared to traditional treatment (Weisner et al., 2000). In the self-selected group, those completing day-hospital were nearly 3 times more likely to achieve abstinence than those

who self-selected traditional outpatient (Weisner et al., 2000). These findings suggest that a longer-term and intensive day-hospital program may be a useful part of any comprehensive treatment program.

3.3.2 Goal Intensity

Treatments for SUDs include abstinence-based programs that mandate complete cessation of substance use and harm reduction programs that work toward reduction of substance use to minimize aversive consequences. In one study of 178 substance use treatment programs in Canada, nearly two-thirds of substance abuse treatment programs maintained that moderate alcohol use was unacceptable (Rosenberg et al., 1996). Although non-abstinence may be viewed as inappropriate for inpatient programs, the majority of outpatient programs reviewed in the same study applied harm reduction approaches, rather than insisting on complete abstinence (Rosenberg et al., 1996). However, goal intensity varies significantly between outpatient treatment programs and more intense formats, such as day hospital, which may require abstinence and incorporate bioverification through blood, breath and urine tests (Graff et al., 2009; NICE, 2011; Rosenberg et al., 1996; Shin et al., 2011; Weisner et al., 2000). One study of 1,007 substance users in Scotland found 57% of participants prefer abstinence-based programming while the remaining 43% preferred treatment offering goals other than abstinence, such as stabilization and harm reduction (McKeganey et al., 2004). This is relevant since individuals entering treatment may not yet have the ability to discontinue substance use and harm reduction approaches may act as a starting point for improvements. Incorporating varying goal opportunities within one treatment program may appeal to diverse needs and encourage a reduction of substance use and eventual cessation. This

method is also known as the gradualism approach through the harm reduction-abstinence continuum (Futterman et al., 2004; Kellogg, 2003). Unfortunately, current research evidence is not clear enough to determine if there is a particular level of goal intensity that is most effective in terms of long-term outcomes.

3.3.3 Care Structure

As the need to reduce health care costs by limiting inpatient programs increases, the versatility and potential for success through outpatient care is increasingly important. One group compared outpatient with inpatient treatment for up to 18 months (Guydish et al., 1998; Guydish et al., 1999). Both treatment formats were based on elements of therapeutic community (i.e. group sessions, relapse prevention), with the exception of residing in the care facility while outpatient participants maintained their primary environment (Guydish et al., 1998; Guydish et al., 1999). Outcomes were measured using the Addiction Severity Index (ASI) which examines core features of stability, such as medical and psychological status, drug and alcohol use, social network and employment (Guydish et al., 1998; Guydish et al., 1999). Both outpatient and inpatient conditions demonstrated improvements in core features over time. Inpatient care only outweighed outpatient programming in aspects of social skills and psychiatric symptoms, which may mean individuals with concomitant psychiatric conditions or those who are socially unstable may benefit from environmental modification (Guydish et al., 1998; Guydish et al., 1999). Another study found the effectiveness of treatment delivery to influence outcomes in which retention and completion of either inpatient or outpatient treatment was directly related to client satisfaction (Burdon et al., 2007). In this study involving 4,165 participants, duration and treatment satisfaction were the

strongest predictors of abstinence 12 months post-treatment, and were much more important than the individual care setting (Burdon et al., 2007). In addition, those with low or high severity of alcohol (and other substance use) disorders benefitted equally from both inpatient and outpatient care (Burdon et al., 2007).

Increasing accessibility to outpatient programs has encouraged the production of novel programs and delivery methods. An Interactive Voice Response (IVR) intervention was produced to help those with moderate alcohol use in one study of 187 individuals (Schroder et al., 2013). In this study the IVR program was automated to reduce error in reporting and recall, and was flexible, anonymous, cost-effective and easily accessible (Schroder et al., 2013). Subjects in this study were given free access to the self-guided change modules for 24 weeks, IVR training, and educational materials (Schroder et al., 2013). The automated modules were presented to the listener in order of typical recovery and meant to supplement and support new recovery behaviour (Schroder et al., 2013). Overall, 84% of participants experienced initial alcohol use resolution tracked through telephone interviews (Schroder et al., 2013). However, these are preliminary results and the potential utility of IVR, or other novel technological approaches, requires significantly more study.

3.3.4 Psychoeducation and treatment approaches

Individuals seeking treatment for alcohol use disorders vary on a number of social and psychological dimensions; however, there is consistent evidence that distress, depression and dysfunctional cognitions accompany alcohol use disorders (Bornovalova et al., 2012; Deane et al., 2012; Jones & McMahon, 1994; Kelly et al., 2012; Magidson et al., 2011; Urbanoski et al., 2012).

Behavioural approaches to alcohol abuse disorders incorporate aspects of cognitive behavioural therapy (CBT), motivational enhancement therapy, and Twelve-Step (12-step) Facilitation (Bornovalova et al., 2012; Deane et al., 2012; Jones & McMahon, 1994; Kelly et al., 2012; Magidson et al., 2011; Urbanoski et al., 2012). CBT allows modification of cognitions related to substance use, such as cravings, peer pressure, or emotional states, into adaptive responses to reduce the likelihood of relapse (Fuller & Hiller-Sturmhofel, 1999). Motivational enhancement therapy encourages the use of personal resources to make changes related to harmful substance use through therapist motivation (Fuller & Hiller-Sturmhofel, 1999). In this model, the therapist broadly guides the client through stages of change; however, not through the recovery process (Angres & Bettinardi-Angres, 2008; Hettema et al., 2005; Miller & Rose, 2009). Twelve-Step Facilitation acts as an introduction to other 12-Step programs, such as Alcoholics Anonymous, and is based on self-recovery steps and peer support (Bond et al., 2003; Donovan et al., 2013; Nienhuis & Perron, 2008).

Maladaptive schemas and cognitions, such as inaccurate assessments of the impacts of alcohol use, may also play a significant role in treatment outcomes, such as abstinence, after completion of treatment (Shorey et al. 2013). Many inpatient and outpatient programs provide psycho-education to counter cognitions influencing alcohol use, and one study focused on alcohol-related beliefs as a predictor of abstinence post-treatment (Jones & McMahon, 1994). Although positive alcohol beliefs are consistently associated with actual use, 53 male participants at a 10-day inpatient program who had positive alcohol expectancies did not consume more alcohol at the 1-month follow up (Jones & McMahon, 1994). At the 3-month follow up; however, negative alcohol expectancies influenced a reduction in alcohol consumption, possibly indicating the importance of

modifying cognitions associated with substance use in treatment programs (Jones & McMahon, 1994). This study did not examine longer-term abstinence and so it is uncertain if this theoretical approach is more widely applicable.

Another approach has been to try and combine CBT with use of the opiate antagonist naltrexone, which reduces cravings to use alcohol (Vuoristo-Myllys et al., 2013). In this study 372 participants attending an outpatient treatment program were instructed to take 50 mg of naltrexone 30-60 minutes before potential situations involving alcohol, in combination with 8 semi-structured CBT sessions lasting 50-60 minutes over 18-20 weeks (Vuoristo-Myllys et al., 2013). The severity of cravings, consumption of alcohol, or adherence to naltrexone during treatment did not predict engagement, and over 50% of participants terminated attendance by the fourth session of basic treatment and before CBT components offered in sessions 5-8 (Vuoristo-Myllys et al., 2013). Again, this novel approach does not appear to be one that is likely to be widely generalizable.

Taken together, current research evidence suggests that the components of psychoeducation do not differ significantly between inpatient and outpatient programs in terms of content. It remains uncertain if the different components affect outcomes specifically, or if there are key elements to psychoeducation that are required for improvement in alcohol misuse outcomes.

3.3.5 Therapeutic Alliance

Collaboration between client and therapist within the scope of treatment decision making and planning is the core element of therapeutic alliance (Ardito & Rabellino, 2011). This alliance may

be enhanced through unconditional acceptance, support, and congruence on treatment-specific goals (Horvath & Symonds, 1991). Therapeutic alliance may be an important factor influencing treatment outcomes and encouraging engagement in aftercare programming (Carter et al., 2008; Meier et al., 2005; Shin et al., 2011; Urbanoski et al., 2012) The collaboration and social bond that is developed has been linked to early improvements in treatment, increased engagement, retention, and abstinence self-efficacy (Ilgen et al., 2006; Meier et al., 2005; Shin et al., 2011). One study observed the effects of therapeutic alliance on young adults, aged 18-24 (Urbanoski et al., 2012). In a sample of 303 patients, of whom 28% had alcohol as their primary use disorder, individuals were assessed for therapeutic alliance at baseline, mid-treatment (14 days), and at discharge (average of 24 days) regardless of treatment completion (Urbanoski et al., 2012). Individuals with strong commitment to Alcoholics Anonymous or Narcotics Anonymous, adaptive coping skills, and abstinence self-efficacy, were more likely to report high levels of alliance (Urbanoski et al., 2012). A stronger sense of therapeutic alliance produced a notable decrease in psychological distress at mid-treatment; however, it was not found to influence commitment to 12-step program, coping skills, abstinence self-efficacy, or motivation to complete treatment at discharge (Urbanoski et al., 2012).

Nonetheless, therapeutic alliance has been proposed to have the potential to be a universal moderator for both inpatient and outpatient programs in diverse populations (Shin et al., 2011; Reid et al., 2005). Data collected by the National Treatment Improvement Evaluation Study from 1992-1995, and an analysis of self-reporting interviews of 6,593 participants from multiple substance use treatment programs in the United States, supported the importance of client-provider relationship in all treatment modalities (Shin et al., 2011). Specifically, the strength of the

therapeutic alliance was found to have a significant and direct impact on duration of treatment and substance use post-treatment in outpatient programs (Shin et al., 2011). Other studies have suggested that the quality of the alliance, as perceived by both client and provider, to be more important than the specific techniques provided by the therapist (Ilgen et al., 2006; Shin et al., 2011). Indeed, the characteristics encouraging the formation of an alliance vary greatly and are challenging to pinpoint, so features guiding this process are unclear (Meier et al., 2005; Urbanoski et al., 2012). Thus, currently the potential role of a strong therapeutic alliance on outcomes remains uncertain, as does the best method for achieving this.

3.3.6 Social and Human Capital

Inpatient care programs may be tailored to individuals with inadequate levels of social and human capital. Human capital is often defined as cumulative skills and competencies that an individual has which may be leveraged in order to achieve abstinence; social capital refers to the ability to form social bonds and affiliate with abstinent peers (Arbour et al., 2011; Bond et al., 2003; Winstanley et al., 2008). Substance use may begin in young adulthood, which is a vulnerable time during which development of social and human capital often occurs (Kelly et al., 2012). For this reason, treatments relying on these factors may not be successful if the underlying skills are underdeveloped (Kelly et al., 2012). A study of 303 inpatients aged 18-24 years found that while individuals may be committed to abstinence upon entering treatment, they may lack the appropriate management tools to attain their goals (Kelly et al., 2012). Coping skills and the belief in one's ability to avoid alcohol, or abstinence self-efficacy, were found to be the strongest

predictors of treatment success when comparing baseline measures to those at discharge (Kelly et al., 2012).

Successful outpatient care depends on an appropriate social and environmental situation which will enhance, rather than disrupt, the recovery process. Non-specific support from a social network may mediate a lack of alcohol specific social support in individuals with alcohol use disorders (Beattie et al., 1993). Environments that are meaningful to the individual can have a positive or negative impact on substance use (Beattie et al., 1993). A study of 148 individuals attending an outpatient program found environmental variables, such as social support, influenced subjective feelings of wellbeing as well as alcohol abuse (Beattie et al., 1993). Other studies indicate social and environmental stability, as well as abstinence self-efficacy, to be features enabling successful treatment in outpatient settings (Bond et al., 2003; Donovan et al., 2013; Ilgen et al., 2006). Outpatient programs promoting peer involvement and social support may supplement other forms of treatment allowing for the formation of prosocial networks. Interestingly, perhaps, it is possible to consider a 12-step approach to be one such prosocial network.

3.3.7 12-Step Approach

Twelve-step programs are based on self-help and mutual support in which individual motivation and commitment to abstinence are the only membership requirements (Alcoholics Anonymous World Services, 2013). In a sample from the National Treatment Outcome Research Study, 142 clients from 8 hospital-based inpatient programs were interviewed at intake and again at 1, 2 and 5 years post-treatment to examine the impact of Alcoholics Anonymous (AA) or Narcotics

Anonymous (Gossop et al., 2008). Frequent Alcoholics Anonymous attendance, at least weekly, predicted consistent abstinence at every follow-up interval in individuals with only alcohol use disorders (Gossop et al., 2008). Involvement in AA may have long-term benefits for those who are motivated to participate and believe in the tenets of this program. When comparing the effects of non-12-step treatments to AA, and no treatment for alcohol use disorders in 466 participants, AA proved to be more effective than non-12-step treatment for problem drinkers at 1-year and 3-year follow up, but outcomes were equivalent at 8-year follow up (Timko et al., 2000). Short term studies on formal treatment in combination with AA find this format to be superior to either program alone (Timko et al., 2000).

Some inpatient programs are structured around 12-step involvement in which attendance is a mandatory part of the daily program. In a study using 7 inpatient care facilities in 3 metropolitan cities in the United States, 733 participants were interviewed at 2, 4, and 8 weeks during treatment and again at 6 and 12 months post-treatment to determine the effects of mandatory AA involvement on alcohol use outcomes (Zenmore & Kaskutas, 2008). Coerced or mandatory involvement in AA did not improve alcohol outcomes in this study (Zenmore & Kaskutas, 2008). This may be related to personal factors, such as readiness to change, or incongruence between AA principles and personal beliefs.

The impact of programs like AA may be due to the establishment of a supportive social network. In a study with 655 participants from 10 alcohol treatment programs, involvement in AA activities and embracing the social network contributed to abstinence at both 1-year and 3-year follow-up (Bond et al., 2003). A significant predictor of relapse includes the number of heavy drinkers in

one's social network, and it is possible that attendance at AA may modify aspects of lifestyle that influence abstinence (Bond et al., 2003). Additionally, individuals who seriously engaged in AA activities, such as step-work, finding a sponsor, and studying self-help manuals, doubled their probability of successful long-term recovery from alcohol use (Bond et al., 2003). The association between social influences through AA and drinking outcomes was also examined in a study comparing 952 outpatients and 774 patients post-inpatient care (Stout et al., 2012). Participants were randomly assigned to one of three conditions: CBT, motivational enhancement therapy or 12-Step treatment (Stout et al., 2012). Individuals in the motivational enhancement therapy condition engaged in 4 sessions over 12 weeks while CBT and 12-Step treatment groups experienced 12 sessions over 12 weeks (Stout et al., 2012). A significant predictor of treatment outcome, regardless of care modality, was the social network at treatment intake (Stout et al., 2012). Further, one pro-drinker in one's social network is capable of overriding one pro-abstainer even when involved in AA (Stout et al., 2012). In a similar study on alcohol use disorder with over 1,700 participants, comparisons were made between the effects of CBT, motivational enhancement therapy, and 12-Step Facilitation on outcomes 12-months post-treatment (Cutler & Fishbain, 2005). The findings of this study indicate the relative similarity in outcomes from all 3 forms of intervention, with minimal statistical significance distinguishing superiority (Curtis & Fishbain, 2005). Additionally, over 60% of participants engaged in formal treatment had near equal post-treatment outcomes as those who were untreated, reinforcing the notion of natural recovery (Curtis & Fishbain, 2005). Taken together, the current findings do not support the efficacy of the 12-step program as something that is better than other approaches.

It should be noted that although AA attempts to appeal to all religious and non-religious denominations, the spiritual content, including the Lord's Prayer at the end of every session at some community settings and submitting to a "Higher Power", may prevent certain individuals from participating in this program (Dossett, 2013; Karoll, 2010). Additionally, there is evidence linking premorbid religiosity and positive connection to God with higher probability of AA membership (Krentzman et al., 2011). This may become a deterrent to treatment for individuals who require the structure and intensity of inpatient care or supplementary support to outpatient programs, but are reluctant to attend AA sessions frequently. Additionally, concomitant psychiatric conditions, such as attachment avoidance and anxiety, may make social engagement difficult for certain individuals and create ambivalence toward 12-step approaches to recovery (Jenkins & Tonigan, 2011).

Overall, the evidence seems to support involvement in an AA program, or something similar, in terms of successful outcomes. However, there appears to be no consistent evidence to suggest that involvement during an inpatient program is better than during an outpatient program.

3.3.8 Strengths and Limitations

Hospital-based inpatient programs are beneficial for medically assisted detoxification and stabilization of withdrawal symptoms; however, the short duration of care may not effectively support the social needs of individuals with substance use disorders (Bond et al., 2003; Weisner et al., 2000; Winstanley et al., 2008). Inpatient care may link, in a step-down approach, to residential or outpatient care, both of which may provide a supportive and safe environment enhancing

successful long-term recovery. It is conceivable that the goal intensity of inpatient programs may be beneficial for those who are unable to control alcohol consumption, and who therefore require mandatory abstinence-based programming. In addition, the longer duration of treatment might enable in-depth psychoeducation and skills training in order to develop ample human capital. Despite all of these potential benefits, literature to date does not appear to demonstrate clear differences for most individuals from an inpatient setting. Similarly, although a significant strength of inpatient treatment is the removal of the client from their primary environment, this may also be a limitation (Table 3.1). The transition from a nurturing environment free from potential triggers to the "real-world" is a considerable shift that may tax newly developed coping skills. It is during this transition that potential for relapse is high; nonetheless, it is possible that supplementary outpatient programs may provide additional support to mitigate these environmental triggers.

TABLE 3.1: STRENGTHS AND LIMITATIONS OF INPATIENT CARE SETTINGS

	Strengths	**Limitations**
Inpatient Care	• Modification of primary environment • Medical and social management of SUDs • Engagement in adaptive social networks • Duration of care may enhance therapeutic alliance • Rigorous monitoring and structured daily routine	• Requires long-term commitment • Not easily accessible; often requires physician referral • Social network from care may not coexist in community post-treatment • Education and career may be placed on hold • Transition from care to independence may be taxing

TABLE 3.2: STRENGTHS AND LIMITATIONS OF OUTPATIENT CARE SETTINGS

	Strengths	Limitations
Standard & Intensive Outpatient Care	• Easily accessible with flexible attendance and goal intensity (i.e. harm reduction; abstinence) • Certain programs are available at low to no cost • Social network formation within community of choice • Ability to maintain family, education, and career obligations while in treatment	• Intensity and lack of structure may not fit some needs • Self-efficacy and motivation are required • Social network from treatment may not share uniform goals • Primary environment may have potential triggers

Outpatient programs can be the first line of treatment, or can offer supplementary aftercare as well as offering flexibility in duration, level of commitment, and approach (Table 3.2). In addition, the ability to maintain family and career obligations may strongly influence commitment to treatment. Engaging in treatment while remaining in the primary environment is both a strength and limitation of this format: individuals with high levels of motivation, abstinence self-efficacy, and supportive environment may benefit from using skills acquired immediately within their community, while those without these features may find this format challenging. Traditional outpatient programs have a lax structure and this may not benefit individuals requiring strict daily organization and monitoring in order to recover successfully.

3.4 Summary of literature on inpatient (or residential) vs outpatient

The ability to identify a program that would consistently and effectively treat alcohol use disorder would be of significant benefit both to individuals with this condition, as well as to society as a whole. However, the complexity of these disorders and their care makes the development of a single universal treatment unlikely. Current evidence does not suggest that there is a single approach that is consistently effective for all individuals. In terms of the relative benefits of inpatient / residential approaches compared to a purely outpatient approach, again the findings are mixed. This is likely to support a greater move to outpatient programs, ideally of longer duration, as a primary treatment for most jurisdictions for economic reasons. In terms of a program focused on youth, the evidence is certainly supportive of an outpatient approach. Perhaps the key finding is that the evidence from the published literature shows that, for most individuals, a long-term outpatient program is likely better than a shorter-term inpatient / residential program. At this point, the inconclusive evidence suggests that the content of individual programs do not appear as important as the time spent in such programs, human capital of the individual, and the ability to develop a therapeutic alliance. For these reasons, any successful youth-focused program should, at the very least, be developmentally appropriate considering underdeveloped human capital, and of greater length; however, it is challenging to recommend therapeutic alliance as a factor in substance misuse treatment programs since this concept is fluid and requires an interaction between client and provider. Presently, this synergy is difficult to quantify.

Chapter 4: Research Methods for PhD study embedded within the EMPATHY Program

4.1 Overview of the EMPATHY Program

A large interventional program was funded by a grant from Alberta Health to examine a novel intervention program in schools in Red Deer, Alberta. This program was called Empowering a Multimodal Pathway towards Healthy Youth (EMPATHY). It was carried out in over 6,000 students aged 11-18, who were followed up over a 15 month period (from January 2014 until June 2015) (Silverstone et al., 2015). Part of the program included a school-based screening, behavioural intervention, and referral for treatment (SBIRT), which was the basis of the PhD study since substance abuse was one of the mental health assessments. The EMPATHY program therefore provided a novel and unique opportunity to examine youth at risk of developing a substance use disorder, and then to examine the effect of an SBIRT in these youth.

4.2 Detailed EMPATHY Study Protocol

The primary focus of the school-based SBIRT, EMPATHY, was to decrease depression and suicidal thinking in youth between the ages of 11 – 18 years (Silverstone et al., 2015). The study protocol is described in detail here.

4.2.1 Program location and timing

Unfortunately a number of youth suicides occurred in a relatively short period of time (2012 and

early 2013) in the community of Red Deer Alberta, a Canadian city with a population of approximately 100,000 people, which led to seeking prevention strategies to try and reduce future risks (Silverstone et al., 2015). In May 2013, a widespread collaborative community approach was implemented involving members from various services that interact with youth, such as education, primary health care, mental health care, social, and police services (Silverstone et al., 2015). A program was developed through consultation with various community stakeholders and other interested parties, and this Empowering a Multimodal Pathway towards Healthy Youth (EMPATHY) program began across an entire public school district in February 2014 (Silverstone et al., 2015). In June 2015, program funding was terminated by the Provincial Government, and subsequent planned research activities and data collection ended at this time (Silverstone et al., 2015). From the outset, a unique attribute of the EMPATHY program is the incorporation of the school-based SBIRT across an entire district (Silverstone et al., 2015). This attribute may potentially allow for greater generalizability of results from the EMPATHY program (Silverstone et al., 2015).

4.2.2 Multimodal approach

The school-based SBIRT program, EMPATHY, incorporated the 3-tiered model of universal screening, selective or targeted brief intervention for those identified as high risk, and referral to treatment for those requiring more intense or specialized treatment (Silverstone et al., 2015). Students were assessed on 5 dimensions of youth mental health: depression, anxiety, quality of life, self-esteem, and substance misuse (Silverstone et al., 2015). For ease of administration, accuracy, and privacy, results from the EMPATHY program were collected on electronic tablets

linked to a private school intranet; however, each student was given an individual tablet to complete SBIRT activities (Silverstone et al., 2015). Further, tablets were stored in each school (Silverstone et al., 2015). Although prior studies utilized highly educated individuals to administer prevention and intervention programs (Gillham, 1990; Kindt et al., 2012), staff hired for the EMPATHY program had experience working with youth; however, not highly qualified in mental health, such as registered psychologists (Silverstone et al., 2015). This was a deliberate decision to examine if non-specialized mental health workers could facilitate the EMPATHY program successfully, while being mindful of the shortage and cost of specialized workers (Silverstone et al., 2015). This area of research is still in its infancy; however, results examining mental health outcomes for interventions facilitated by teachers (other non-specialized workers were not included) are insufficient to draw valid conclusions (van Ginneken et al., 2013). Each non-specialized mental health worker was called a "Resiliency Coach", and each was dedicated to a specific school (Silverstone et al., 2015). It is important to note that the role of the Resiliency Coaches was to facilitate SBIRT processes, and not to act as therapists (Silverstone et al., 2015). During screening, if students were flagged as exhibiting high risk behaviour (i.e. suicidal ideation), both students and their families were contacted within 48 hours of screening in nearly all cases, if not as rapidly as 2 – 4 hours after screening in acute situations (Silverstone et al., 2015).

4.2.3 Screening

Universal screening of students in Grades 6 – 12 took place within classrooms or in the gymnasium during class time, often taking no more than 25 minutes (Silverstone et al., 2015). Dedicated tablets were used to administer screening questions and students logged onto the app using their student

IDs (Silverstone et al., 2015). Individual screening questions were randomized, and all data was uploaded to a secure database to be immediately available for study staff to identify cases of imminent risk (Silverstone et al., 2015). Further, no data was saved to the actual tablet since these electronic devices were connected to school intranet (Silverstone et al., 2015). Approaches to electronic data collection complied with both security and privacy requirements (Silverstone et al., 2015). It is important to note that study staff did not have identifiable information from students, and only determined risk through a number assigned to each student, unique to the EMPATHY program (Silverstone et al., 2015). When risk was identified, study staff relayed this unique number to school staff to determine student identity (Silverstone et al., 2015). It was only at this time that information regarding student results and scores were available to school staff (Silverstone et al., 2015).

4.2.4 Screening Tools

Screening tools were brief and easily created into a screening app for the study (Silverstone et al., 2015). The PHQ-9 (Patient Health Questionnaire, 9 questions) is used to evaluate risk of depressive disorder (Silverstone et al., 2015; Spitzer et al., 1999), and we used the adapted PHQ-A which is well validated in youth (Ganguly et al., 2013; Richardson et al., 2012; Richardson et al., 2010; Silverstone et al., 2015). For the EMPATHY study, a cut-off score of $\geq$ 10 was determined, *a priori*, to represent meaningful depressive symptoms (Silverstone et al., 2015). Since the anxiety questions from the HADS (Hospital Anxiety and Depression Scale) (Zigmond & Snaith, 1983) screening tool has been used in youth populations in the past (Silverstone, 2015; van der Geest et al., 2013; Wen et al., 2015; Wiklund et al., 2012), it seemed appropriate to use it in

this study, and a score of ≥11 was determined, *a priori,* to represent meaningful symptoms of anxiety (Silverstone et al., 2015). Another 2 standard scales were used to measure self-esteem through the Rosenberg Self-Esteem Scale which has been used previously with youth (Khajehdaluee et al., 2013; Puskar et al., 2010; Rosenberg, 1965; Sullivan, 1978), and quality-of-life KIDSCREEN-10 developed for international use with both younger and older youth (8 – 18 years old) (Ravens-Sieberer et al., 2005; Silverstone et al., 2015). To assess substance misuse, a novel 11 question DAT (Drug, Alcohol, and Tobacco) scale was used (Silverstone et al., 2015). Of these 11 questions, 9 were from the CRAFFT Substance Use Screening Tool, but it should be noted that in scoring the CRAFFT only 6 questions are actually used (Knight et al., 1999; Silverstone et al., 2015). Previously, baseline findings from the overall 11-item DAT scale has been reported (Silverstone et al., 2015), as well as a manuscript submitted for publication in which we have extracted the scores for just the 6 questions that form the CRAFFT to allow more direct comparison to previous research findings (Hamza et al., submitted).

4.2.5 Identification of High Risk group (Top 10%)

A "High Risk" group was identified through the cumulative scores from each of the 5 mental health scales, given equal weight (20%), and normalized to a maximum score of 100 (Silverstone et al., 2015). This was called the "EMPATHY score" (Silverstone et al., 2015). In addition to having an EMPATHY score in the Top 10%, students who were flagged as being actively suicidal were also classified as high risk (Silverstone et al., 2015). Classifying students with scores in the Top 10% is based on previous findings that approximately 10% of youth between 10 – 18 years of age may have clinical symptoms of depression (Costello et al. 2005; Goldman, 2012), and those with sub-

clinical symptoms may be at higher risk of suicidal ideation (Balazs et al., 2013; Bertha & Balazs, 2013; Carli et al., 2014; Silverstone et al., 2015). In addition, there is some evidence that symptoms of depression and/or anxiety may co-occur with substance use (Nardi et al., 2013).

4.2.6 Brief Interventions offered in school

Once individuals were classified into the high risk group, parental consent along with student assent was required in order to participate in the selective online intervention (Silverstone et al., 2015). The intervention programs offered were "This Way Up" (Calear & Christensen, 2010) which focused on symptoms of depression, and "Breaking Free" (Postel et al., 2008) which focused on substance misuse (Silverstone et al., 2015). Both programs were existing internet-based cognitive behavioural therapy (CBT) programs and students were able to choose which program to engage in (Silverstone et al., 2015). Follow-up after each module with students allowed Resiliency Coaches to facilitate the selective brief intervention in a guided manner; however, these discussions were restricted to the content of the program and not providing therapy to students (Silverstone et al., 2015). At the outset, it was unclear how many students would participate in the selective intervention component of the EMPATHY program, since it has been suggested that uptake of opportunities can be limited for a variety of reasons (Sawyer et al., 2010; Silverstone et al., 2015). For this reason, it remained unclear how many students in the high risk group offered the brief intervention would participate (Silverstone et al., 2015).

In addition to SBIRT processes in the EMPATHY program, a universal prevention program, called *Op Volle Kracht* (OVK), after its Dutch name, was given to students in Grades 6 – 8 and was based

on principles of cognitive behavioural therapy (Kindt et al., 2014; Kindt et al., 2012; Silverstone et al., 2015; Tak et al., 2012; Wijnhoven et al., 2014). During class time usually covering health topics, 16 OVK sessions were implemented to help students understand the connection between thoughts, feelings, and behaviours, as well as instruction on social norms and learning social competence skills (i.e. assertiveness, resistance, and stress relief training) (Silverstone et al., 2015). In Year 1 of the EMPATHY program (February – June 2014) only 8 CBT sessions were given to all students in Grades 7 and 8 (ages 12 – 13) since the program started in the middle of the school year (Silverstone et al., 2015). All 16 sessions (8 CBT, 8 social competence training) were given to all students in Grades 6 – 8 (ages 11 – 13) in Year 2 (September 2014 – June 2015) of the EMPATHY program (Silverstone et al., 2015). Resiliency Coaches received specialized training from the creators of the OVK program to facilitate the sessions (Silverstone et al., 2015).

4.2.7 Referral for treatment

The referral to treatment process followed a collaborative care model in which communication between schools, primary care, and specialty youth psychiatric services produced a shared decision to make appropriate referrals (Silverstone et al., 2015). Although training on CBT in youth was offered to primary care clinicians, treatment was the standard care each professional was currently using, and no standardized treatment was mandated for this component of the program (Silverstone et al., 2015). Study staff were instructed to carefully track all referrals to both primary care and specialist mental health care during the program, and a commitment was made that additional staff resources could be made available to help following identification of youth in need (Silverstone et al., 2015).

4.2.8 Ethics Statement

It should be noted upon consultation with the school district (and agreement from the local ethics board), the screening process was deemed not part of the study as the school district was adamant that programs that they implement district-wide did not need specific parental consent. This was based on the fact that education for any subject matter within these schools, even areas that may be considered controversial (such as discussions about sexual matters or sexual orientation, or ethical matters such as physician-assisted suicide) do not require parental consent. Thus, they did not believe that teaching students on a universal, district-wide basis about mental health issues required a different process than any other subject. Similarly, they asserted that assessing students on a range of topics is done frequently, again, on a universal, district-wide basis, and the assessments in the screening were not something for which specific consent was required. Indeed, they felt that requesting specific consent for what was taught or collected as part of class would be antithetical to their processes. Consistent with their normal processes, they sent a general information letter to all parents about the new program, informing the parents/guardians that the school district was introducing a school district-wide "Resiliency Project" (they didn't want to use the term "EMPATHY program" as they had recently introduced a different program that had a similar name). The University of Alberta, as well as the Strategic Clinical Network for Addiction and Mental Health of Alberta Health Services, helped design the most appropriate screening tool and intervention program, train teachers about assessment, provide close liaison to clinical services in the region when required, and evaluate the effectiveness of the program. In discussions, the school set a threshold for the combined scores (termed the "EMPATHY score" (Silverstone et al., 2015)) to trigger invitation to the "trial" or targeted intervention; this threshold varied by age and

by school. This component included a guided internet-based CBT approach. Since this additional support was not part of regular teaching, prior to receiving this additional internet-based CBT, the parents or guardians of the students provided written consent on behalf of the youth and the student provided written assent, both documents and the process were approved by the University of Alberta Health Ethics review board. The signed consent and assent forms were kept as part of the trial documentation, in a secure, private location. The data collected by the school as part of their regular classroom assessment was made available for analysis by the research team, but only on an anonymized basis (excepting the Alberta Health Number which, while having no personal identification components, would allow subsequent determination of any attendance at ER for suicidal behaviour). This approach was approved by the Health Research Ethics Committee of the University of Alberta on December 5th, 2013, ethics protocol number Pro00041063. Amendments to the original protocol and consent letters were approved in January of 2014, with all changes to the informed consent letter subsequently approved prior to the start of the program. The first student was screened in February 2014 and the follow-up screening was completed by June 2015. No further student follow-up will be carried out subsequently, since program funding was terminated.

This study is registered with ClinicalTrials.gov Identifier: NCT02169960. Although an application for this was completed at the time of the ethics approval, due to an unfortunate administrative oversight, the actual submission to the registration database did not occur until July 2014. This omission was corrected as soon as it was recognized, and was noted in our original publication (Silverstone et al., 2015).

4.3 PhD Project within the EMPATHY Program

4.3.1 Research Questions

The overarching research questions of this PhD thesis are:

- Can a school-based SBIRT reduce substance misuse behaviors in adolescents, shown through decreased CRAFFT Substance Use scores?
- Are there components of SBIRT activities that contribute to a change in CRAFFT scores
- Are the challenges of facilitating a school-based SBIRT the same when facilitating a primary care clinic-based SBIRT?
- What component(s) of Resiliency Lessons (OVK) are valued by students experiencing the program?

In addition to these overarching questions, the present PhD program examined: (1) CRAFFT Substance Use scores, described in terms of gender, age, and severity; (2) observed changes in substance misuse in response to screening only; (3) determination whether or not additional universal resiliency lessons (referred to by program initials in Dutch, "OVK"), and/or brief online intervention resulted in a reduction in substance misuse; (4) determination of the prevalence of comorbid conditions, such as depression and anxiety in those at risk of a substance use disorder; (5) determination as to whether or not symptoms of depression and anxiety decreased in those engaging in risky substance use; (6) determination of the prevalence of use of marijuana, alcohol, tobacco, and smokeless tobacco; (7) observation of whether or not the number of students using marijuana, alcohol, tobacco, and smokeless tobacco changed over the 15-month program; (8)

qualitative inquiry into the SBIRT experience from facilitator perspective, and observation to determine if reports on barriers/challenges are the same and/or different as reported for primary care implementation; (9) qualitative inquiry to better understand factors in the content of OVK resiliency lessons that were valuable to understand student preferences; (10) qualitative studies to better understand reasons why parents and students refused participation in the brief online intervention; (11) qualitative inquiry to better understand student perspective on the SBIRT processes – attributes and areas for improvement.

Clearly, all of these research inquiries could not be answered by one type of design, and using both quantitative and qualitative models allowed the best framework to examine all of these aspects. As such, the mixed methods intervention paradigm provided the best approach to examine these diverse aspects. To simplify the explanation of each strand of research and subsequent methods, each component will be discussed in detail separately.

4.3.2 Research Design: Mixed Methods Intervention

The strategy of inquiry for the present study uses a mixed methods intervention paradigm. In contrast to quantitative studies examining one truth through experimental or non-experimental designs; as well as qualitative data examining multiple truths through phenomenologies, grounded theory, ethnographies, and narratives, the mixed methods approach bridges positivism and constructivism (Creswell, 2015; Creswell, 2003; Feilzer, 2010; Hsieh & Shannon, 2005). Essentially, the mixed methods approach to research focuses on pragmatism (Creswell, 2015; Creswell, 2003; Feilzer, 2010; Hsieh & Shannon, 2005).

4.3.3 Worldview of the PhD Candidate

Worldview is often described in studies involving subjective analysis of data, or data investigating multiple truths, such as approaches used in qualitative study design. Since this thesis is based on a mixed methods paradigm, it is important to briefly describe the philosophical orientation of the PhD Candidate. Often worldview is described in the context of epistemology (the type of evidence we use to make claims) and ontology (the belief that reality is singular or multiple); however, it is possible to have a worldview that centers on pragmatism which is a philosophy focused on the consequences of research, the problem, and what works in real-world practice (Creswell, 2015; Creswell, 2003; Feilzer, 2010; Hsieh & Shannon, 2005). This is the worldview of the PhD Candidate. Through this paradigm, the researcher is able to liberally use both quantitative and qualitative approaches, as well as various methods to best meet the needs of the research at hand (Creswell, 2015; Creswell, 2003; Feilzer, 2010). Further, philosophically, pragmatism accepts the idea of singular and multiple truths that are open to inquiry, with the determination of solving "real-world" problems (Feilzer, 2010).

4.3.4 Mixed Methods Intervention Integration Matrix

Based on the ends expected from research, as well as the PhD Candidate's worldview, the present study employs the mixed methods intervention approach in which quantitative research is produced within a quasi-experimental framework, and the integration of qualitative research embedded within the intervention program (Creswell, 2015; Creswell, 2003; Hsieh & Shannon, 2005) (Figure 4.1).

Figure 4.1: Mixed Methods Intervention Integration Matrix

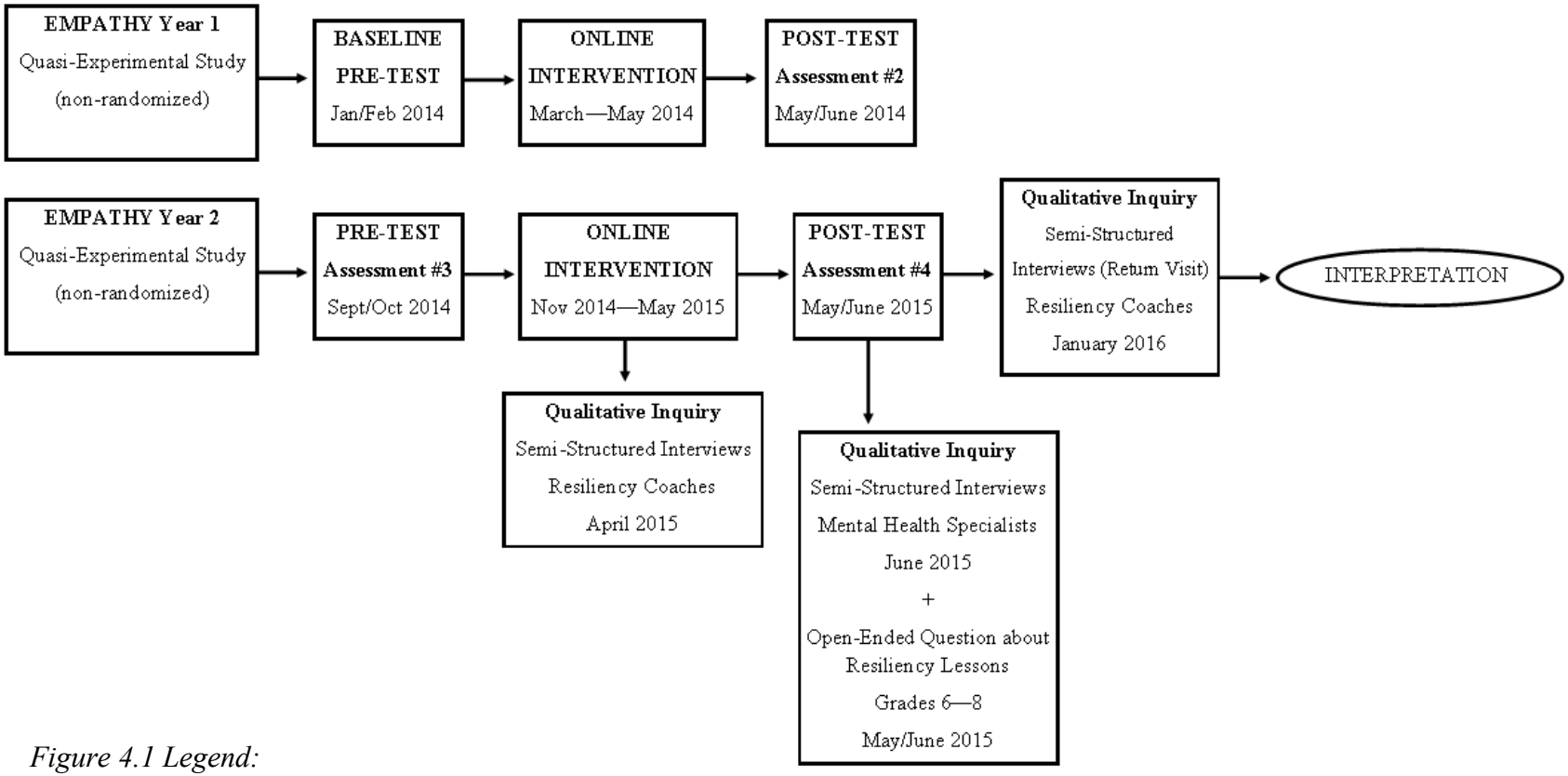


Figure 4.1 Legend:

This figure depicts the integration of both quantitative and qualitative strands of research inquiry within the overarching mixed methods intervention design

4.3.5 Quantitative Strand of Mixed Methods Intervention

Although the EMPATHY program incorporates a treatment factor (i.e. brief intervention) in the study, it would have been unethical to identify students at risk for suicide and then randomize this subgroup to either control or treatment arm (Silverstone et al., 2015). Randomization is a critical feature found in experimental designs (Price et al. 2015); however, because of the sensitive nature of the EMPATHY program, the appropriate study design is quasi-experimental (Silverstone et al., 2015). It is important to note that research design is often borne out of areas of inquiry or research questions; however, the protocol for the EMPATHY study, including design, methods, and participants, was determined prior to this present investigation (secondary analysis) into youth substance misuse within the larger study.

4.3.5.1 CRAFFT Substance Use Scores: Research Questions and Null Hypotheses

Based on uncertain outcomes of implementing SBIRT in youth populations, specifically as an opportunistic prevention and early intervention approach, various questions arose to guide the research process. The most prominent question was if the implementation of school-based SBIRT for Grades 6 – 12 in an entire school district could facilitate favourable substance misuse outcomes, possibly through a change in school culture. More specifically, could an SBIRT program which begins with universal Screening, followed by targeted Brief Intervention, and Referral to Treatment when needed (in summary, referred to as "SBIRT"), have an effect on overall school culture, subsequently resulting in decreased CRAFFT Substance Use scores?

a. **(Cross-Sectional) H_0: There is no difference in CRAFFT Substance Use scores with the introduction of SBIRT in Grades 6 – 12 in students with at least 1 Assessment; (Longitudinal) H_0: There is no difference in CRAFFT Substance Use scores with the introduction of SBIRT is Grade 6 – 12 for students with all 4 Assessments**

Additionally, the EMPATHY program was multimodal and assessed youth on 5 dimensions of mental wellness (depression, anxiety, substance use, self-esteem, and quality of life) and each component of the program was weighted equally for a maximum total score of 100 (Silverstone et al., 2015). Scores of students per Grade and per school found to be in the Top 10% were classified as high risk and were the target population for the Brief Intervention (online CBT modules) (Silverstone et al., 2015). With this select population of students invited to participate in the Brief Intervention, additional research questions arose. Namely, is there a difference in CRAFFT Substance Use scores between the group of students at risk of a substance use disorder and classified as high risk (Top 10%), in comparison to those who were at risk of a substance use disorder, but did not have an overall high risk EMPATHY score?

b. **(Longitudinal) H_0: There is no difference in CRAFFT Substance Use scores with the introduction of SBIRT in Grades 6 – 12 between students at risk of a substance use disorder and classified in the Top 10%, and those at risk of a substance use disorder but were not classified in the Top 10% for students with all 4 Assessments**

Further, participation in the Brief Intervention required both parental consent and student assent; however, it was uncertain the number of at-risk students who would take the opportunity to

participate in the intervention (Silverstone et al., 2015). Another area of interest was to examine if a greater reduction in CRAFFT Substance Use scores was observed for students at risk of a substance use disorder in combination with demonstrated risk behaviours in more than one area of mental health (Top 10%): Do students in the Top 10% who experience the Brief Intervention have lower CRAFFT Substance Use scores than those in the Top 10% who did not experience the Brief Intervention?

c. **(Longitudinal) H_0: There is no difference in CRAFFT Substance Use scores between students at risk of a substance use disorder classified in the Top 10% who participated in the Brief Intervention and those in the Top 10% who did not, both groups having completed all 4 Assessments**

Another component of the EMPATHY program was the introduction of a universal prevention program, known in Dutch as "Op Volle Kracht" (OVK), which translates approximately to "on full power". This was given to students in Grades 6 – 8 in addition to SBIRT components implemented with all Grades (Silverstone et al., 2015). Would there be a reduction in CRAFFT Substance Use scores in students who experienced both OVK and SBIRT components (i.e. screening), but were not classified in the Top 10%?

d. **(Longitudinal) H_0: There is no difference in CRAFFT Substance Use scores in students at risk of a substance use disorder who participated in both OVK and SBIRT components, but were not in the Top 10% and had all 4 Assessments**

Also, is a reduction of CRAFFT Substance Use scores observed for those at risk of a substance use disorder between the select group of students who were classified as high risk (Top 10%) and

participated in both OVK and Brief Intervention, in comparison to those who participated in OVK only?

e. **(Longitudinal) H_0: There is no difference in CRAFFT Substance Use scores for students in Grades 6 - 8 at risk of a substance use disorder and were classified in the Top 10% and participated in the Brief Intervention and OVK, in comparison to those in the Top 10% who only participated in OVK, and had all 4 Assessments**

There is some evidence suggesting that depression and/or anxiety co-occurs with substance misuse in youth: With those at risk of a substance use disorder, how many were at risk of comorbid depression, anxiety, and depression + anxiety, and did this number decrease over time?

f. **(Cross-Sectional) H_0: There is no decrease in the number of students at risk of developing comorbid depression, anxiety, or depression + anxiety who participated in at least one Assessment, and were at risk of a substance use disorder**

g. **(Longitudinal) H_0: There is no decrease in the number of students at risk of developing comorbid depression, anxiety, or depression + anxiety who participated in all 4 Assessments, and were at risk of a substance use disorder**

In addition, mean depression and anxiety scores in youth engaging in risky substance use was of interest to determine if the addition of the EMPATHY program in an entire school district impacted school culture, potentially enhancing mental health beyond substance misuse: In students engaging in risky substance use, is there a reduction in mean depression, anxiety, or aggregated depression + anxiety scores over time?

h. **(Cross-Sectional) H_0: There is no decrease in mean depression, anxiety, or depression + anxiety scores in students at risk of a substance use disorder who participated in at least one Assessment**

i. **(Longitudinal) H_0: There is no decrease in mean depression, anxiety, or depression + anxiety scores in students at risk of a substance use disorder who participated in all 4 Assessments**

Also of interest was to determine which questions students responded affirmatively to on the CRAFFT screen – Would responses to the CRAFFT questions change over the 15-month program?

j. **(Cross-Sectional) H_0: There is no change in affirmative responses on the CRAFFT screen over the 15-month program for students with at least one Assessment; (Longitudinal): H_0: There is no change in affirmative responses on the CRAFFT screen over the 15-month program for students with all 4 Assessments**

A detailed description and analysis of CRAFFT Substance Use Scores, and subsequent risk of depression and anxiety scores, within the EMPATHY program are undertaken in Chapter 5 of this PhD thesis.

4.3.5.2 Drug, Alcohol, and Tobacco (DAT-5, DAT-11) Scores: Research Questions and Null Hypotheses

In the original EMPATHY program there were a total of 11 questions asked regarding drugs, alcohol, and tobacco (DAT), of which 6 are used in the CRAFFT score (Table 4.1), which is an acronym representing the six questions asked (Car, Relax, Alone, Forget, Family, Trouble).

TABLE 4.1: LIST OF QUESTIONS ASKED TO DETERMINE DRUG, ALCOHOL, AND TOBACCO (DAT) SCORE

Included in CRAFFT score	Question Number	Questions asked	Possible score
	1	During the past 12 months, did you drink any alcohol (more than a few sips)?	0 or 1
	2	During the past 12 months, did you smoke any marijuana or hashish?	0 or 1
	3	During the past 12 months, did you use anything else to get high?	0 or 1
CRAFFT	4	During the past 12 months, have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	0 or 1
CRAFFT	5	During the past 12 months, do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?	0 or 1
CRAFFT	6	During the past 12 months, do you ever use alcohol or drugs while you are by yourself, or ALONE?	0 or 1
CRAFFT	7	During the past 12 months, do you every FORGET things you did while using alcohol or drugs?	0 or 1
CRAFFT	8	During the past 12 months, do your FAMILY or friends ever tell you that you should cut down on your drinking or drug use?	0 or 1
CRAFFT	9	During the past 12 months, have you ever gotten into TROUBLE while you were using alcohol or drugs?	0 or 1

Included in CRAFFT score	Question Number	Questions asked	Possible score
	10	During the past 12 months, did you smoke tobacco products?	0 or 1
	11	During the past 12 months, did you use smokeless tobacco products?	0 or 1
		Unmodified maximum possible raw DAT score =	**11**

It is important to note that although responses to the full list of DAT-11 questions were examined in the initial study (Silverstone et al., 2015), the validity of this approach has not be evaluated and does not allow the data to be compared to any other study. Essentially, the ability of this scale to determine risk of developing a substance use problem or disorder remains unknown. As such, the term "score" used in this section describes an arbitrary value without an indicated threshold of risk and without discriminant properties.

The DAT-11 scale includes 3 introductory questions from the CRAFFT asking youth if they have engaged in (1) alcohol use, more than a few sips, (2) marijuana/hashish use, and (3) use of any substance to get high in the past 12 months (Knight et al., 1999; Silverstone et al., 2015). These first 3 questions are often used in primary care as a way to determine if the remaining 6 questions of the CRAFFT need to be administered; this is determined if a youth responds affirmatively to at least one of the 3 questions (Knight et al., 1999). The 3 introductory questions are followed by the 6-item CRAFFT, and 2 additional questions inquiring about tobacco and smokeless tobacco use in the past 12 months, added for use in the EMPATHY program (Silverstone et al., 2015). The DAT-5 questionnaire includes the 3 introductory CRAFFT questions assessing alcohol, marijuana/hashish, and any other substance use, along with questions on tobacco and smokeless tobacco use (Silverstone et al., 2015).

From the DAT-5 scale, it was of interest to determine the prevalence of specific substances used since the scored CRAFFT questions focus on risky substance use behaviours, and not details of specific substances used. It was also important to determine, with the implementation of the EMPATHY program, if perceived normative behaviours regarding youth drug use, and overall school culture, changed through a reduction in self-reported substance use. Part of the purpose of this study is to extend our understanding in this area and an examination of current responses, in detail, was a significant goal. More specifically, what is the prevalence rate of alcohol, marijuana/hashish, any substance, tobacco, and smokeless tobacco use (DAT-5) in the overall school district, as well as by individual Grade? Followed by, does the implementation of an SBIRT program, such as EMPATHY, change responses to specific drug questions over time?

a) **(Cross-Sectional) H_0: There is no change in responses to DAT-5 questions (alcohol, marijuana/hashish, any substance, tobacco, and smokeless tobacco) over time for the entire study population; (Longitudinal) H_0: There is no change in responses to DAT-5 questions over time for students with all 4 Assessments**
b) **(Cross-Sectional) H_0: There is no change in responses to DAT-5 questions (alcohol, marijuana/hashish, any substance, tobacco, and smokeless tobacco) over time by Grade (6 – 12) for entire study population; (Longitudinal) H_0: There is no change in responses to DAT-5 questions over time by Grade for students with all 4 Assessments**

Further, would the implementation of the EMPATHY program result in decreased mean DAT-11 scores for the entire study population?

c) **(Cross-Sectional) H_0: There is no reduction in mean DAT-11 scores for the entire study population; (Longitudinal) H_0: There is no reduction in mean DAT-11 scores in the population of students with all 4 Assessments**

In addition, responses to DAT-5 questions may have differed for those who had an overall EMPATHY score in the Top 10%. These students were invited to participate in the brief intervention; however, they may or may not have taken up the opportunity (Silverstone et al., 2015). Is a reduction in DAT-5 responses and DAT-11 mean scores observed for those who participate in the intervention versus those who did not?

d) **(Longitudinal) H_0: There is no reduction in DAT-5 responses for students who were in the Top 10% and participated in the brief intervention in the population of students with all 4 Assessments**

e) **(Longitudinal) H_0: There is no reduction in DAT-11 mean scores for students who were in the Top 10% and participated in the brief intervention in the population of students with all 4 Assessments**

A detailed description and analysis of DAT-5 and DAT-11 findings within the EMPATHY program are undertaken in Chapter 6 of this PhD thesis.

4.3.5.3 Participants

The EMPATHY project was implemented in Red Deer, Alberta, a Canadian city with a population of 100,000 people, during the months of January 2014 to June 2015 with the exception of summer

holiday months, July & August (Silverstone et al., 2015). Novel to previous studies, the EMPATHY study was implemented across an entire school district (Silverstone et al., 2015). Participants were between the ages of 11 – 18 years, or Grades 6 – 12, with appropriate cognitive abilities, with both parental consent and student assent to participate in certain SBIRT activities (Silverstone et al., 2015).

4.3.5.4 Instruments

The CRAFFT Substance Use Screening Tool, named after the acronym of each question (Car, Relax, Alone, Friends/Family, Forget, Trouble), is a brief 6-item screening tool that can assess lifetime and current substance misuse, and is specifically designed for youth populations and is widely used with this age group (Harris et al. 2014; Knight et al., 1999; Pilowsky & Wu, 2013). The questions are answered dichotomously (yes/no), and each positive answer is scored as one (1) point, with a maximum score of 6 (Knight et al., 1999). Individuals who score ≥2 are likely to be at elevated risk of developing a substance use disorder (Knight et al., 1999). In addition, the CRAFFT has discriminant properties that can assist with the assessment of severity of substance use (Dhalla et al., 2011; Whiteside et al., 2010). Further, the validity of the CRAFFT in identifying any substance use problem is high (sensitivity 0.76, specificity 0.94, positive predictive value 0.83, negative predictive value 0.91); along with accurate identification of youth with a possible substance use disorder (sensitivity 0.80, specificity 0.86, positive predictive value 0.53, negative predictive value 0.96); and detection of substance dependence in this particular population (sensitivity 0.92, specificity 0.80, positive predictive value 0.25, negative predictive value 0.99) (Knight et al., 2002). These findings correspond to a score of ≥2 on the CRAFFT and validity was

not affected by sex, age, or race (Knight et al., 2002). Another study found the CRAFFT to have a sensitivity of 0.92 (0.88-0.96) and specificity of 0.64 (0.59-0.69); however these results were specific to detecting problematic alcohol use and with a cut-off value of scoring 1 on the questionnaire (Knight et al., 2003). Further, a more recent examination of the CRAFFT confirms past validity values, as well as finding this screening tool to be applicable across ethnicities (Subramaniam et al., 2010)

Indeed, there is evidence that the CRAFFT is a valid gauge of substance misuse, and because of its brevity, ease of scoring, and relevance of the questions posed (Knight et al., 1999; Subramaniam et al., 2010), it has been recommended for routine use with youth in the 2011 guidelines presented by the American Academy of Pediatrics (Levy & Williams, 2016; Ozechowski et al., 2016).
It is important to reiterate that the CRAFFT Substance Use Screening Tool was embedded within the Drug, Alcohol, and Tobacco (DAT-11) questionnaire; however, because the DAT-11 is not a validated screening tool, the standard 6- item CRAFFT screening scores were used in this study to determine risk of developing a substance use disorder (Appendix).

The Patient Health Questionnaire, is a 9-item scale (PHQ-9) used to assess risk of developing a depressive disorder in adults, has an adapted version specifically for use with youth between the ages of 11 – 17 years (PHQ-A) (Johnson et al., 2002; Spitzer et al., 1999). The difference between the PHQ-9 and the PHQ-A is altered content to ensure the screen poses questions that are relevant to youth life, such as asking about poor concentration when completing schoolwork, in place of reading the newspaper found in the adult PHQ-9 (Johnson et al., 2002; Spitzer et al., 1999). Another difference is the scoring system – the total raw score of the PHQ-A is divided by the

number of questions the youth actually answers (Johnson et al., 2002). Like the CRAFFT, the PHQ-9 has discriminant properties and can provide information on the severity of depressive disorder development (Johnson et al., 2002; Spitzer et al., 1999). More specifically, scores in the 10 – 14 range are indicative of moderate depression, 15 – 19 moderately severe depression, and ≥20 suggests severe depression (Johnson et al., 2002; Spitzer et al., 1999). There is some evidence that the ability of the PHQ-9 to detect DSM-IV criteria for major depression in youth populations has shown sensitivity at 89.5% (0.90), and specificity of the tool, or the ability to detect that a youth does not meet DSM-IV criteria for major depression, was accurate 77.5% (0.78) of the time (Richardson et al., 2010). The sensitivity and specificity values illustrated in youth populations is similar to values reported when this tool is applied to adults (Richardson et al., 2010).

Based on the brevity, applicability of content to youth life, and validity in identifying youth at risk of developing a depressive disorder, this screening tool was included in the EMPATHY program. Although the PHQ-9 contains 9 scored items, an additional 4 questions were added to this scale when applied to youth participating in the EMPATHY program (Silverstone et al., 2015) (Appendix). Thoughts of hurting oneself and thoughts of being better off dead are question #9 on the validated PHQ-9 tool (Spitzer et al., 1999); however, this question was separated into two parts when applied within the EMPATHY program (Silverstone et al., 2015) (Appendix). In addition, the validated PHQ-9 asks how the individual perceives the difficulty of these problems in terms of keeping up with responsibilities (i.e. work, home, relationships) and this is not a scored component of the screen (Spitzer et al., 1999); however, this question is scored in the EMPATHY program (Silverstone et al., 2015) (Appendix). Further, responses indicating agreement with the statement on question #9 (i.e. symptoms lasting several days, more than half the days, or nearly every day)

on the EMPATHY scale (i.e. thoughts of hurting self, or would be better off dead), would trigger a drop down menu for two additional questions: (1) Has there been a time in the past month when you have had serious thoughts about ending your life?; (2) Have you ever, in your WHOLE LIFE, tried to kill yourself or made a suicide attempt? (Silverstone et al., 2015) (Appendix).

Although the questions added to the PHQ-9 for use in the EMPATHY study provide more insight into potentially risky behaviours exhibited by youth, such as further assessment of risk of suicide for both lifetime and within the past month, this modified scale has not been validated (Silverstone et al., 2015) (Appendix). As such, only the standard 9 –item scale was used in this present study.

The Hospital Anxiety and Depression Scale (HADS) is a tool used to assess emotional disorders, such as depression and anxiety (Zigmond & Snaith, 1983). The HADS, like the PHQ-9 and CRAFFT, is brief taking approximately 2 – 5 minutes to complete (Snaith, 2003). The HADS scale consists of 7 questions assessing risk of developing an anxiety disorder and includes insight into feelings of worry, fear, restlessness, and panic (Zigmond & Snaith, 1983). Each question is scored from 0 – 3, 0 meaning "not at all", and 3 indicating the symptoms occur "very often" (Zigmond & Snaith, 1983). A score ranging between 11 and 21 indicates abnormal levels of anxiety and increased risk of developing an anxiety disorder (Zigmond & Snaith, 1983). Despite being created for use within hospital settings, the HADS has performed well when used with patients in primary care clinics and within the general population (Snaith, 2003). In addition to extensive research into the validity of this scale in identifying risk with the elderly, extensive research into the performance of this tool has been undertaken for use with youth (Snaith, 2003; White et al., 1999). There is some evidence that a higher cut-off value indicative of youth risk of developing an anxiety disorder

can range between 9 and 12, which differs from the standard cut-off of 11 when this tool is applied with adults; however, utilizing a lower cut-off value, such as 9, prevents false-negatives while a higher cut-off value, such as 12, prevents potential false positives (White et al., 1999; Zigmond & Snaith, 1983). In addition, the HADS-A demonstrates sensitivity and specificity (true positive, true negative, respectively) of 0.80 (Bjelland et al., 2002).

The HADS is a brief screening tool consisting of 7 questions specifically assessing risk of developing an anxiety disorder that has been validated for use with youth, with optimal psychometric performance when identifying risk of disorder development (Bjelland et al., 2002; Richardson et al., 2010; Snaith, 2003; Zigmond & Snaith, 1983). As such, this screening tool was incorporated in the screening battery used with the larger EMPATHY study and no modifications were made to this tool (Silverstone et al., 2015) (Appendix).

4.3.5.5 Data Analysis Plan

Since it was inappropriate to randomize at risk youth to control or treatment groups for ethical reasons, a quasi-experimental design was implemented (Silverstone et al., 2015). Based on this, examining data cross-sectionally for those who participated in at least one Assessment, and longitudinally for students who participated in all 4 Assessments, was the most appropriate method for analyzing the data collected by the school district (Silverstone et al., 2015). This approach to analysis of the data was approved by the Health Research Ethics Committee, with subsequent modification in April 2015 to approve secondary analysis of the information obtained from the EMPATHY program (presented here in the present publication) with the ethics protocol number

Pro00061164 (Silverstone et al., 2015).

It is important to note that the primary outcome measure examined was CRAFFT Substance Use Scores which required participants to recall substance use in the past 12 months (Appendix). This means an accurate representation of Pre/Post scores is only appropriate when comparing Pre-Intervention (Baseline/Assessment #1) CRAFFT scores with Post-Intervention (Assessment #4) scores during the 15 month EMPATHY program, for both cross-sectional and longitudinal groups. Analysis of CRAFFT scores comparing Assessment #2 with Assessment #4 is included for interest as it is a 12 month interval; however, these results must be viewed with caution since Assessment #2 scores are Post-Intervention for Year 1 of the program, and Assessment #4 scores are Post-Intervention for Year 2 of the program.

4.3.5.6 Access to Data

Data was received from study staff in the form of Excel spreadsheets. In the first part of analysis, spreadsheets contained only data collected from students who were classified as being at risk of developing a substance use disorder, or scoring ≥ 2 on the CRAFFT Substance Use Screening Tool. In the second part of analysis, data collected from the entire study allowed for examination of DAT-5 responses. For student responses to OVK, this was also provided by study staff in the form of a spreadsheet. All data provided was de-identified prior to being available for analysis.

4.3.6 Missing Data

In both studies examining CRAFFT Substance Use Screening Scores (Chapter 5), and overall self-reported use of specific substances through the Drugs, Alcohol, and Tobacco (DAT) screen (Chapter 6), gender data for some participants were missing across all 4 assessment periods; however, more so for Assessment #3 and #4 in Year 2 of the EMPATHY Program, and particularly for the cross-sectional group. All data reported in Chapters 5 and 6 are detailed by school district and by individual grade, informing the reader of the overall number of participants at risk of a substance use disorder, or responses to specific drug questions; however, data displayed by gender only includes participants in which their gender was known. Prior to discluding participants with missing gender values, due effort was taken to retrieve this missing data via study staff with potential access to this information.

4.3.7 Qualitative Strand of Mixed Methods Intervention

4.3.7.1 Facilitator Perspective on SBIRT Processes: Study Design

Briefly, for insight into facilitator perspective on the SBIRT process and how it unfolds, including potential issues that may arise during implementation, we sought to investigate the social processes surrounding the EMPATHY program, in Red Deer, Alberta, Canada. This pragmatic inquiry of facilitator perspective builds on the larger EMPATHY program. We have a clear understanding of the need to identify risky substance using behaviours exhibited by youth, as well as the need to intervene early; however, little is known about the effectiveness of the 3-tiered SBIRT model on

youth substance use outcomes. As the EMPATHY program unfolded in Year 1 (January/February 2014), it was clear that Resiliency Coaches played a crucial role facilitating the program, and may provide valuable insight into procedures and possible consequences of procedures. How did this SBIRT program unfold from the perspective of the Resiliency Coaches? This question was the starting point of our qualitative inquiry.

Since we found it important to understand what happens as Resiliency Coaches facilitate the SBIRT protocol and possible interactions between people guiding this process, as well as collecting data from a variety of sources, semi-structured interviews were the most appropriate method of collecting data within the mixed methods approach. Our study begins with open questions in the hopes of understanding potential issues that arise when implementing a school-based SBIRT from front-line facilitators of the program, rather than stakeholder perspective on the topic. This component of the PhD thesis is described in detail in Chapter 7.

4.3.7.2 Student Perspective on "Op Volle Kracht" (OVK) Resiliency Lessons: Study Design

For insight into the perspective of the students in Grades 6 – 8 who experienced the "Op Volle Kracht" OVK program (translated from Dutch as "on full power"), a predetermined open-ended question was incorporated into the mixed methods intervention design, posed to students in Grades 6 - 8. We have a clear understanding of the need for early prevention strategies targeting symptoms of mental health issues, such as depression, suicidality, anxiety, and substance use; however, little is known about the opinions and responses of youth who engage in programs designed for them. As the EMPATHY program unfolded in Year 1 (January/February 2014), it became clear that

responses from students may be invaluable to aid in the creation of appealing programs in the future. This focus on youth feedback was the starting point of our qualitative inquiry into memorable or valuable factors present in a prevention program for youth.

Since we found it important to understand student perspective on the positive and negative aspects of the 16 lesson OVK program, including possible interactions between people guiding this process, a predetermined open ended question was used to gain insight into individual experiences. Our study begins with a question posed to students in the hopes of understanding potential attributes of the OVK program, rather than focusing solely on symptom outcomes. This component of the PhD thesis is described in detail in Chapter 8.

Chapter 5: EMPATHY program Significantly Decreases Long-Term Drug and Alcohol Abuse in Youth Aged 11-18

5.1 Abstract

Youth alcohol and drug misuse has multiple long-term consequences. Suggestions to reduce the frequency of this include combining Screening, Brief Interventions, and Referral to Treatment (SBIRT); however, SBIRT has not been studied widely in youth. The present study was part of a larger school-based intervention program (EMPATHY), with a primary goal to reduce depression, anxiety, and suicidal thinking. A secondary goal was to determine if the EMPATHY program, which utilizes all aspects of SBIRT, would also decrease substance abuse. To allow better comparisons with previous research we extracted the scores for the 6-items of the CRAFFT, a standardized scale designed for youth assessment, for which a score of ≥2 indicates an increased likelihood of substance abuse. Here, we report on CRAFFT scores in 6,227 students who completed at least one assessment at Baseline (n=3,224), 3-months (n=3,229), 7-months (n=4,860), and 15-months (n=4,497). We also report on CRAFFT scores in the 1,884 students who completed all 4 assessments, and all comorbidity rates. Our results showed, as expected, rates of risk for substance abuse that increased with age. We also found that the EMPATHY program, which entails a version of SBIRT, led to a significant reduction in the total percentage of students who scored ≥2, decreasing from 14% to 7% at the 15-month follow-up. This occurred in all grades, for example at Baseline 31% of Grade 12 students scored ≥2, but this decreased to 20% at 15-months, while reductions in Grade 11 were from 24% at Baseline to 15% at 15-months. We also found a significant decrease in both risk of comorbid depression and anxiety over time. These

findings support more widespread use of SBIRT for youth, perhaps as part of other comprehensive school-based programs.

5.2 Introduction

The rate of substance misuse appears to increase with age (Statistics Canada, 2013), with youth between the ages of 15 and 24 years exhibiting the highest rate of substance misuse (Patton et al., 2014). Unfortunately, alcohol and/or substance use during adolescence increases the likelihood of developmental delays in both social and academic capacities, particularly those associated with cognition, motivation, and impulse control (Carney & Myers, 2012; Curtis et al., 2014; Levy & Williams, 2016). In addition, short and long term consequences beyond mental health problems include: decreased school achievement, increased victimization and suicide attempts, and subsequent mortality (Mitchell et al., 2016). Previous Canadian studies have suggested that at least 25% of students in Grade 7 (mean age 12.3 years) use alcohol, of whom nearly half binge drink (defined as consuming more than 5 alcoholic drinks during one occasion) (Elgar & Pickett, 2012). The percentage of students who use alcohol increases with age, with 86% of Grade 12 students (aged 17-18) consuming alcohol, and 50% of Grade 12 students having used an illicit drug in the previous 12-months (Elgar & Pickett, 2012). These findings support the need for effective tools to reduce abuse of alcohol and drugs in youth populations.

Amidst a variety of proposed interventions (Jensen et al., 2011; Toumbourou et al., 2007), one suggested approach for youth is to utilize a combination of universal Screening, Brief Intervention for those at high risk, and Referral to Treatment when this requirement is identified (SBIRT)

(Yuma-Guerrero et al., 2012). In principal, SBIRT may be an effective approach that can be used in various settings, such as primary care or schools, and can be used as stand-alone treatment (screening and brief intervention component) for youth substance misuse, or in conjunction with other treatment approaches, such as cognitive-behavioural therapy (Sterling et al., 2012). SBIRT in youth also has potentially important public health benefits since early identification and treatment of individuals engaging in high risk substance use may delay, and optimally prevent, the onset of substance use problems (Vendetti et al., 2013; Yuma-Guerrero et al., 2012). Although SBIRT has the potential to be an inclusive program for the prevention and intervention of youth substance use, implementing this program in the most appropriate setting, within schools (or possibly also in primary care), has proved challenging (Sterling et al., 2012; Yuma-Guerrero et al., 2012). For this reason, determining the best approach and setting for substance use prevention and intervention in youth attending schools remains uncertain. Several key issues arise when considering the most appropriate methods to utilize SBIRT most effectively, including the choice of screening tools, the nature of any brief interventions, and the best methods for subsequent referral to treatment.

5.2.1 Screening Tools

While there are several screening tools available for youth, most focus on alcohol use and not overall substance use. Three of the most widely used alcohol-centered screening tools are the AUDIT (The Alcohol Use Disorders Identification Test), RAPS-QF (Rapid Alcohol Problems Screen – Quantity Frequency), and the CAGE questionnaire (Cut, Annoyed, Guilty, and Eye-Opener) (Kelly et al., 2004). In addition, the POSIT (Problem Oriented Screening Instrument for

Teenagers) is used to evaluate 10 dimensions of health, including substance use (Rahdert, 1991). Nonetheless, it is important to note these screening tools, with the exception of the POSIT, were not specifically designed for use with youth, and some of the components included in these questionnaires are not readily transferable to this age group. To address this issue a shortened alcohol screening tool, called the RUFT–Cut, has been developed for use in older youth populations specifically for those presenting at the Emergency Rooms of hospitals (Kelly et al., 2009), and it shows similar specificity and sensitivity to the AUDIT.

In contrast to these alcohol-centered screening tools there are screening tools designed to measure substance abuse more widely, including the CRAFFT, named after the focus of each of the 6 questions (Car, Relax Alone, Forget, Friends, and Trouble) (Knight et al., 1999) and the ASSIST (Alcohol, Smoking and Substance Involvement Screening Test) (World Health Organization, 2016). When comparing these two, the ASSIST is a screening tool not specifically designed for youth populations, consists of more than 80 questions, and has a more complex scoring procedure than the CRAFFT (World Health Organization, 2014). The CRAFFT is a 6-item screening tool that can assess lifetime and current substance misuse, and is specifically designed for youth populations (Knight et al., 1999; Pilowsky & Wu, 2013). The questions are answered dichotomously (yes/no), and each positive answer is scored as one (1) point, with a maximum score of 6. Individuals who score ≥2 are likely to be at elevated risk of developing a substance use disorder.

For these reasons the CRAFFT has been widely used in youth populations (Harris et al., 2014) and has discriminant properties that can assist clinicians with their assessment of severity of substance

use (Dhalla et al., 2011; Whiteside et al., 2010). Studies have also examined its effectiveness in those youth presenting to Emergency Rooms of hospitals, and have found that up to 25% of such youth have a CRAFFT score of ≥2, although there is low predictive value for abuse and dependence overall when it is used for screening in such situations (Knight et al., 2002). This may be due to reluctance to disclose misuse of substances in acute care settings. More success from screening using CRAFFT has been found in primary care in some studies (Knight et al., 2007), and it has been recommended for this purpose (Whittle et al., 2015) although it isn't widely used (Sterling et al., 2012). Further, without the use of appropriate screening tools, the severity of the substance use problem is frequently underestimated (Wilson et al., 2004). Indeed, there is evidence that the CRAFFT is a useful gauge of substance misuse and has been recommended for routine use with youth in the 2011 guidelines presented by the American Academy of Pediatrics (Levy & Williams, 2016; Ozechowski et al., 2016). Barriers to more widespread use in primary care include insufficient time, insufficient training, attention to competing medical issues, insufficient treatment resources, and insufficient knowledge of screening tools (Van Hook et al., 2007). In contrast, studies in school populations have varied widely, in part depending upon the exact population studied, with some studies suggesting approximately 1 in 3 students have a score of ≥2 using the CRAFFT tool (Falck et al., 2012).

5.2.2 Brief Intervention

Brief interventions are usually described as time-limited sessions, often administered in person, with the principal goal to motivate an individual to progress from pre-contemplating change (no concern or thoughts regarding substance using behaviour) to actually contemplating change

(beginning to realize potential risks or consequences) (Carney et al., 2014). One of the most widely used brief interventions in SBIRT is motivational interviewing and/or motivational enhancement therapy (Cole et al., 2012; Madras et al., 2009). Motivational interviewing is described as allowing the youth and interviewer to establish a working alliance through unconditional positive regard (avoiding judgment and displaying acceptance), empathy, and support, in order to examine the youth's feelings of uncertainty, or ambivalence, toward changing substance misuse behaviour (Miller & Rose, 2009; Rubak et al., 2005). Core components of motivational interviewing also incorporate feedback in the form of counselling, recognition of personal responsibility, providing advice and options for change, and promotion of self-efficacy (Angres & Bettinardi-Angres, 2008; Miller & Rose, 2009). The inclusion of an assessment component to motivational interviewing creates the counselling approach known as motivational enhancement therapy (Hettema et al., 2005; Miller & Rose, 2009). This encourages youth to move toward harm reduction or abstinence from substance use (Angres & Bettinardi-Angres, 2008; Tatarsky et al., 2003). Traditionally, SBIRT uses motivational interviewing and motivational enhancement therapy for the brief intervention; however; other therapeutic interventions have been used, such as cognitive behavioural therapy (CBT) (Baker et al., 2005; Copeland et al., 2001; Kelleher et al., 2014). Despite many findings of the effectiveness of SBIRT in adult populations (Bernstein et al., 2005; Madras et al., 2009; Ondersma et al., 2005; Ondersma, et al., 2007), there is some evidence of ineffectiveness of SBIRT on adult drug use (Mitchell et al., 2016; Saitz et al., 2014). Further, there is a paucity of evidence regarding the potential positive impact of SBIRT as an integrative program for youth (Ozechowski et al., 2016). In the only review to date of 15 relevant studies (Mitchell et al., 2013), six targeted youth alcohol use only, another 3 targeted only marijuana use, one study targeted alcohol, cocaine and ecstasy, while one study examined the impact on a complex high

needs youth population. The remaining 4 studies included some control groups, and of the 15 studies included in the meta-analysis, 7 examined components of SBIRT in school-based settings (Grenard et al., 2007; Marsden et al., 2006; McCambridge & Strang, 2004, 2005; Peterson et al., 2006; Walker et al., 2006; Winters & Leitten, 2007). The 7 SBIRT studies had significant methodological issues, including small sample sizes, different age groups under study, different screening tools used, and different interventions offered. It is perhaps not surprising that the findings between the studies varied widely in terms of effectiveness (Mitchell et al., 2013). Another recent review focussing on SBIRT identified similar findings and concerns, although the review focussed on implementation within primary care settings (Beaton, et al. 2016). Currently, there is no clear consensus regarding the most efficacious brief intervention to use in schools.

5.2.3 Referral to Treatment

Although SBIRT demonstrates potential as a comprehensive public health approach to the prevention and early identification of substance use problems, there is limited evidence of formal evaluation of this approach. Additionally, while individual components, such as screening and brief intervention have been assessed, a comprehensive program has not been adequately studied in youth and there remains a significant lack of information necessary to determine the key elements of any such program (Sowers & Rohland, 2014). In addition, there is very limited information on the outcomes of youth who are subsequently referred for treatment, either to primary care or to specialty addiction clinics. Furthermore, there are major concerns regarding the cost implications of treating newly identified individuals following screening (Barnett et al., 2012;

Madson et al., 2013; Mitchell et al., 2016). All of these factors represent potentially significant barriers to developing effective SBIRT approaches in youth.

5.3 Present Study

Taken together the literature suggests there is a need for well-studied interventions that can potentially reduce substance misuse in youth. Ideally, these could be administered within school settings as this is likely to impact the largest number of youth. It is possible that SBIRT may offer such a solution, but currently there is relatively limited evidence to support this approach. In the present publication we examine the effectiveness of an SBIRT approach that was contained within a larger school-based program (EMPATHY). Previously we have published baseline data that show the large number of students that use drugs and alcohol (Silverstone et al., 2015). Here we present data on the long-term follow-up CRAFFT scores for students who took part in the EMPATHY program to determine if this SBIRT approach may be of utility for future programs.

5.3.1 Methods

The Materials and Methods for the EMPATHY study have been described in detail in the previous chapter.

5.3.1.1 Cross-Sectional Tests

In brief, since our data displayed a non-normal distribution (exponential rather than bell-shaped)

we used a non-parametric test, specifically the two-tailed Wilcoxon rank-sum test (also known as the Mann Whitney U test), to test hypotheses on the differences between mean scores for different stages of screening from two independent groups. The Mann Whitney U test is a nonparametric test which is often reported to test differences in medians (Campbell, 2006; Swinscow, 2001). This may prove problematic since comparing two groups could yield the same median, but demonstrate a Mann Whitney U test that is significant (Campbell, 2006, 2011; Swinscow, 2001). Essentially, if the sample distribution of each group is similar, the location shift will move both medians and means by the same amount (Campbell, 2006; Swinscow, 2001). This indicates that the Mann Whitney U test is a statistical process that can account for differences in means (Campbell, 2006; Swinscow, 2001). As such, the results reported describe differences in means rather than medians. The test was performed on all students screened. In addition, Chi-square (or Fisher's Test when $n<10$) was used to test the difference between expected and observed frequencies of the number of students at risk of a substance use disorder, and subsequent risk of depression, and anxiety disorders. Effect sizes for Chi-Square tests were calculated using the Phi-Coefficient (ϕ), and effect sizes for the non-parametric Mann Whitney U Test (Wilcoxon rank-sum test) was calculated using Pearson's Coefficient (r). Statistical significance was set at $\alpha=0.05$; however a much more conservative value, $\alpha=0.005$ is detailed in **bold** to view results with the application of the Bonferroni correction in cases where there were multiple comparisons.

5.3.1.2 Longitudinal Tests

For those students who completed all 4 ratings, the statistical method was a paired design in which each student who completed both baseline ratings and follow-up ratings was their own control.

Similarly, since the data showed evidence of non-normality (exponential distribution), a non-parametric test was carried out to compare the difference between mean scores at baseline and each follow-up. This involved the two-tailed Wilcoxon match pair signed-rank test (Wilcoxon Signed Rank Test). In addition, McNemar's Test was used to calculate the difference between expected and observed frequencies in longitudinal study groups. Calculating the effect size for McNemar's test using the odds ratio to subsequently determine the Cohen's d value was problematic due to a discordant value, therefore effect sizes are not reported for these results. The effect sizes are reported through Pearson's Coefficient (r) for results calculated using the Wilcoxon Signed Rank Test. Statistical significance was $\alpha=0.05$; however results displayed in **bold** reflect $\alpha=0.005$, a much more conservative value when the Bonferroni correction was applied to the standard $\alpha=0.05$ in cases where there were multiple comparisons.

A power analysis had been completed prior to our initial study which determined that the study was adequately powered at the current sample sizes (Silverstone et al., 2015).

As mentioned previously, it is important to note that the primary outcome measure examined was CRAFFT Substance Use Scores which required participants to recall substance use in the past 12 months (Appendix). This means an accurate representation of Pre/Post scores is only appropriate when comparing Pre-Intervention (Baseline/Assessment #1) CRAFFT scores with Post-Intervention (Assessment #4) scores during the 15 month EMPATHY program, for both cross-sectional and longitudinal groups. Analysis of CRAFFT scores comparing Assessment #2 with Assessment #4 is included for interest as it is a 12 month interval; however, these results must be viewed with caution since Assessment #2 scores are Post-Intervention for Year 1 of the program,

and Assessment #4 scores are Post-Intervention for Year 2 of the program.

Statistical analysis was carried out on an "intention to treat" basis utilizing R, version 3.1.0 (R Foundation for Statistical Computing, Vienna, Austria).

5.3.2 Results

The study was carried out in all of the 9 schools educating those aged 11-18 (Grades 6 – 12) located within a single school district, Red Deer Public Schools. Schools included; 3 Middle Schools for those aged 11-14 (Grades 6 - 8); 3 schools which were Kindergarten - Grade 8 schools for those aged 5 – 14, but only those in Grades 6, 7, and 8 at these schools were included in the study; also included were 1 special school for those aged 15-18 (Grades 9 – 12); and 2 High Schools for those aged 15 – 18 (Grades 9-12).

From a total of 6,227 students, who were assessed at least once (Figure 5.1), 15,830 assessments were completed. Assessment #1 (Baseline) occurred during February and March 2014 (n=3,244); Assessment #2 was the 3-month follow-up screening which occurred during May and June 2014 (n=3,229); Assessment #3 was the 7-month follow-up screening which occurred during September and October 2014 (n=4,860); and Assessment #4, the final 15-month follow-up assessment, occurred during the period April to June 2015 (n=4,497). The timing of the follow-up screenings was based around the school year, with Assessments #1 and #2 in school year 1, and Assessments #3 and #4 occurring in school year 2, with all schools being on vacation in July and August 2014. Note that only 5 schools took part in school year 1; three Middle Schools and 2 High Schools. Of

these students, a total of 6,227 students completed at least one assessment, 4,917 completed at least 2 assessments, and 2,796 completed at least 3 assessments (Figure 5.1). A total of 1,884 students completed all 4 assessments over both years, and this group consisted only of students in Grades 6 – 11 from the first school year: they could not be in either Grade 6 in school year 2 (as they would be new to the system) or Grade 12 in school year 1 (as they would have graduated before school year 2).

In the present study we carried out a cross-sectional statistical analysis comparing the Baseline group (n=3,244), who were in 5 separate schools, with the total sample at 15-months (n=4,497), who were at 9 separate schools. We also performed a longitudinal analysis of the data comparing Baseline findings to 15-month findings in the 1,884 students who completed all assessments, and were therefore their own controls.

5.3.2.1 Cross-sectional Analysis in all students rated at each time point

CRAFFT Substance Use Scores

As anticipated, there was a clear increase in the percentage of students who scored ≥2 on the CRAFFT with increasing age, indicating an increased likelihood of substance abuse with age (Table 5.1). This showed an increase particularly when students entered High School (increasing from 3.9% at Baseline in Grade 8 to 15.3% at Baseline in Grade 9, mean age 13.3 and 14.3 years old respectively), and this percentage increased again in Grade 11 to 24.3% at Baseline (mean age 16.4 years old), and even further to 30.5% in Grade 12 (mean age 17.4 years old). This increase

was consistent at all Assessments, and was seen even more clearly with those who scored in the range of 3 – 6 on the CRAFFT (Table 5.1).

TABLE 5.1. CRAFFT SCORES FOR EACH GRADE AT EACH OF THE 4 ASSESSMENTS DISTRIBUTED BY GRADE [1] [2]

Baseline Assessment #1 (3,244 students in January/February 2014)														
	Grade 6 (mean age 11.3, n=435)		Grade 7 (mean age 12.3, n=412)		Grade 8 (mean age 13.3, n=389)		Grade 9 (mean age 14.3, n=523)		Grade 10 (mean age 15.3, n=572)		Grade 11 (mean age 16.4, n=493)		Grade 12 (mean age 17.4, n=420)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2	1	1	2	2	3	3	12	14	19	15	30	18	27	36
3			2	1	2	2	16	15	10	14	12	26	11	17
4					1	1	7	9	12	7	15	10	11	13
5					1	1	5	1	3	7	4	4	5	5
6									2	2	1		2	1
Totals	2 (0.5%)		7 (1.7%)		15 (3.9%)		80 (15.3%)		91 (15.9%)		120 (24.3%)		128 (30.5%)	
Assessment #2 (3,228 students in May/June 2014)														
	Grade 6 (mean age 11.3, n=434)		Grade 7 (mean age 12.3, n=433)		Grade 8 (mean age 13.3, n=428)		Grade 9 (mean age 14.3, n=523)		Grade 10 (mean age 15.3, n=563)		Grade 11 (mean age 16.4, n=477)		Grade 12 (mean age 17.4, n=370)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2			1	3	3	10	8	14	17	26	22	27	20	26
3				2	2	4	11	9	10	11	11	13	11	22
4		1	1				7	7	4	7	16	11	7	10
5				1	1		3	1	4	3	3	6	9	8
6					1		2	1	2	1	1		2	
Totals	1 (0.2%)		7 (1.6%)		21 (4.9%)		63 (12.0%)		87 (15.5%)		110 (24.6%)		115 (31.1%)	

Assessment #3 (4,855 students in September/October 2014)														
	Grade 6 (mean age 11.3, n=711)		Grade 7 (mean age 12.3, n=712)		Grade 8 (mean age 13.3, n=632)		Grade 9 (mean age 14.3, n=722)		Grade 10 (mean age 15.3, n=667)		Grade 11 (mean age 16.4, n=737)		Grade 12 (mean age 17.4, n=664)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2				2	1	3	3	2	14	12	19	20	22	27
3				2	1		3	4	7	6	12	23	14	17
4							1	2	5	7	10	3	18	12
5							2	5	4	2	3	10	6	8
6					1				2	2	1		1	1
Totals	0 (0.0%)		4 (0.6%)		6 (1.5%)		22 (3.0%)		61 (10.7%)		101 (20.5%)		126 (19.0%)	
Assessment # 4 (4,496 students in May/June 2015)														
	Grade 6 (mean age 11.3, n=719)		Grade 7 (mean age 12.3, n=700)		Grade 8 (mean age 13.3, n=623)		Grade 9 (mean age 14.3, n=669)		Grade 10 (mean age 15.3, n=620)		Grade 11 (mean age 16.4, n=653)		Grade 12 (mean age 17.4, n=512)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2					2	4	3	4	11	8	19	23	19	19
3					2	1	2	4	9	11	9	17	16	16
4							2	1	5	11	11	10	9	12
5								1	2	1	6	6	4	8
6					1						3		1	
Totals	0 (0.0%)		0 (0.0%)		10 (1.6%)		17 (2.5%)		59 (9.5%)		95 (14.5%)		104 (20.3%)	

[1] Male = M; Female = F
[2] Totals indicate the number of males and females combined per grade; the percentage reflects the total number students at risk of a substance use disorder divided by the number of students participating in the assessment, per grade

Upon closer examination of mean CRAFFT scores and number of students at risk of developing a substance use disorder by individual grade, a statistically significant change in mean scores over time is not evident (Table 5.2). Despite this, a highly significant decrease in the number of students

at risk is observed for Grades 7 – 12, ranging from $p<0.01$ and $p<0.001$ when comparing Baseline to 15-month follow-up (Assessment #4), as well as comparing the 12-month interval between Assessment #2 and Assessment #4 (Table 5.2). The size of the difference is most notable for Grade 9 ($\phi = 0.233$), demonstrating a small to medium effect over the 15-month interval from Baseline to Assessment #4 (Table 5.2). Small effect sizes are noted for Grades 7, 11, and 12 (Table 5.2).

TABLE 5.2. CHANGES IN SUBSTANCE MISUSE SCORES BY INDIVIDUAL GRADE FOR STUDENTS AT RISK OF SUBSTANCE USE DISORDER IN THE ENTIRE STUDY POPULATION [1] [2] [3] [4]

	Baseline Assessment #1 (B) (n=3,244) Year 1	**3-month Assessment #2 (A2) (n=3,228) Year 1**	**7-month Assessment #3 (A3) (n=4,856) Year 2**	**15-month Assessment #4 (A4) (n=4,496) Year 2**
GRADE 6				
Mean Substance Use Score (±SD)	2.50 (±0.71) (95%CI = 1.52 – 3.48)	4.00 (±0)	n/a	n/a
Risk of Substance Use Disorder (n)	2	1	0	0
GRADE 7				
Mean Substance Use Score (±SD)	2.43 (±0.53) (95%CI = 2.04 – 2.82)	2.86 (±1.21) (95%CI = 1.96 – 3.76)	2.50 (±0.58) (95%CI = 1.93 – 3.07)	n/a
Risk of Substance Use Disorder (n)	7	7	4	**0***+++** B – A4 ϕ=0.104 A2 – A4 ϕ=0.104
GRADE 8				
Mean Substance Use Score (±SD)	2.93 (±1.10) (95%CI = 2.37 – 3.49)	2.62 (±1.07) (95%CI = 2.16 – 3.08)	3.13 (±1.25) (95%CI = 2.26 – 4.00)	2.58 (±1.16) (95%CI = 1.92 – 3.24)
Risk of Substance Use Disorder (n)	15	21	8	12++ ϕ=0.084
GRADE 9				
Mean Substance Use Score (±SD)	3.03 (±0.91) (95%CI = 2.83 – 3.23)	3.14 (±1.12) (95%CI = 2.86 – 3.42)	3.58 (±1.18) (95%CI = 3.10 – 4.06)	2.88 (±0.93) (95%CI = 2.42 – 3.34)

	Baseline Assessment #1 (B) (n=3,244) Year 1	**3-month Assessment #2 (A2) (n=3,228) Year 1**	**7-month Assessment #3 (A3) (n=4,856) Year 2**	**15-month Assessment #4 (A4) (n=4,496) Year 2**
Risk of Substance Use Disorder (n)	79	62	23	**16*****+++** B – A4 ϕ=0.233 A2 – A4 ϕ=0.190
GRADE 10				
Mean Substance Use Score (±SD)	3.19 (±1.18) (95%CI = 2.95 – 3.43)	2.93 (±1.14) (95%CI = 2.69 – 3.17)	3.23 (±1.29) (95%CI = 2.91 – 3.55)	3.07 (±0.94) (95%CI = 2.83 – 3.31)
Risk of Substance Use Disorder (n)	90	86	63	59**++ B – A4 ϕ=0.094 A2 – A4 ϕ=0.088
GRADE 11				
Mean Substance Use Score (±SD)	2.97 (±0.98) (95%CI = 2.79 – 3.15)	2.97 (±1.04) (95%CI = 2.77 – 3.17)	3.30 (±1.06) (95%CI = 3.09 – 3.51)	3.22 (±1.15) (95%CI = 2.99 – 3.45)
Risk of Substance Use Disorder (n)	119	109	100	**96*****+++** B – A4 ϕ=0.120 A2 – A4 ϕ=0.104
GRADE 12				
Mean Substance Use Score (±SD)	2.92 (±1.10) (95%CI = 2.73 – 3.11)	3.10 (±1.14) (95%CI = 2.89 – 3.31)	3.13 (±1.10) (95%CI = 2.94 – 3.32)	3.07 (±1.07) (95%CI = 2.86 – 3.28)
Risk of Substance Use Disorder (n)	127	114	126	**104*****+++** B – A4 ϕ=0.114 A2 – A4 ϕ=0.120

[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6
[3] Values in bold indicate statistical significance at α=0.005 after application of Bonferroni correction to account for multiple comparisons
[4] Effect size for Chi-square is depicted by ϕ (Phi Coefficient): 0.1 (small), 0.3 (medium), 0.5 (large)
***p<0.001 when comparing Assessment #1 and Assessment #4
+++ p<0.001 when comparing Assessment #2 and Assessment #4
** p<0.01 when comparing Assessment #1 and Assessment #4
++ p <0.01 when comparing Assessment #2 and Assessment #4

Table 5.3 displays aggregated scores for all Grades and a highly statistically significant reduction in the number of students at risk of a substance use disorder from Baseline to 15-months, as well as the 12-month interval between Assessment #2 and #4. The effect sizes for the decreased number of students at risk of a substance use disorder over the course of the 15-month EMPATHY program are small, ranging from $\phi = 0.093 – 0.127$ (Table 5.3).

TABLE 5.3. CHANGES IN SUBSTANCE MISUSE, AND CORRESPONDING DEPRESSION AND ANXIETY SCORES FOR ENTIRE POPULATION [1] [2] [3] [4] [5]

	Baseline Assessment #1 (B) (n=3,244) Year 1	**3-month Assessment #2 (A2) (n=3,228) Year 1**	**7-month Assessment #3 (A3) (n=4,856) Year 2**	**15-month Assessment #4 (A4) (n=4,496) Year 2**
Mean Substance Use Score (±SD)	3.00 (±1.05) (95%CI = 2.90 – 3.10)	3.01 (±1.11) (95%CI = 2.90 – 3.12)	3.14 (±1.14) (95%CI = 3.02 – 3.26)	3.09 (±1.07) (95%CI = 2.97 – 3.21)
Risk of Substance Use Disorder (n)	443	404	320	**291 ***+++** B – A4 ϕ=0.120 A2 – A4 ϕ=0.120
Proportion at risk (%)	13.7%	12.5%	6.6%	6.5%
Males at risk (n)	216	179 ++	150	**128 ***+++ +** B – A4 ϕ=0.127 A2 – A4 ϕ=0.093
Proportion of males at risk (%)	49.0%	44.4%	46.9%	44.9%
Females at risk (n)	225	224	170	**157***+++** B – A4 ϕ=0.115 A2 – A4 ϕ=0.114
Proportion of females at risk (%)	51.0%	55.6%	53.1%	55.1%
Mean Depression Score (±SD)	9.84 (±7.26) (95%CI = 8.83 – 10.85)	9.23 (± 6.79) (95%CI = 8.20 – 10.26)	8.46 (±6.65) (95%CI = 7.28 – 9.64)	**7.84 (±6.61)***** (95%CI = 6.54 – 9.14) r = 0.144

	Baseline Assessment #1 (B) (n=3,244) Year 1	**3-month Assessment #2 (A2) (n=3,228) Year 1**	**7-month Assessment #3 (A3) (n=4,856) Year 2**	**15-month Assessment #4 (A4) (n=4,496) Year 2**
Mean Anxiety Score (±SD)	10.07 (±5.03) (95%CI = 9.39 – 10.75)	9.95 (±5.22) (95%CI = 9.21 – 10.69)	9.66 (±5.21) (95%CI = 8.80 – 10.52)	9.20 (±5.23) * (95%CI = 8.25 – 10.15) r = 0.085
Mean Depression & Anxiety Score (±SD)	32.43 (±6.70) (95%CI = 31.36 – 33.50)	31.65 (±6.48) (95%CI = 30.56 – 32.74)	31.60 (±6.46) (95%CI = 30.29 – 32.91)	31.93 (±6.55) (95%CI = 30.41 – 33.45)
Risk of Comorbid Depression (n)	198	167	122	99** B – A4 ϕ=0.106
Risk of Comorbid Anxiety (n)	208	192	142	117
Risk of Comorbid Anxiety & Depression (n)	151	136	94	71** B – A4 ϕ=0.120

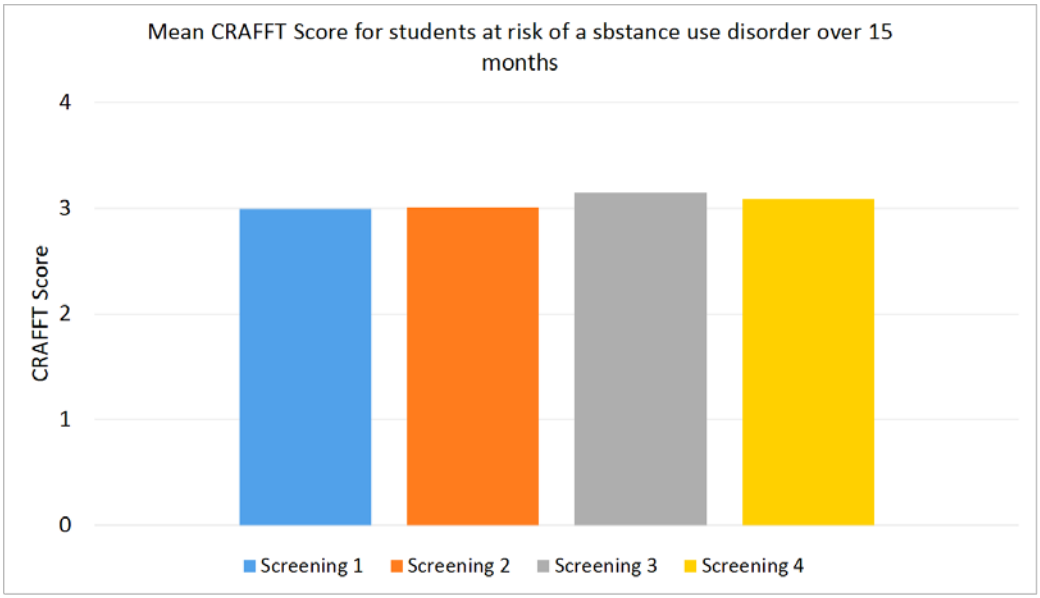
[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6
[3] Values in bold indicate statistical significance at α=0.005 after application of Bonferroni correction to account for multiple comparisons
[4] Effect size for Chi-square is depicted by ϕ (Phi Coefficient): 0.1 (small), 0.3 (medium), 0.5 (large)
[5] Effect size for Mann Whitney (Wilcoxon Rank Sum Test) is depicted by r (Pearson r Coefficient): 0.1 (small), 0.3 (medium), 0.5 (large)

*** p<0.001 compared to Baseline
++ p<0.001 comparing Assessment #2 to Assessment #4
** p <0.01 compared to Baseline
+ p<0.05 comparing proportion of males to females at Assessment #4
++ p<0.01 comparing proportion of males to females at Assessment #2
* p<0.05 compared to Baseline

It is interesting to note that, while there was a decrease in the number of students at risk, there was no overall decrease in mean CRAFFT scores over time that was statistically significant with the mean being 3.0 ± 1.05 (95%CI = 2.90 – 3.10) at Baseline and 3.1 ± 1.07 (95%CI = 2.97 – 3.21) at 15-months (Figure 5.3).

In addition, we found that there were slightly more females than males who scored at least ≥2 on the CRAFFT at Baseline (Table 5.3). This ratio changed significantly at Assessment #2 and Assessment #4, and was also reflected in those with the highest CRAFFT scores. Changes in the number of males and females from Baseline to 15 months, as well as the 12-month interval between Assessment #2 and Assessment #4 were found to be statistically significant (Table 5.3). Figure 5.1 shows the mean CRAFFT scores at each Assessment for all students (Baseline - n=3,244; Assessment #2 - n=3,229; Assessment #3 - n=4,860; Assessment #4 - n=4,497). There were no statistically significant differences between the mean score at Baseline and at 15-months.

Figure 5.1. Mean CRAFFT scores for total sample



It was of interest to determine if the range of behaviours changed over time following SBIRT activities. This is shown in Table 5.4, where the number of students answering in the affirmative (i.e. agreed with the question) for each cohort was examined to determine if the rates of answers

to specific items varied between Assessments. For the individual questions of the CRAFFT, described fully in Table 4.1, there were some changes observed over time, with changes in responses for certain questions reaching statistical significance (Table 5.4). The effect sizes of demonstrated changes are noted to be very small (Table 5.4).

TABLE 5.4 NUMBER OF STUDENTS GIVING AFFIRMATIVE RESPONSES FOR EACH QUESTION ON THE CRAFFT SUBSTANCE USE SCREENING TOOL AT EACH ASSESSMENT [1]

	Baseline Assessment #1 (B) (n, n%)	**3-month Assessment #2(A2) (n, n%)**	**7-month Assessment #3 (A3) (n, n%)**	**15-month Assessment #4 (A4) (n, n%)**
CAR	267, 60.3%	239, 59.2%	225, 70.3%	198, 68.0% +* B – A4 ϕ=0.079 A2 – A4 ϕ=0.091
RELAX	191, 43.1%	174, 43.1%	156, 48.8%	135, 46.4%
ALONE	92, 21.8%	68, 16.8%	60, 18.8%	40, 13.7% * B – A4 ϕ=0.089
FORGET	274, 61.9%	222, 55.0%	205, 64.0%	179, 61.5%
FRIENDS/FAMILY	251, 56.7%	204, 50.5%	204, 63.8%	174, 59.8%+ A2 – A4 ϕ=0.092
TROUBLE	253. 57.1%	218, 54.0%	183, 57.1%	173, 59.5%

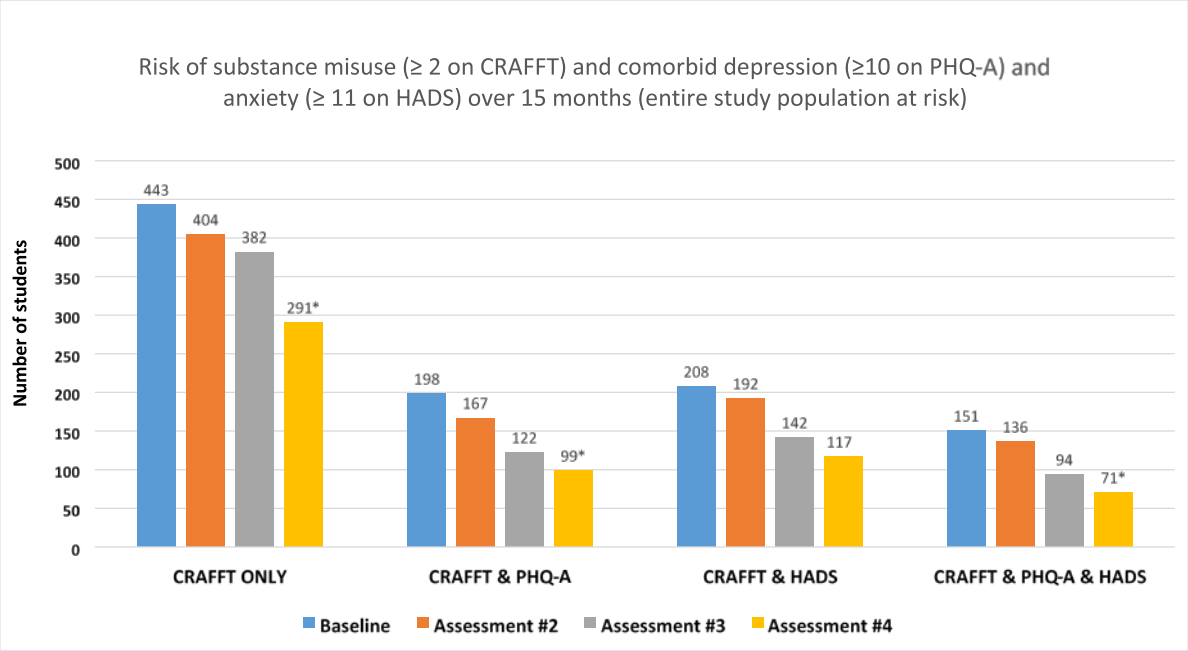
[1] Effect size for Chi-square is depicted by ϕ (Phi Coefficient): 0.1 (small), 0.3 (medium), 0.5 (large)
***** $p<0.05$ compared to Baseline
+ $p<0.05$ comparing Assessment #2 to Assessment #4

In terms of defining risk of comorbidity on an *a priori* basis in this context, we had decided that a score of ≥10 on the PHQ-A would be indicative of meaningful depressive symptoms and that a score of ≥11 on the HADS anxiety scale would be indicative of meaningful anxiety symptoms. On this basis we were able to determine how many individuals who had scores of ≥2 on the CRAFFT

also had scores above threshold indicating risk of either depression, anxiety, or both. As can be seen in Figure 5.2, large numbers of students who had high risk of substance abuse also had depression, anxiety, or both, but these decreased significantly over the 15-month period. Of interest is the observation of highly significant decreases between Baseline rates of comorbidity and those at 15-months for CRAFFT and depression, with a mean depression score at Baseline of 9.84 (±7.26; 95%CI = 8.83 – 10.85) compared to a mean depression score at 15-months of 7.84 (±6.61; 95%CI = 6.54 – 9.14; r=0.144) (Table 5.3); and similarly at Baseline the mean anxiety score was 10.07 (±5.03) (95%CI = 9.39 – 10.75) and 9.20 (±5.23; 95%CI = 8.25 – 10.15; r=0.085) at 15-months (Table 5.3). A statistically significant decrease in mean scores for students at concurrent risk of substance abuse, depression, and anxiety, was not found (Table 5.3).

Figure 5.2 shows the number of students who scored ≥2 on the CRAFFT at each assessment (decreasing from 443 at Baseline to 291 at 15 months) and how many had risk of comorbid depression (indicated by students who had a PHQ-A score of ≥10), how many had risk of comorbid anxiety (indicated by students who had a HADS anxiety score of ≥11), and how many had risk of both anxiety and depression. It can be seen that there were highly significant decreases in the numbers of each group comparing Baseline to results at 15-months. * $p<0.01$. Statistically significant results are also observed during the 12-month interval between Assessment #2 and Assessment #4 (Table 5.3). (Baseline - n=3,244; Assessment #2 - n=3,229; Assessment #3 - n=4,860; Assessment #4 - n=4,497). These findings are evident for substance abuse alone, and in combination with depression, and depression + anxiety; however, the reduction in number of students at concurrent risk of substance abuse and anxiety was not statistically significant (Table 5.3; Figure 5.2).

Figure 5.2. Number of students with CRAFFT who also had risk of depression and/or anxiety



5.3.2.2 Longitudinal Analysis in students who completed all 4 ratings

CRAFFT Substance Use Scores

As with the cross-sectional analysis, there was a clear increase in the percentage of students who scored ≥2 on the CRAFFT as students became older, indicating an increased likelihood of substance abuse with age in the longitudinal cohort (Table 5.5). This showed an increase particularly when students entered High School (increasing from 4.0% at Baseline in Grade 8 to 12.3% at Baseline in Grade 9, mean age 13.3 and 14.3 years old respectively), and this percentage increased again in Grade 11 to 20.1% at Baseline (mean age 16.4 years old). This increase was

consistent at all Assessments, and was seen even more clearly with those who scored in the range of 3 – 6 on the CRAFFT (Table 5.5).

TABLE 5.5. CRAFFT SCORES FOR STUDENTS WITH ALL 4 ASSESSMENTS FOR EACH GRADE DISTRIBUTED BY GENDER [1] [2] [3]

Baseline Assessment #1 (1,884 students in January/February 2014)														
	Grade 6 (mean age 11.3, n=322)		Grade 7 (mean age 12.3, n=319)		Grade 8 (mean age 13.3, n=300)		Grade 9 (mean age 14.3, n=349)		Grade 10 (mean age 15.3, n=356)		Grade 11 (mean age 16.4, n=234)		Grade 12 (mean age 17.4, n=4)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2	1		1		2	3	9	9	7	12	15	8		1
3			2	1	2	2	11	4	5	6	4	11		
4					1	1	2	4	7	3	1	5		
5					1		4		2	3	1	2		
6										1				
Totals	1 (0.3%)		4 (1.3%)		12 (4.0%)		43 (12.3%)		46 (12.9%)		47 (20.1%)		1 (25.0%)	
Assessment #2 (1,884 students in May/June 2014)														
	Grade 6 (mean age 11.3, n=322)		Grade 7 (mean age 12.3, n=319)		Grade 8 (mean age 13.3, n=300)		Grade 9 (mean age 14.3, n=349)		Grade 10 (mean age 15.3, n=356)		Grade 11 (mean age 16.4, n=234)		Grade 12 (mean age 17.4, n=4)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2						1		3	4	7	6	8		
3							2	1	7	3	6	3		1
4									5	2	2	6		
5							1		3		3	2		
6														
Totals					1 (0.3%)		7 (2.0%)		31 (8.7%)		36 (15.4%)		1(25.0%)	

Assessment #3 (1,884 students in September/October 2014)														
	Grade 6 (mean age 11.3, n=1)		Grade 7 (mean age 12.3, n=322)		Grade 8 (mean age 13.3, n=318)		Grade 9 (mean age 14.3, n=300)		Grade 10 (mean age 15.3, n=348)		Grade 11 (mean age 16.4, n=354)		Grade 12 (mean age 17.4, n=241)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2					1				5	3	4	4	4	8
3								2	5	4	8	8	5	5
4								2	3	1	3		4	4
5							2		2	1	2	3		2
6									1	1	1			1
Totals					1 (0.3%)		6 (2.0%)		26 (7.5%)		33 (9.3%)		33 (13.7%)	
Assessment # 4 (1,884 students in May/June 2015)														
	Grade 6 (mean age 11.3, n=0)		Grade 7 (mean age 12.3, n=322)		Grade 8 (mean age 13.3, n=319)		Grade 9 (mean age 14.3, n=301)		Grade 10 (mean age 15.3, n=348)		Grade 11 (mean age 16.4, n=354)		Grade 12 (mean age 17.4, n=240)	
CRAFFT Score	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2							1	1	7	2	2	4	5	8
3					1	1		2	2	3	3	6	4	4
4							2		3	3	6	3	4	5
5									3	1	3	3	1	4
6											2			
Totals					2 (0.6%)		6 (2.0%)		24 (6.9%)		32 (9.0%)		35 (14.6%)	

[1] Male = M; Female = F

[2] Totals indicate the number of males and females combined per grade; the percentage reflects the total number students at risk of a substance use disorder divided by the number of students participating in the assessment, per grade

[3] Although data is evident for Grade 12 in Assessments #1 and #2, and for Grade 6 in Assessments #3 and #4, these students would not have all 4 Assessments because of a shift in Grade from Year 1 to Year 2

As with the cross-sectional cohort, a highly significant decrease in the number of students at risk of a substance use disorder between Grades 8 to 11 at Baseline is observed (Table 5.6). In contrast to the results in the cross-sectional cohort, a highly statistically significant decrease in mean CRAFFT scores is observed for Grades 8 and 9 ($p<0.05$ and $p<0.001$ respectively) (Table 5.6).

The effect size of this change in mean scores for Grades 8 and 9 is noted to be medium to large (r = 0.463; r = 0.343, respectively).

TABLE 5.6. CHANGES IN SUBSTANCE MISUSE SCORES BY INDIVIDUAL GRADE FOR STUDENTS WITH ALL 4 ASSESSMENTS [1] [2] [3] [4] [5]

	Baseline Assessment #1 (B) (n=1,884) Year 1	**3-month Assessment #2 (A2) (n=1,884) Year 1**		**7-month Assessment #3 (A3) (n=1.884) Year 2**	**15-month Assessment #4 (A4) (n=1,884) Year 2**
GRADE 6 (n=1)			**GRADE 7 (n=1)**		
Mean Substance Use Score (±SD)	2.00 (±0)	1.00 (±0)		1.00 (±0)	0 (±0)
Risk of Substance Use Disorder (n)	1	0		0	0
GRADE 7 (n=4)			**GRADE 8 (n=4)**		
Mean Substance Use Score (±SD)	2.75 (±0.50) (95%CI = 2.26 – 3.24)	0.75 (±0.96) (95%CI = 0.19 – 1.69)		0.75 (±0.96) (95%CI = -0.19 – 1.69)	1.50 (±1.73) (95%CI = -0.20 – 3.20)
Risk of Substance Use Disorder (n)	4	1		1	2
GRADE 8 (n=12)			**GRADE 9 (n=12)**		
Mean Substance Use Score (±SD)	2.92 (±1.00) (95%CI = 2.35 – 3.49)	1.92 (±1.44) (95%CI = 1.11 – 2.73)		2.42 (±1.93) (95%CI = 1.33 – 3.51)	1.58 (±1.62)* (95%CI = 0.66 – 2.50) r = 0.463
Risk of Substance Use Disorder (n)	12	7		7	6*

	Baseline Assessment #1 (B) (n=1,884) Year 1	**3-month Assessment #2 (A2) (n=1,884) Year 1**		**7-month Assessment #3 (A3) (n=1.884) Year 2**	**15-month Assessment #4 (A4) (n=1,884) Year 2**
GRADE 9 (n=43)			**GRADE 10 (n=43)**		
Mean Substance Use Score (±SD)	2.91 (±0.97) (95%CI = 2.62 – 3.20)	1.93 (±1.58) (95%CI = 1.45 – 2.41)		2.19 (±1.74) (95%CI = 1.66 – 2.72)	**1.95 (±1.69)***** (95%CI = 1.44 – 2.46) r = 0.343
Risk of Substance Use Disorder (n)	42	24		26	**24*****
GRADE 10 (n=45)			**GRADE 11 (n=45)**		
Mean Substance Use Score (±SD)	3.09 (±1.13) (95%CI = 2.76 – 3.42)	2.50 (±1.44) (95%CI = 2.08 – 2.92)		2.54 (±1.44) (95%CI = 2.12 – 2.96)	2.74 (±1.73) (95%CI = 2.23 – 3.25)
Risk of Substance Use Disorder (n)	45	35		33	**32*****
Grade 11 (n=46)			**Grade 12 (n=46)**		
Mean Substance Use Score (±SD)	2.77 (±0.91) (95%CI = 2.51 – 3.03)	2.13 (±1.36) (95%CI = 1.74 – 2.52)		2.40 (±1.41) (95%CI = 1.99 – 2.81)	2.47 (±1.56) (95%CI = 2.02 – 2.92)
Risk of Substance Use Disorder (n)	46	33		33	35**
Grade 12 (n=1)			**Grade 12 (n=1)**		
Mean Substance Use Score (±SD)	2.00 (±0)	3.00 (±0)		1.00 (±0)	1.00 (±0)
Risk of Substance Used Disorder (n)	1	1		0	0

[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6

[3] Shift from Year 1 to Year 2 indicates an increase in Grade (i.e. Grade 6 in Year 1 shifts to Grade 7 in Year 2)
[4] Values in **bold** indicate statistical significance at α=0.005 after application of Bonferroni correction to account for multiple comparisons
[5] Effect size for Wilcoxon Sign Ranked Test is depicted by r (Pearson r Coefficient): 0.1 (small), 0.3 (medium), 0.5 (large)
*** $p<0.001$ when comparing Assessment #1 and Assessment #4
** $p<0.01$ when comparing Assessment #1 and Assessment #4
* $p<0.05$ when comparing Assessment #1 and Assessment #4

Although the focus of this study is to examine changes in substance use scores, some students in the longitudinal cohort scored at risk of potential comorbid conditions, such as suicidality, depression, and/or anxiety and were classified as having an EMPATHY score in the Top 10% within their Grade and school. As such, they were invited to participate in the Brief Intervention (online CBT, "This Way Up"). Out of the 154 students with a CRAFFT score ≥2 at Baseline, 35 students (22.7%) scored in the Top 10% and were offered the intervention (Table 5.7). Five students (14.3%) participated in the online CBT program; however, the decrease in mean CRAFFT scores observed did not reach statistical significance (Table 5.7). Further, although a decrease in mean CRAFFT scores is observed for the remaining 30 students (85.7%) who did not participate in the intervention, this decrease also was not statistically significant (Table 5.7).

TABLE 5.7. CHANGES IN SUBSTANCE MISUSE SCORES FOR STUDY POPULATION OF STUDENTS WHO WERE AT RISK OF A SUBSTANCE USE DISORDER, WERE IN THE TOP 10%, AND COMPLETED ALL 4 RATINGS [1] [2] [3]

	Baseline Assessment #1 Year 1	**3-month Assessment #2 Year 1**	**7-month Assessment #3 Year 2**	**15-month Assessment #4 Year 2**
Students who Participated in the Intervention (n=5)	2.60 (±0.89) (95%CI = 1.82 – 3.38)	2.20 (±0.84) (95%CI = 1.46 – 2.94)	3.20 (±0.45) (95%CI = 2.81 – 3.59)	2.00 (±2.12) (95%CI = 0.14 – 3.86)

	Baseline Assessment #1 Year 1	3-month Assessment #2 Year 1	7-month Assessment #3 Year 2	15-month Assessment #4 Year 2
Mean Substance Use Score (±SD)				
Students who Did Not Participate in the Intervention (n=30) Mean Substance Use Score (±SD)	3.07 (±1.01) (95%CI = 2.71 – 3.43)	2.40 (±1.16) (95%CI = 1.98 – 2.82)	3.20 (±1.40) (95%CI = 2.70 – 3.70)	2.93 (±1.62) (95%CI = 2.35 – 3.51)

[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6
[3] Shift from Year 1 to Year 2 indicates an increase in Grade (i.e. Grade 6 in Year 1 shifts to Grade 7 in Year 2)

Interestingly, the remaining students in the cohort who were not classified as being at risk of comorbid conditions, and thus were not in the Top 10% (n=119, 76.6%), demonstrated a reduction in mean CRAFFT scores that is highly statistically significant (Table 5.8, *p<0.001). In addition, the effect size of this change in mean scores was observed to be small to medium (r = 0.283) (Table 5.8).

TABLE 5.8. CHANGES IN SUBSTANCE MISUSE SCORES FOR STUDY POPULATION OF STUDENTS WHO WERE AT RISK OF A SUBSTANCE USE DISORDER, WERE NOT IN THE TOP 10%, AND COMPLETED ALL 4 RATINGS [1] [2] [3] [4] [5]

	Baseline Assessment #1 (n=119) Year 1	3-month Assessment #2 (n=119) Year 1	7-month Assessment #3 (n=119) Year 2	15-month Assessment #4 (n=119) Year 2
Mean Substance Use Score (±SD)	2.88 (±1.00) (95%CI = 2.70 – 3.06)	2.07 (±1.55) (95%CI = 1.79 – 2.35)	2.08 (±1.54) (95%CI = 1.80 – 2.36)	**2.15 (±1.66)*** ** (95%CI = 1.85 – 2.45) r = 0.283

[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6
[3] Shift from Year 1 to Year 2 indicates an increase in Grade (i.e. Grade 6 in Year 1 shifts to Grade 7 in Year 2)
[4] Values in **bold** indicate statistical significance at α=0.005 after application of Bonferroni correction to account for multiple comparisons
[5] Effect size for Wilcoxon Signed Rank Test is depicted by r (Pearson r Coefficient): 0.1 (small), 0.3 (medium), 0.5 (large)
*** $p<0.001$ when comparing Assessment #1 and Assessment #4

Students in Grades 7 and 8 in Year 1, and Grades 6 – 8 in Year 2 participated in the Universal Prevention program OVK, also termed Resiliency Lessons. Some of these students were found to have an EMPATHY score in the Top 10% (n=6) and were also invited to participate in the Brief Intervention ("This Way Up"). Table 5.9 indicates that out of the 6 students offered the Brief Intervention, 2 students participated in the program. Although there is a clear reduction in mean CRAFFT scores in both groups – individuals who participated in the intervention versus those who did not – the results are not statistically significant (Table 5.9).

TABLE 5.9. CHANGES IN SUBSTANCE MISUSE SCORES FOR STUDY POPULATION OF STUDENTS IN GRADES 6 – 8 WHO WERE AT RISK OF A SUBSTANCE USE DISORDER, WERE IN THE TOP 10%, AND COMPLETED ALL 4 RATINGS [1] [2] [3]

	Baseline Assessment #1 Year 1	**3-month Assessment #2 Year 1**	**7-month Assessment #3 Year 2**	**15-month Assessment #4 Year 2**
Students who Participated in the Intervention (n=2) Mean Substance Use Score (±SD)	2.50 (±0.71) (95%CI = 1.52 – 3.48)	1.50 (±0.71) (95%CI = 0.52 – 2.48)	3.00 (±0)	1.00 (±1.41) (95%CI = -0.95 – 2.95)
Students who Did Not participate in the Intervention (n=4) Mean Substance Use Score (±SD)	3.50 (±1.29) (95%CI = 2.24 – 4.76)	2.25 (±1.50) (95% CI = 0.78 – 3.72)	3.50 (±1.29) (95%CI = 2.24 – 4.76)	2.25 (±1.71) (95%CI = 0.57 – 3.93)

[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6
[3] Shift from Year 1 to Year 2 indicates an increase in Grade (i.e. Grade 6 in Year 1 shifts to Grade 7 in Year 2)

Further, students in Grades 6 – 8 who were at risk of a substance use disorder but did not score in the Top 10 % (n=10) also demonstrated a noteworthy reduction in mean CRAFFT scores; however, as with previous results, this reduction was not statistically significant (Table 5.10).

TABLE 5.10. CHANGES IN SUBSTANCE MISUSE SCORES FOR STUDY POPULATION OF STUDENTS IN GRADES 6 – 8 WHO WERE AT RISK OF A SUBSTANCE USE DISORDER, WERE NOT IN THE TOP 10%, AND COMPLETED ALL 4 RATINGS [1] [2] [3]

	Baseline Assessment #1 (n=10) Year 1	**3-month Assessment #2 (n=10) Year 1**	**7-month Assessment #3 (n=10) Year 2**	**15-month Assessment #4 (n=10) Year 2**
Mean Substance Use Score (±SD)	2.70 (±0.67) (95%CI = 2.28 – 3.12)	1.40 (±1.51) (95%CI = 0.46 – 2.34)	1.20 (±1.81) (95%CI = 0.08 – 2.32)	1.40 (±1.65) (95%CI = 0.38 – 2.42)

[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6
[3] Shift from Year 1 to Year 2 indicates an increase in Grade (i.e. Grade 6 in Year 1 shifts to Grade 7 in Year 2)

Table 5.11 displays aggregated scores for all Grades and a highly statistically significant decrease over time in the number of students who scored ≥2 on the CRAFFT. This clear reduction in the number of students at risk of a substance use disorder is statistically significant from Baseline to 15-months (Table 5.11). However, unlike the cross-sectional cohort, a statistically significant reduction in the number of students at risk of a substance use disorder was not observed in the 12-month interval between Assessment #2 and #4 (Table 5.11).

TABLE 5.11. CHANGES IN SUBSTANCE MISUSE, AND CORRESPONDING DEPRESSION AND ANXIETY SCORES FOR STUDY POPULATION OF 1,884 WHO COMPLETED ALL 4 RATINGS [1] [2] [3] [4]

	Baseline Assessment #1 (n=1,884) Year 1	**3-month Assessment #2 (n=1,884) Year 1**	**7-month Assessment #3 (n=1,884) Year 2**	**15-month Assessment #4 (n=1,884) Year 2**
Mean Substance Use Score (±SD)	2.90 (±1.00) (95%CI = 2.74 – 3.06)	2.13 (±1.46) (95%CI = 1.90 – 2.36)	2.32 (±1.56) (95%CI = 2.07 – 2.57)	**2.29 (±1.67)*** ** (95%CI = 2.03 – 2.55) r = 0.247
Risk of Substance Use Disorder (n)	154	101	100	**99 *** **
Proportion at risk (%)	8.2%	5.4%	5.3%	5.3%
Males at risk (n)	78	54	51	**50 *** **
Proportion of males at risk (%)	50.6%	53.5%	51.0%	50.5%
Females at risk (n)	76	47	49	**49 *** **
Proportion of females at risk (%)	49.4%	46.5%	49.0%	49.5%
Mean Depression Score (±SD)	9.90 (±7.07) (95%CI = 8.24 – 11.56)	7.58 (± 6.37) (95%CI = 6.09 – 9.07)	6.84 (±5.84) (95%CI = 5.47 – 8.21)	**6.80 (±6.22)*** ** (95%CI = 5.34 – 8.26) r = 0.305
Mean Anxiety Score (±SD)	10.05 (±4.99) (95%CI = 8.89 – 11.21)	8.88 (±5.22) (95%CI = 7.67 – 10.09)	8.04 (±5.16) (95%CI = 6.84 – 9.24)	**7.93 (±5.16)*** ** (95%CI = 6.73 – 9.13) r = 0.271
Mean Depression & Anxiety Score (± SD)	31.92 (±6.47) (95%CI = 30.18 – 33.66)	30.20 (±5.52) (95%CI = 28.71 – 31.69)	30.77 (±7.15) (95%CI = 28.85 – 32.69)	30.00 (±6.75) (95%CI = 28.18 – 31.82)
Risk of Comorbid Depression (n)	70	41	35	**35*****+**
Risk of Comorbid Anxiety (n)	71	50	36	**36*****+++**
Risk of Comorbid Anxiety & Depression (n)	53	40	30	**34*****+**

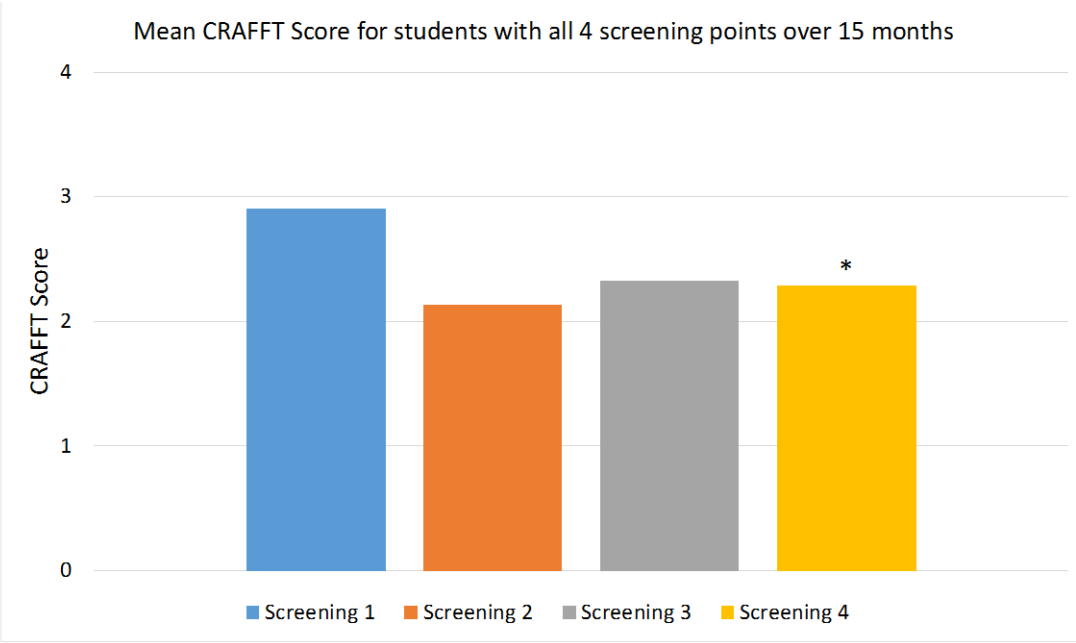
[1] Decreased scores show improvement
[2] Note that scores for risk of substance misuse varied from 2 – 6
[3] Values in **bold** indicate statistical significance at α=0.005 after application of Bonferroni correction to account for multiple comparisons
[4] Effect size for Wilcoxon Signed Rank Test is depicted by r (Pearson r Coefficient): 0.1 (small), 0.3 (medium), 0.5 (large)
*** p<0.001 compared to Baseline
+++ p<0.001 comparing scores at Assessment #2 and Assessment #4
+ p<0.05 comparing scores at Assessment #2 and Assessment #4

There was a statistically significant decrease in the mean CRAFFT scores over time, from a mean of 2.90 (±1.00; 95%CI = 2.74 – 3.06) at Baseline to 2.29 (±1.67; 95%CI = 2.03 – 2.55) at 15-months with a small to medium effect size (r = 0.247) (Table 5.11). While a reduction is noted, it appears that most of this change was seen in the first 3 months (Figure 5.3).

Table 5.11 also shows the percentage of males and females at risk of a substance use disorder. It can be seen that there were no statistically significant changes in the gender ratio within each Assessment (as determined by the percentage of each gender that was at risk). However, changes in the actual number of male and the number of female students decreased significantly in both genders from Baseline to 15-months. These results were not observed in the 12-month interval between Assessment #2 and Assessment #4.

Figure 5.3 shows the mean CRAFFT scores at each Assessment for students with all 4 ratings (n=1,884). There was a statistically significant decrease in the mean CRAFFT score from Baseline to that at 15-months. *p<0.001.

Figure 5.3. Mean CRAFFT scores for students with all 4 ratings



As with the cross-sectional cohort, it was of interest to track possible changes in substance use behaviours through affirmative responses on the CRAFFT Screening Tool. There were statistically significant changes over time for all questions between Baseline and 15-months, and/or the 12-month interval between Assessment #2 and #4 (Table 5.12).

TABLE 5.12. NUMBER OF STUDENTS WITH AFFIRMATIVE RESPONSES ON THE CRAFFT SUBSTANCE USE SCREENING TOOL FOR STUDENTS WITH ALL 4 ASSESSMENTS [1]

	Baseline Assessment #1 (n, n%)	**3-month Assessment #2 (n, n%)**	**7-month Assessment #3 (n, n%)**	**15-month Assessment #4 (n, n%)**
CAR	76, 49.4%	74, 48.1%	81, 52.6%	80, 51.9% +
RELAX	55, 35.7%	45, 29.2%	52, 33.8%	**58, 37.7% +++**
ALONE	34, 22.1%	22, 14.3%	27, 17.5%	**14, 9.1%*** +**
FORGET	95, 61.7%	64, 41.6%	65, 42.2%	**64, 41.6%*** **
FRIENDS/FAMILY	92, 59.7%	61, 39.6%	68, 44.2%	**65, 42.2%*** **
TROUBLE	95, 61.7%	62, 40.3%	64, 41.6%	**71, 46.1% ***++**

[1] Values in **bold** indicate statistical significance at α=0.005 after application of Bonferroni correction to account for multiple comparisons
*** p<0.001 compared to Baseline
+++ p<0.001 comparing Assessment #2 to Assessment #4
++ p<0.01 comparing Assessment #2 to Assessment #4
+ p<0.05 comparing Assessment #2 to Assessment #4

As with the cross-sectional analysis, we examined the risk of co-morbidity with the longitudinal cohort. As described previously, we had determined that a score of ≥10 on the PHQ-A would be indicative of meaningful depressive symptoms and that a score of ≥11 on the HADS anxiety scale would be indicative of meaningful anxiety symptoms. We therefore determined how many individuals who had scores of ≥2 on the CRAFFT also had scores above threshold indicating risk of either depression, anxiety, or both.

As can be seen in Figure 5.4 there were large numbers of students who had high risk of substance abuse but also had risk of depression, anxiety, or both. It is also apparent that highly significant

decreases occurred between Baseline rates of comorbidity and those at 15-months for students with concurrent risk of substance abuse and depression, where the mean depression scale score (PHQ-A) decreased from 9.90 (±7.07) (95%CI = 8.24 – 11.56) to 6.80 (±6.22) (95%CI = 5.34 – 8.26) (Table 5.11). This reduction in mean depression scores demonstrated a medium effect size with r = 0.305 (Table 5.11). Highly significant decreases are also noted for those with concurrent risk of substance abuse and anxiety, decreasing from a mean of 10.05 (±4.99) (95%CI = 8.89 – 11.21) to 7.93 (±5.16) (95%CI = 6.73 – 9.13) (Table 5.11). A small to medium effect size (r = 0.271) is noted for the reduction in mean anxiety scores (Table 5.11).

Figure 5.4 shows the number of students, from the total sample of 1,884, who scored ≥2 on the CRAFFT at each assessment (decreasing from n=154 at Baseline to n=99 at 15 months), as well as how many had risk of comorbid depression (indicated by students who had a PHQ-A score of ≥10), how many had risk of comorbid anxiety (indicated by students who had a HADS anxiety score of ≥11), and how many of had risk of both anxiety and depression. It can be seen that there were highly significant decreases in the numbers of each group comparing Baseline to results at 15-months. * $p<0.01$. Statistically significant results are also observed in the 12-month interval between Assessment #2 and Assessment # 4 (Table 5.11). A summary of both cross-sectional and longitudinal results for risk of substance use disorder and concurrent risk of depression and/or anxiety is illustrated by Figure 5.5. In addition, a summary of cross-sectional and longitudinal results for affirmative responses to the CRAFFT Substance Use Screening Tool is illustrated by Figure 5.6.

Figure 5.4. Number of students with all 4 ratings with CRAFFT who also had depression and/or anxiety

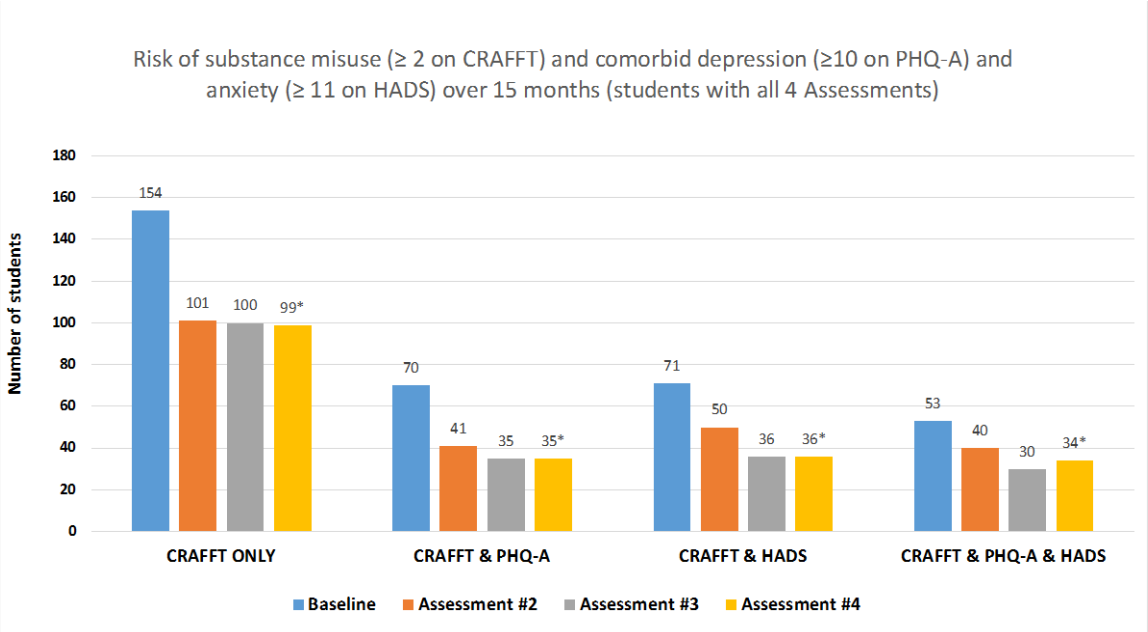


Figure 5.5. Summary of cross-sectional and longitudinal results for risk of substance use disorder and concurrent risk of depression and/or anxiety over the 15-month project

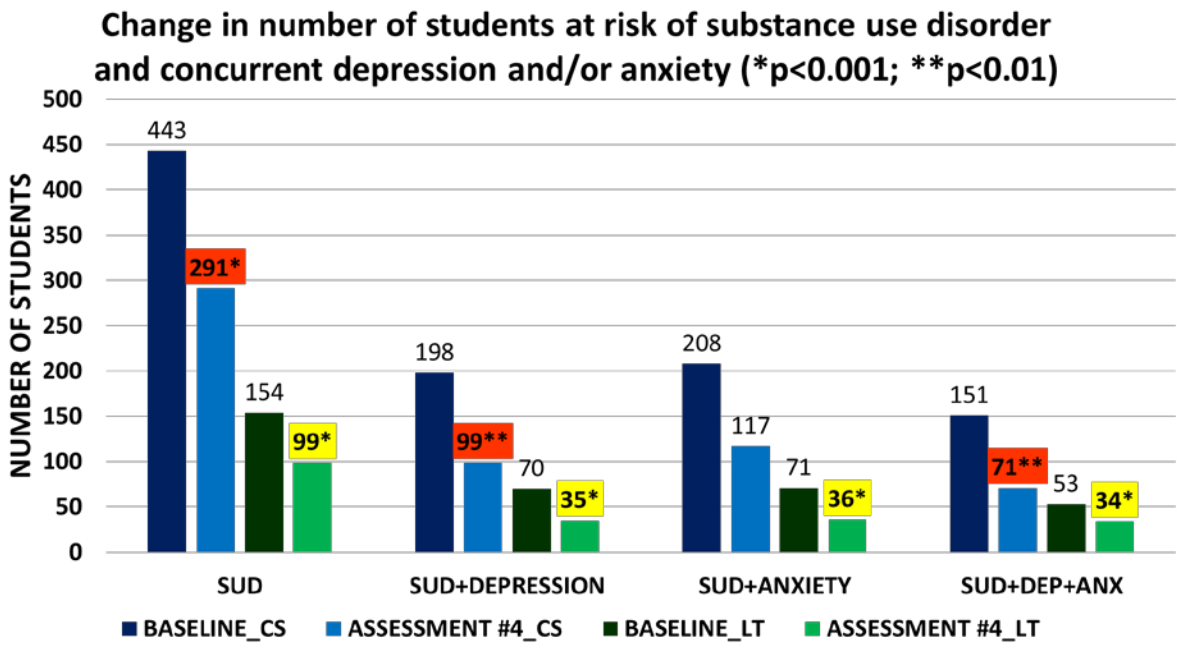
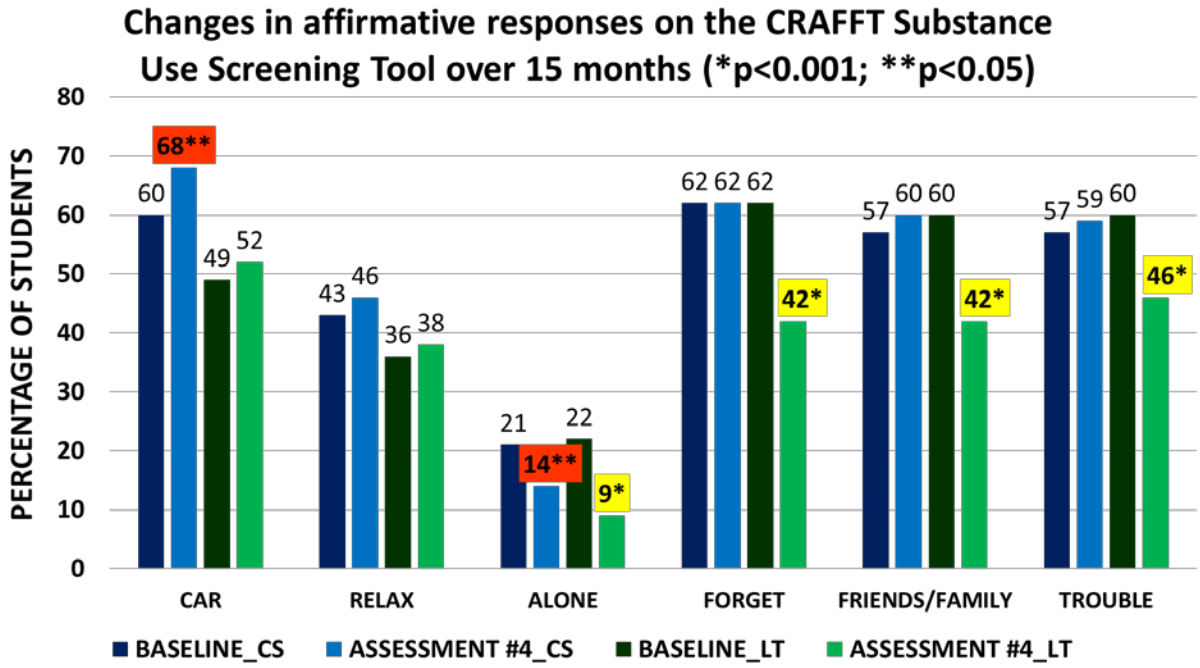


Figure 5.6. Summary of cross-sectional and longitudinal results for affirmative responses to the CRAFFT Substance Use Screening Tool over the 15-month project



5.3.3 Discussion

The present findings indicate the potential usefulness of a screening, brief intervention, and referral to treatment (SBIRT) program in youth populations in a school context. A unique strength of this study is that it was carried out across a complete school district, and involved a large number of students. We found high rates of substance abuse, particularly in High Schools, although during the program the actual number of students requiring referral for any mental health reason (including addictions) was only 2% (65 students) in the first 3-months of the program (Silverstone et al., 2015). This is somewhat reassuring, in that one of the significant potential barriers to more widespread implementation is the fear that by screening large populations an undue workload will be placed on existing services. In the present study this was mitigated by the brief intervention

given in schools (having "guided" internet-based CBT). This may be an approach that will also prove useful in other programs; however, our results indicate that screening alone may be a potential catalyst to changing the perception of normative behaviour within schools, subsequently decreasing the prevalence and severity of substance misuse. Although our results have not shown a decrease in substance using behaviour by those experiencing a brief intervention (OVK as the universal intervention for Grades 6 – 8; This Way Up as the brief intervention for those with an EMPATHY score in the Top 10%), it would be premature to discredit the potential value brief interventions may have since the number of students who participated was very small. There are various reasons why youth at risk may not engage in programs addressing substance misuse, including fear of exposure to parents and subsequent repercussions; developmental recalcitrance; and denial of consequences related to risky behaviour (Dakof et al., 2001; Ozechowski et al., 2016; Sawyer et al., 2010). Specifically in our cohort, we found obtaining parental consent to be a consistent barrier preventing students from participating in the brief intervention. Future research focusing on programs that do not require parental consent my provide further insight into both behavioural and attitudinal components of youth engagement, as well as an ecological view of potential barriers external to youth (i.e. family, community, and agency).

Of interest was the finding that specific answers to the different CRAFFT questions changed significantly over time, and it appears that not all behaviours are equally impacted by the present program. Knowing this, future programs may want to specifically address those areas that changed the least, such as the continued riding in a car with somebody who was "high", or using drugs or alcohol to relax.

In the present study, 14% of students between the ages of 11 and 18 scored ≥2 on the CRAFFT indicating possible risk of future substance use disorder. The results also confirm that rates of substance misuse may increase dramatically over 13 years of age, in accord with previous studies (Botvin & Griffin, 2007; Merikangas et al., 2010). This is clearly of concern given the increasing evidence of vulnerability of the developing brain to impacts of alcohol and drug use and, consequently, possible impact on behaviours related to motivation and impulsivity (Chambers et al., 2014; Swendsen et al., 2012).

Specifically, our results confirm previous findings that students in Grades 9 – 12 (ages 14 – 17) engage in more high risk substance use than younger school-age groups, and also show that the rate of substance misuse may double between Grade 9 (14 years old) and Grade 12 (17 years old). Linked to this, we observed a marked increase in substance abuse in the year following Middle School (Grade 8) to the first year of High School (Grade 9). It should be noted that in this specific school district (and similar to the United States) High School includes 4 grades. It is not certain if the same increase at the same time would have been seen in those school districts in which High School is only 3 years (Grades 10 – 12). Also of interest was the finding that, while males exhibited a higher risk, the size of this gender difference was not as large as previous studies (Becker & Hu, 2008; Holloway & Bennett, 2007; Vigna-Taglianti et al., 2009). We are not certain why this may be, but it will be important to determine in future large studies if this same trend is observed, as it may support adult studies suggesting that that the risk of alcohol and drug use for women may be increasing.

On a more positive note, the present data also showed a statistically significant and clinically meaningful reduction in the rate of those scoring ≥2 on the CRAFFT. This rate decreased to only 6.5% 15-months following the implementation of the EMPATHY program. This is approximately 50% of the Baseline rate in this population, which suggests that, at the very least, the screening component of an SBIRT program in schools can meaningfully impact risk of drug and alcohol abuse. This was the primary goal of the study, with the size of the improvement being greater than anticipated (Silverstone et al., 2015).

We also examined the possible relationship between rates of substance misuse and other conditions. As reported elsewhere, when using the complete DAT screening tool there was little correlation between the degree of drug, alcohol, and tobacco use and either depression or anxiety scores (Silverstone et al., 2015). However, when using the CRAFFT specifically, we found a clear relationship between substance misuse and clinically meaningful depression and anxiety scores. This is in keeping with previous studies, although it remains uncertain which condition precedes the other (Brady & Sinha, 2014; Curry et al., 2012; McCarty et al., 2012). Our data suggests an approximately 10% risk of High School students developing a substance use disorder in conjunction with depression or anxiety. Previous studies have suggested that anxiety predates the onset of other psychiatric conditions (Deas & Brown, 2006; Kendall et al., 2004), although other studies have found the relationship between initial anxiety and subsequent alcohol or drug abuse to be less clear (Buckner et al., 2013; Degenhardt et al., 2013; Ersche et al., 2012; Wolitzky-Taylor et al., 2012). The very clear decrease in the rates of comorbid depression and anxiety following implementation of this program is a very important indication of the likely benefit of adopting the EMPATHY program or a similar program of evidence-based intervention.

There are limitations to this study. Among these, for ethical reasons, this program could not incorporate a control group since doing so would have required randomization of students who were actively suicidal to non-intervention groups, which is clearly unethical (Silverstone et al., 2015). Additionally, in terms of the misuse of substances, the present study relied on self-report scales, and so there was no objective measurement of substance use, or use of triangulation. However, previous studies have supported the relative reliability of youth self-reports of substance use and other high risk behaviours (Flisher et al., 2004; Levy et al., 2004; Winters et al., 1990). A further potential study limitation was that the treatment received after referral was non-standardized, being treatment as usual by the individual physician or care team, both in primary and specialist care.

In conclusion, here we present data on a large community sample of students aged 11 – 18 years and find high rates of substance misuse, which increases with age. We also demonstrate a major decrease in the risk of abuse following the EMPATHY program, which entailed a form of SBIRT. This supports the potential utility of such approaches in other programs and we hope that this research provides support for future endeavours and effective knowledge translation. The importance of effective preventative programs for substance abuse should not be minimized, and the present study findings support proposals that SBIRT may be an appropriate approach for school-aged youth, particularly when incorporated into more comprehensive and multimodal programs. We did not provide a health economics analysis of the benefits of implementing an EMPATHY based program – such analysis would be invaluable for informing full value of this approach to policy makers and health care funders and providers.

Chapter 6: Changes in Self-Reported Alcohol, Marijuana, Tobacco, and Illicit Substance Use

6.1 Abstract

In recent years, there has been an observed reduction in substance misuse by youth as reported by Canadian statistics; however, the use of drugs during this developmental stage continues to be concerning. A suggested approach to identifying youth at risk of developing a substance use disorder and providing appropriate care is through the SBIRT model, which incorporates universal Screening, Brief Intervention for those identified to be at risk, and Referral to Treatment for youth in need of more intense or specialized care. Despite the recommendation for immediate implementation of this approach with youth, this approach has not been widely studied for use with this age group.

The present study is part of a larger school-based intervention program (EMPATHY). The primary goal of this program is to reduce symptoms of depression, anxiety, and suicidality. A secondary goal of the EMPATHY program was to determine if a school-based SBIRT would decrease self-reported substance use of specific drugs. Here we report on use of alcohol, marijuana/hashish, tobacco, smokeless tobacco, and other illicit substance use in 6,227 students who completed at least one assessment at Baseline (n=3,224), 3-months (n=3,229), 7-months (n=4,860), and 15-months (n=4,497). We also present data on specific substances used in 1,884 students who completed all 4 assessments over the course of the EMPATHY program.

Results show, as expected, an increase in reported substance use with age. We also find changes in self-reporting with the cross-sectional cohort showing a decrease in alcohol and smokeless tobacco use, and an overall decrease in mean DAT-11 scores. Results from the longitudinal cohort show an increase in self-reported use for all substances. These findings should be viewed with caution. The DAT-11 is a novel scale used in the EMPATHY study and has not been validated. Further, the scale does not assess frequency or amount of substances used, and therefore the "score" is a value that does not have discriminant properties and does not determine risk of developing a substance use disorder. Future research assessing specific substances used by youth using a validating screening tool would provide stronger insight.

6.2 Introduction

In the face of adverse outcomes related to youth substance misuse, the rate of youth involvement in alcohol, marijuana, tobacco, and other substances continues to be problematic (Leatherdale et al., 2008; Pearson & Ali, 2015). In fact, youth between the ages of 15 – 24 exhibit the highest rate of substance misuse (Patton et al., 2014; Pearson et al., 2015). A number of past studies have examined the effect of youth substance use on the developing brain, with consistent evidence of neurodevelopmental insults to brain regions associated with impulse control and overall executive function, motivation, and cognition (Bava & Tapert, 2010; Gould, 2010; Levy & Williams, 2016; Lisdahl et al., 2013). The detrimental effects of substance use on the youth brain is also associated with reduced academic achievement and increased antisocial behaviour (Compton et al., 2005; Henry et al., 2012; Monahan et al., 2014a; Monahan et al., 2014b). Specific substances commonly used by youth are briefly described below.

6.2.1 Specific Substances and Youth Use

6.2.1.1 Alcohol

Studies aimed at determining the prevalence rate of substance misuse in Canadian youth have proposed that at least 25% of students between the ages of 11 and 18 (or students in Grades 6 – 12) have consumed alcohol, with nearly half of this group consuming 5 or more alcoholic drinks in one occasion – high risk behaviour known as binge drinking (Elgar & Pickett, 2012). More specifically, in 2012, 26.8% of Grade 7 students used alcohol, with 12.9% having experienced binge drinking (Elgar & Pickett, 2012). Rates increase to 46.8% and 25.2% (use and binge drinking, respectively) for Grade 8 students; and in the final year of High School, 85.6% of Grade 12 students engaged in alcohol use with 68.3% binge drinking (Elgar & Pickett, 2012). Indeed, there appears to be a significant increase in alcohol use during the transition from Middle School to High School, and there is evidence of increased rates of high risk consumption in college aged youth (O'Malley & Johnston, 2002). Heavy episodic drinking, or binge drinking, appears to be a prominent risk behaviour, or phenomenon, exhibited by youth and young adults (Dawson et al., 2004). This behaviour is concerning since it increases the risk of morbidity, and more importantly mortality, in youth populations (Foxcroft et al., 2016).

Youth perception of peer involvement in alcohol use, or perceived normative behaviour, may influence alcohol use (Foxcroft et al., 2015). Most often, youth overestimate peer involvement (Foxcroft et al., 2015). In addition, initiation of alcohol use during transition periods in adolescence may be thought of as a rite of passage, and this may promote increased use without consideration

of potential consequences of risky behaviour (Crawford & Novak, 2006). Further, parental expectancies play an important role in age of first use, possibly impacting alcohol use more so than peer influence (Nash et al., 2005). In fact, parental disapproval of alcohol use has been suggested to reduce the formation of relationships with alcohol using peers, while increasing self-efficacy, specifically through resistance and assertiveness skills, to counter peer pressure (Nash et al., 2005).

6.2.1.2 Cannabis: Marijuana/Hashish

The use of cannabis (generic name for marijuana, and the more potent counterpart, hashish) has increased in recent decades, and amidst legalization for medical use, new legislation is focusing on decriminalizing recreational use; however, potential psychological and physiological risks remain uncertain (Estoup et al., 2016; Patton et al., 2002). Marijuana is currently the most widely used illicit substance, and although it is often referred to as a safe or harmless drug, this is not without heated debate (Volkow et al., 2014). Short-term side effects of marijuana use include: impaired judgment and motor coordination; impaired short-term memory, and increased risk of experiencing paranoia or psychosis (Degenhardt & Hall, 2008; Volkow et al., 2014). Long-term side effects include: addiction; chronic bronchitis; cognitive impairment and poor academic outcomes; altered brain development; and increased risk of psychotic disorder for individuals with an underlying predisposition (Degenhardt & Hall, 2008; Volkow et al., 2014). Alarmingly, these symptoms are thought to be associated with age of first use which would indicate poorer outcomes for individuals who begin using marijuana during adolescence; however, there is no consensus on risks and negative outcomes, or lack thereof, of marijuana use during adolescence (Degenhardt & Hall, 2008; Hall & Degenhardt, 2014; Volkow et al., 2014).

Within Canada, it is estimated that 3-8% of Grade 7 students have used marijuana, substantially increasing to 30-53% by Grade 12 (Elgar & Pickett, 2012). Further, between 1990 and 2010, students in Grades 9 and 10 had a lifetime prevalence of cannabis use that increased from 25% to 38% (Elgar & Pickett, 2012). One study found youth who begin using marijuana in Grade 7 were more likely to experience negative consequences as a result of marijuana use; were more likely to progress to using hard drugs and engage in polydrug use; and have poorer academic achievement by Grade 10 (Ellickson et al., 2004). In addition, predictors of initiating marijuana use included current smoking habits, frequency of offers to try marijuana, and poor academic achievement (Ellickson et al., 2004). Although smoking tobacco may be a predictor for later marijuana use, the gateway theory from socially acceptable, and legal, substances to harder, and illegal, drugs does not always follow this temporal sequence which assumes a hierarchy or rank of substances (Kandel, 1975; Tarter et al., 2006; Tarter et al., 2012). In fact, marijuana is often considered the gateway drug to harder substances, such as cocaine or methamphetamines, a role previously assigned to alcohol and tobacco; however, some evidence continues to show nicotine as the gateway to harder, illicit drug use (Kandel & Kandel, 2015; Vanyukov et al., 2012).

6.2.1.3 Other Illicit Substances

As with other substances, the rate of illicit substance use increases with age; however, youth use of drugs, such as cocaine and ecstasy has declined consistently from 2010 (Canadian Center on Substance Abuse, 2016). Despite this decrease, there appears to be an increase in abuse of prescription medication during adolescence (Compton & Volkow, 2006; Johnston et al., 2003)

with 1.5% of Grade 7 to 9 students using medications not prescribed for them to get high; while 2.5% of students in Grades 10 to 12 engaging in this same behaviour (Canadian Center on Substance Abuse, 2016).

There is evidence suggesting that the rate of substance misuse increases with age (Kandel & Logan, 1984; Tarter et al., 1999; White & Papadaratsakis, 2005) indicating the need for strategies to decrease the age of onset of substance use, and subsequent development of a substance use disorder.

There are various strategies that can be administered to youth populations for early identification of substance misuse to reduce the risk of developing a substance use disorder; however, one suggested approach gaining interest is a 3-tiered program: universal Screening, Brief Intervention for those identified as high risk, and Referral to Treatment for those requiring more acute care (SBIRT) (Babor et al., 2007; D'Souza & Harris, 2016; Jensen et al., 2011; Mitchell et al., 2013; Toumbourou et al., 2007). Although a few studies have outlined the potential benefits of implementing SBIRT within primary care clinics and school settings (i.e. early, opportunistic identification of cases), there remains limited evidence of standardized methods (i.e. screening tools; therapeutic model of brief intervention; and referral to treatment process) to facilitate this approach (Carney & Myers, 2012; Curtis et al., 2014; Mitchell et al., 2013; Sterling et al., 2012; Yuma-Guerrero et al., 2012).

Here we present the results of the EMPATHY study focusing on self-reported changes in the use of alcohol, marijuana, tobacco, and illicit substance use over 15 months.

6.2 Methods

The Materials and Methods for the EMPATHY study have been described in detail in Chapter 4.

6.2.1 Cross-Sectional Tests

To test the equality of means from two independent groups, we used the two-tailed Wilcoxon rank-sum test (also known as the Mann Whitney U test) to test hypotheses on the differences between mean scores for different stages of screening. The Mann Whitney U test is a nonparametric test which is often reported to test differences in medians (Campbell, 2006; Swinscow, 2001). This may prove problematic since comparing two groups could yield the same median, but demonstrate a Mann Whitney U test that is significant (Campbell, 2006; Swinscow, 2001). Essentially, if the sample distribution of each group is similar, the location shift will move both medians and means by the same amount (Campbell, 2006; Swinscow, 2001). This indicates that the Mann Whitney U test is a statistical process that can account for differences in means (Campbell, 2006; Swinscow, 2001). As such, the results reported describe differences in means rather than medians. The test was performed on all students screened. In addition, Chi-square (or Fisher's Test when $n<10$) was used to test the difference between expected and observed frequencies of the number of students at risk of substance misuse, depression, and anxiety disorders. Statistical significance was set at $\alpha=0.05$; however a much more conservative value, $\alpha=0.005$ is detailed in **bold** to view results with the application of the Bonferroni correction in cases where there were multiple comparisons.

6.2.2 Longitudinal Tests

For those students who completed all 4 ratings, the statistical method was a paired design in which each student who completed baseline ratings and follow-up ratings was their own control. Similarly, since the data showed evidence of non-normality, a non-parametric test was carried out to compare the difference between mean scores at baseline and each follow-up. This involved the two-tailed Wilcoxon match pair signed-rank test. In addition, McNemar's test was used to test the difference between expected and observed frequencies in longitudinal study groups. Statistical significance was $\alpha=0.05$; however results displayed in **bold** reflect $\alpha=0.005$, a much more conservative value when the Bonferroni correction was applied to the standard $\alpha=0.05$ in cases where there were multiple comparisons.

A power analysis had been completed prior to our initial study which determined that the study was adequately powered at the current sample sizes (Silverstone et al., 2015).

As mentioned previously, it is important to note that in the present study we have only carried out statistical analysis comparing results at two time periods: Baseline and 15-month follow-up, and 3-months and 15-month follow-up, respectively. This is because the Drug, Alcohol, and Tobacco (DAT) questions ask about use "during the past 12-months", and other potential analyses (such as examining changes between Baseline and 3-month or 7-month findings) are not appropriate. Therefore, although we collected data at 3-months, 7-months, and show this for comparison purposes, the only time at which statistical comparisons were made was between Baseline ratings and those at 15-months (Baseline and Assessment #4), and between 3 month ratings and those at

15 months (Assessment #2 and #4).

Statistical analysis was carried out on an "intention to treat" basis utilizing R, version 3.1.0 (R Foundation for Statistical Computing, Vienna, Austria).

6.3 Results

6.3.1 Cross-sectional Analysis in students rated at each time point

6.3.1.1 DAT-5 Responses

Changes in affirmative responses to questions assessing substance use in the past 12-months indicates the most widely used substance by youth between Grades 6 to 12 is alcohol, followed by marijuana and/or hashish (Table 6.1). Interestingly, smokeless tobacco is the third most used substance, followed by "any substance to get high", and tobacco (Table 6.1).

TABLE 6.1. PREVALENCE AND CHANGES IN AFFIRMATIVE RESPONSES ON DAT-5 OVER THE 15-MONTH COURSE OF THE EMPATHY PROJECT FOR ENTIRE STUDY POPULATION [1]

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**	**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
Number of students who consume alcohol (n, %)	1,046 (32.3%)	1,016 (31.5%)	1,285 (26.5%)	**1,278 (28.4%)** *** ++
Number of students who consume Hashish or Marijuana (n, %)	484 (14.9%)	474 (14.7%)	667 (13.7%)	629 (14.0%)
Number of students who use any substance to get high (n, %)	140 (4.32%)	135 (4.18%)	202 (4.16%)	203 (4.52%)
Number of students who smoke tobacco products (n, %)	111 (3.42%)	92 (2.85%)	169 (3.48%)	141 (3.14%)
Number of students who use smokeless tobacco products (n, %)	250 (7.71%)	216 (6.69%)	341 (7.02%)	290 (6.45%)*
Mean drug, alcohol, and tobacco (DAT-11) score (±SD)	1.13 (±2.06) (95%CI = 1.06 – 1.20)	1.08 (±2.02) (95%CI = 1.01 – 1.15)	0.98 (±2.01) (95%CI = 0.92 – 1.04)	**1.01 (±1.99)*****+ (95%CI = 0.95 – 1.07)

[1] Values in **bold** indicate an α=0.005 once the Bonferroni correction is applied to account for multiple comparisons

*** p<0.001 compared to Baseline

++ p<0.01 comparing Assessment #2 to Assessment #4

* p<0.05 compared to Baseline

+ p<0.05 comparing Assessment #2 to Assessment #4

Aggregate data depicting affirmative responses for the entire study population shows an increase in affirmative responses for each question on the DAT-5; however, in relation to the increased number of students participating in the study (Baseline = 3,244; Assessment #4 = 4,496) a highly significant proportion of the study population is not using alcohol or smokeless tobacco products at 15-month follow up (Table 6.1). In addition, a highly significant decrease in mean DAT-11 scores is observed at both 12-month and 15-month follow-up (Table 6.1). Upon closer examination of results over the course of the 15-month SBIRT program, a statistically significant reduction in responses to using alcohol and marijuana/hashish is seen for students in Grade 6 (mean age 11.3 years old) (Table 6.2). In addition, a significant reduction in responses for students in Grade 7 (mean age 12.3 years old) is noted for marijuana/hashish and smokeless tobacco use; while students in their last year of Middle School, Grade 8 (mean age 13.3 years old), had a significant reduction in responses to alcohol use in the past year (Table 6.2).

Students in High School also demonstrated a marked decrease in responses to substance use questions, despite a marked increase in substance use noted in the transition from Middle School to High School (Table 6.2). For example, a significant reduction in responses is observed for students in Grade 9 (mean age 14.3 years old) for all substances except for tobacco use (Table 6.2). In addition, Grade 10 (mean age 15.3 years old) students had a reduction in reported alcohol and smokeless tobacco use; while students in Grade 11 (mean age 16.4 years old) had significantly reduced reporting of smokeless tobacco use. Even with this observed trend of decreased reporting of substance use, changes in responses to the DAT-5 questions for students in Grade 12 (mean age 17.4 years old) were not statistically significant (Table 6.2).

TABLE 6.2. CHANGES IN AFFIRMATIVE RESPONSES TO DAT-5 QUESTIONS BY INDIVIDUAL GRADE FOR STUDENTS IN THE ENTIRE STUDY POPULATION [1]

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**	**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
GRADE 6				
Alcohol	5, 1.1%	7, 1.6%	3, 0.4%	2, 0.3%+
Marijuana/Hashish	4, 0.9%	4, 0.9%	1, 0.1%	0*+
Any Substance Use	3, 0.7%	1, 0.2%	0	1, 0.1%
Tobacco	2, 0.5%	1, 0.2%	0	0
Smokeless Tobacco	4, 0.9%	1, 0.2%	2, 0.3%	1, 0.1%
GRADE 7				
Alcohol	19, 4.5%	22, 5.1%	16, 2.3%	25, 3.5%
Marijuana/Hashish	8, 1.9%	15, 3.5%	4, 0.6%	7, 1.0% ++
Any Substance Use	7, 1.7%	2, 0.5%	3, 0.4%	4, 0.6%
Tobacco	1, 0.2%	3, 0.7%	5, 0.7%	1, 0.1%
Smokeless Tobacco	9, 2.2%	9, 2.1%	6, 0.8%	5, 0.7%*
GRADE 8				
Alcohol	45, 11.6%	64, 15.0%	35, 5.5%	**48, 7.7%+++**
Marijuana/Hashish	20, 5.1%	28, 6.5%	20, 3.2%	31, 5.0%
Any Substance Use	3, 7.7%	8, 1.9%	3, 0.5%	7, 1.1%
Tobacco	9, 2.3%	6, 1.4%	6, 0.9%	8, 1.3%
Smokeless Tobacco	12, 3.1%	19, 4.4%	14, 2.2%	16, 2.6%

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**	**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
GRADE 9				
Alcohol	166, 31.7%	158, 30.2%	85, 11.8%	**106, 15.8%*****+++**
Marijuana/Hashish	86, 16.4%	92, 17.6%	49, 6.8%	**72, 10.8%*****+++**
Any Substance Use	22, 4.2%	23, 4.4%	14, 1.9%	14, 2.1%+
Tobacco	22, 4.2%	20, 3.8%	14, 1.9%	14, 2.1%
Smokeless Tobacco	53, 10.1%	50, 9.6%	36, 5.0%	38, 5.7%**+
GRADE 10				
Alcohol	242, 42.3%	242, 43.0%	196, 29.4%	**199, 32.1%*****+++**
Marijuana/Hashish	101, 17.6%	105, 18.7%	116, 17.4%	103, 16.7
Any Substance Use	29, 5.1%	33, 5.9%	28, 4.2%	31, 5.0%
Tobacco	26, 4.5%	17, 3.0%	23, 3.4%	22, 3.5%
Smokeless Tobacco	62, 10.8%	38, 6.7%	54, 8.1%	41, 6.6%*
GRADE 11				
Alcohol	275, 55.8%	261, 54.7%	319, 43.3%	337, 51.6%
Marijuana/Hashish	137, 27.8%	120, 25.2%	151, 20.5%	149, 22.8%
Any Substance Use	36, 7.3%	30, 6.3%	44, 6.0%	45, 6.9%
Tobacco	26, 5.3%	22, 4.6%	24, 3.3%	28, 4.3%
Smokeless Tobacco	62, 12.6%	60, 12.6%	58, 7.9%	52, 8.0%*+
GRADE 12				
Alcohol	289, 68.8%	257, 69.5%	347, 52.3%	348, 68.0%

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**	**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
Marijuana/Hashish	126, 30.0%	108, 29.2%	168, 25.3%	142, 27.7%
Any Substance Use	38, 9.0%	43, 11.6%	47, 7.1%	51, 10.0%
Tobacco	22, 5.2%	25, 6.8%	34, 5.1%	26, 5.1%
Smokeless Tobacco	44, 10.5%	39, 10.5%	77, 11.6%	65, 12.7%

[l] Values in **bold** indicate an $\alpha=0.005$ once the Bonferroni correction is applied to account for multiple comparisons
*** $p<0.001$ compared to Baseline
+++ $p<0.001$ comparing Assessment #2 to Assessment #4
** $p<0.01$ compared to Baseline
++ $p<0.01$ comparing Assessment #2 to Assessment #4
* $p<0.05$ compared to Baseline
+ $p<0.05$ comparing Assessment #2 to Assessment #4

Another area of interest was to determine if affirmative responses to specific substances differed between genders, and if the reduction over the course of the SBIRT program differed (Table 6.3).

Results indicate a statistically significant decrease in substance use reporting in relation to the increase in students participating in the study from Baseline to Assessment #4. This is observed for most substances for both males and females over the course of the EMPATHY program (Assessment #4) (Table 6.3).

TABLE 6.3. CHANGES IN AFFIRMATIVE RESPONSES ON DAT-5 OVER THE 15-MONTH COURSE OF THE EMPATHY PROJECT FOR ENTIRE STUDY POPULATION BY GENDER [1]

	Baseline Assessment #1 (n, n%)	**3-month Assessment #2 (n, n%)**	**7-month Assessment #3 (n, n%)**	**15-month Assessment #4 (n, n%)**
Number of students who consume alcohol				
Males	513, 49.3%	477, 45.6%	478, 47.8%	**524, 49.3%*****+++**
Females	527, 50.7%	534, 54.4%	523, 52.2%	**539, 51.7%*****+++**
Number of students who consume Hashish or Marijuana				
Males	241, 50.0%	222, 47.0%	247, 48.5%	250, 49.6%**+
Females	241, 50.0%	250, 53.0%	262, 51.5%	**254, 50.4%**++ +++
Number of students who use any substance to get high				
Males	73, 52.9%	67, 47.9%	67, 48.2%	83, 54.2%
Females	65, 47.1%	73, 52.1%	72, 51.8%	70, 45.8%+
Number of students who smoke tobacco products				
Males	55, 50.9%	50, 53.2%	55, 51.9%	47, 47.5%*
Females	53, 49.1%	44, 46.8%	51, 48.1%	52, 52.5%
Number of students who use smokeless tobacco products				
Males	136, 55.3%	102, 47.2%	125, 50.6%	**104, 47.7%*****++**
Females	110, 44.7%	114, 52.8%	122, 49.4%	114, 52.3%*

[1] Values in **bold** indicate an α=0.005 once the Bonferroni correction is applied to account for multiple comparisons

*** p<0.001 compared to Baseline

+++ p<0.001 comparing Assessment #2 to Assessment #4

** p<0.01 compared to Baseline

++ $p<0.01$ comparing Assessment #2 to Assessment #4
* $p<0.05$ compared to Baseline
+ $p<0.05$ comparing Assessment #2 to Assessment #4

Additionally, students were grouped based on level of risk behaviour on the 5-component EMPATHY scale score, and those with the highest scores per Grade per school were categorized as being in the Top 10% and were offered an online intervention. Since this select group of students was considered to be at higher risk than the overall population, it was important to see if their reported use of substances differed for those who participated in the intervention in comparison to those who did not (Table 6.4).

The results show an increased use of all substances reported by students who participated in the online intervention when comparing Baseline to 15-month follow-up (Assessment #4), as well as 3-month and 15-month follow-up (Assessment #2 and Assessment #4); however, it is important to note that the study population increased in Assessment #4. Reported use of smokeless tobacco was the only response that reached statistically significance, in which the greater proportion of the study population was using smokeless tobacco at 15-month follow-up (Table 6.4). In addition, mean DAT-11 scores increased over the 15-month EMPATHY program; but this increase was not statistically significant at either 12-month (Assessment #2 and Assessment #4) or 15-month (Baseline and Assessment #4) follow-up (Table 6.4).

TABLE 6.4. CHANGES IN AFFIRMATIVE RESPONSES AND MEAN DAT-5 FOR STUDENTS IN THE TOP 10% FOR THE ENTIRE STUDY POPULATION

.	**Baseline Assessment #1 (n, n%)**	**3-month Assessment #2 (n, n%)**	**7-month Assessment #3 (n, n%)**	**15-month Assessment #4 (n, n%)**
Students in the Top 10 % who did not participate in the intervention				
Alcohol	91, 49.5%	100, 54.3%	222, 56.6%	119, 48.8%
Marijuana/Hashish	63, 34.2%	79, 42.9%	190, 48.5%	97, 39.8%
Any Substance Use	26, 14.1%	29, 15.8%	88, 22.4%	48, 19.7% * +
Tobacco	23, 12.5%	21, 11.4%	78, 19.9%	34, 13.9%
Smokeless Tobacco	36, 19.6%	45, 22.5%	123, 31.4%	53, 21.7%
Mean DAT-11 score (±SD)	2.72 (±3.12) (95%CI = 2.72 – 3.17)	2.85 (±3.10) (95%CI = 2.40 – 3.30)	3.63 (±3.44) (95%CI = 3.29 – 3.97)	2.84 (±3.28) (95%CI = 2.43 – 3.25)
Students in the Top 10 % who did participate in the intervention				
Alcohol	15, 19.0%	12, 14.3%	53, 24.4%	38, 22.0%
Marijuana/Hashish	4, 5.1%	9, 10.7%	27, 12.4%	25, 14.5%
Any Substance Use	2, 2.5%	4, 4.8%	5, 2.3%	10, 5.8%
Tobacco	1, 1.3%	3, 3.6%	10, 4.6%	8, 4.6%
Smokeless Tobacco	2, 2.5%	3, 3.6%	18, 8.3%	18, 10.4%*
Mean DAT-11 score (±SD)	0.58 (±1.35) (95%CI = 0.28 – 0.88)	0.81 (±1.84) (95%CI = 0.42 – 1.20)	1.04 (±1.90) (95%CI = 0.79 – 1.29)	1.06 (±2.07) (95%CI = 0.75 – 1.37)

*p<0.05 compared to Baseline
+p<0.05 comparing Assessment #2 to Assessment #4

For the students in the Top 10% who were offered the online intervention, but did not participate, their responses to the DAT-5 questions indicate a statistically significant increase in use of any substance (other than alcohol, marijuana/hashish, or tobacco products) at both 12-month (Assessment #2 and Assessment #4) and 15-month (Baseline and Assessment #4) intervals (Table 6.4). Although an increase in mean DAT-11 scores is observed at both 12-month and 15-month follow-up, the results at both intervals did not reach statistical significance (Table 6.4)

6.3.2 Longitudinal Analysis in students who completed all 4 ratings

6.3.2.1 DAT-5 Responses

As with the cross-sectional analysis, there was a clear increase in reported substance use through affirmative responses on the DAT-5 questions; however, in contrast to the cross-sectional cohort, the number of students with all 4 Assessments remained consistent over time (Table 6.5). Alcohol and marijuana continue to be the most widely used substances in the cohort of students in Grades 6 to 12 with all 4 Assessments over the 15-month EMPATHY program (Table 6.5).

TABLE 6.5: PREVALENCE AND CHANGES IN AFFIRMATIVE RESPONSES ON THE DAT-5 OVER THE 15-MONTH COURSE OF THE EMPATHY PROJECT FOR STUDENTS WITH ALL 4 ASSESSMENTS [1]

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**	**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
Number of students who consume alcohol (n)	413 (21.9%)	418 (22.2%)	484 (25.7%)	**599 (31.8%)** ***+++
Number of students who consume Hashish or Marijuana (n)	175 (9.98%)	188 (9.98%)	223 (11.8%)	**273 (14.5%)** ***+++
Number of students who use any substance to get high (n)	41 (2.18%)	48 (2.55%)	50 (2.66%)	**71 (3.77%)** ***+++
Number of students who smoke tobacco products (n)	42 (2.23%)	33 (1.75%)	44 (2.34%)	**48 (2.55%)**+++*
Number of students who use smokeless tobacco products (n)	108 (5.73%)	96 (5.10%)	119 (6.32%)	**121 (6.42%)*****+++
Mean drug, alcohol, and tobacco (DAT-11) score (±SD)	0.72 (±1.66) (95%CI = 0.65 – 0.79)	0.71 (±1.62) (95%CI = 0.64 – 0.78)	0.84 (±1.76) (95%CI = 0.76 – 0.92)	**1.03 (±1.93)*****+++ (95%CI = 0.94 – 1.12)

[1] Values in **bold** indicate an α=0.005 once the Bonferroni correction is applied to account for multiple comparisons
*** p<0.001 compared to Baseline
+++ p<0.001 comparing Assessment #2 to Assessment #4
* p<0.05 compared to Baseline

Aggregate data indicates a consistent increase in substance use responses; however, like the cross-sectional cohort, it was of interest to determine if changes could be observed for each individual

Grade. Unlike the cross-sectional cohort, students in Grade 6 had increased reporting of alcohol by the time they were in Grade 7, but this change was not statistically significant (Table 6.6). The transition from Grade 7 to Grade 8, the last year of Middle School, shows a highly statistically significant increase in reported alcohol, marijuana/hashish, and tobacco use, and this same trend is observed during the transition from Grade 8 to Grade 9, the first year of High School (Table 6.6). More specifically, students in Grade 9 in Year 2 had significantly increased responses to using alcohol, marijuana/hashish, any substance, and smokeless tobacco in the past 12 months (Table 6.6). This same trend is observed from Grade 9 to Grade 10, with increased affirmative responses to alcohol, marijuana/hashish, and any substance use at both 12-month (Assessment #2 and Assessment #4) and 15-month (Baseline and Assessment #4) follow-up that is statistically significant (Table 6.6). Further, these results are also observed in the transition for Grade 10 to 11, with the exception of increased smokeless tobacco use reported by students who were in Grade 11 in Year 2 (Table 6.6). Results from students in their final year of High School at the end of the EMPATHY program (Grade 12 in Year 2) shows a highly significant increase in reported alcohol and smokeless tobacco use, followed by a significant increase in reported marijuana/hashish use (Table 6.6).

TABLE 6.6. CHANGES IN AFFIRMATIVE RESPONSES ON DAT-5 QUESTIONS BY INDIVIDUAL GRADE FOR STUDENTS WITH ALL 4 ASSESSMENTS [1]

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**		**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
GRADE 6			**GRADE 7**		
Alcohol	4, 1.2%	4, 1.2%		8, 2.5%	9, 2.8%
Marijuana/Hashish	2, 0.6%	2, 0.6%		1, 0.3%	1, 0.3%
Any Substance Use	1, 0.3%	0		0	2, 0.6%
Tobacco	1, 0.3%	0		2, 0.6%	0
Smokeless Tobacco	1, 0.3%	0		3, 0.9%	1, 0.3%
GRADE 7			**GRADE 8**		
Alcohol	14, 4.4%	13, 4.1%		19, 5.9%	**32, 10.0%*****++**
Marijuana/Hashish	7, 2.2%	9, 2.8%		12, 3.8%	17, 5.3%**+
Any Substance Use	4, 1.3%	1, 0.3%		0	6, 1.9%
Tobacco	1, 0.3%	0		3, 0.9%	6, 1.9%+
Smokeless Tobacco	7, 2.2%	6, 1.9%		9, 2.8%	8, 2.5%
GRADE 8			**GRADE 9**		
Alcohol	31, 10.3%	43, 14.3%		41, 13.7%	**56, 18.7%*****++**
Marijuana/Hashish	15, 5.0%	18, 6.0%		23, 7.7%	**46, 15.3%*****++**
Any Substance Use	4, 1.3%	5, 1.7%		5, 1.7%	10, 3.3%+

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**		**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
GRADE 8			**GRADE 9**		
Tobacco	6, 2.0%	4, 1.3%		8, 2.7%	8, 2.7%
Smokeless Tobacco	8, 2.7%	12, 4.0%		19, 6.3%	**25, 8.3%*****++**
GRADE 9			**GRADE 10**		
Alcohol	101, 28.9%	92, 26.4%		115, 33.0%	**141, 40.4%*****++**
Marijuana/Hashish	41, 11.7%	46, 13.2%		51, 14.6%	**67, 19.2%*****++**
Any Substance Use	10, 2.9%	11, 3.2%		12, 3.4%	17, 4.9%*+
Tobacco	13, 3.7%	10, 2.9%		11, 3.2%	10, 2.9%
Smokeless Tobacco	31, 8.9%	29, 8.3%		26, 7.4%	26, 7.4%
GRADE 10			**GRADE 11**		
Alcohol	136, 38.2%	143, 40.2%		159, 44.7%	**190, 53.4%*****++**
Marijuana/Hashish	54, 15.2%	55, 15.4%		71, 20.0%	**79, 22.2*****+++**
Any Substance Use	10, 2.8%	20, 5.6%		20, 5.6%	**23, 6.5%*******
Tobacco	10, 2.8%	10, 2.8%		11, 3.1%	14, 3.9%
Smokeless Tobacco	36, 10.1%	23, 6.5%		32, 9.0%	33, 9.3*
Grade 11			**Grade 12**		
Alcohol	123, 52.6%	121, 51.7%		137, 58.5%	**166, 46.4%*****++**
Marijuana/Hashish	55, 23.5%	54, 23.1%		60, 25.6%	63, 26.9%++

	Baseline Assessment #1 (n, n%) Year 1	3-month Assessment #2 (n, n%) Year 1		7-month Assessment #3 (n, n%) Year 2	15-month Assessment #4 (n, n%) Year 2
Grade 11			**Grade 12**		
Any Substance Use	14, 6.0%	11, 4.7%		13, 5.6%	13, 5.6%
Tobacco	11, 4.7%	10, 4.3%		9, 3.8%	9, 3.8%
Smokeless Tobacco	22, 9.4%	24, 10.3%		29, 12.4%	28, 12.0%*
Grade 12			**Grade 12**		
Alcohol	2, 50.0%	1, 25.0%		1, 25.0%	2, 50.0%
Marijuana/Hashish	1, 25.0%	2, 50.0%		2, 50.0%	1, 25.0%
Any Substance Use	0	0		0	0
Tobacco	0	0		0	0
Smokeless Tobacco	1, 25.0%	1, 25.0%		0	0

[1] Values in **bold** indicate an $\alpha=0.005$ once the Bonferroni correction is applied to account for multiple comparisons
*** $p<0.001$ compared to Baseline
+++ $p<0.001$ comparing Assessment #2 to Assessment #4
** $p<0.01$ compared to Baseline
++$p<0.01$ comparing Assessment #2 to Assessment #4
* $p<0.05$ compared to Baseline
+ $p<0.05$ comparing Assessment #2 to Assessment #4

In addition to examining DAT-5 responses by individual Grade, it was of interest to determine if differences in reported substance use differed by gender. Table 6.7 shows changes in affirmative responses to substances used and for nearly all of the questions, both genders demonstrate a highly

statistically significant increase in reported substance use over the 15-month EMPATHY program (Table 6.7).

TABLE 6.7. CHANGES IN AFFIRMATIVE RESPONSES ON DAT-5 OVER THE 15-MONTH COURSE OF THE EMPATHY PROJECT FOR STUDENTS WITH ALL 4 ASSESSMENTS, BY GENDER [1]

	Baseline Assessment #1 (n, n%)	**3-month Assessment #2 (n, n%)**	**7-month Assessment #3 (n, n%)**	**15-month Assessment #4 (n, n%)**
Number of students who consume alcohol				
Males	205, 49.9%	207, 49.6%	232, 48.4%	**300, 50.5%*****+++**
Females	206, 50.1%	210, 50.4%	247, 51.6%	**294, 49.5%*****+++**
Number of students who consume Hashish or Marijuana				
Males	79, 45.1%	87, 46.8%	107, 49.1%	**133, 48.7%*****+++**
Females	96, 54.9%	99, 53.2%	111, 50.9%	**140, 51.3%*****+++**
Number of students who use any substance to get high				
Males	24, 55.8%	27, 56.3%	28, 56.0%	**42, 59.2%*****+++**
Females	19, 44.2%	21, 43.8%	22, 44.0%	29, 40.8%++ +
Number of students who smoke tobacco products				
Males	21, 50.0%	21, 61.8%	21, 47.7%	22, 46.8%
Females	21, 50.0%	13, 38.2%	23, 52.3%	25, 53.2%++
Number of students who use smokeless tobacco product				
Males	56, 52.8%	43, 45.3%	55, 47.0%	55, 45.1++
Females	50, 47.2%	52, 54.7%	62, 53.0%	**67, 54.9%*****+++**

[1] Values in **bold** indicate an α=0.005 once the Bonferroni correction is applied to account for multiple comparisons
*** $p<0.001$ compared to Baseline
+++ $p<0.001$ comparing Assessment #2 to Assessment #4
** $p<0.01$ compared to Baseline

++ $p<0.01$ comparing Assessment #2 to Assessment #4
+ $p<0.05$ comparing Assessment #2 to Assessment #4

Additionally, students were grouped based on level of risk behaviour on the 5-item EMPATHY scale score, and those with the highest scores per Grade per school were categorized as being in the Top 10% and were offered an online intervention. Since this select group of students was considered to be at higher risk than the overall population, it was important to see if reported substance using behaviour differed for those who participated in the intervention, versus those who did not (Table 6.8).

The results indicate that students who participated in the online intervention reported increased use of all substances when comparing Baseline to 15-month follow-up (Assessment #4), as well as 3-month and 15-month follow-up (Assessment #2 and Assessment #4); however, the results for alcohol and marijuana/hashish use were the only responses that were statistically significant (Table 6.8). Further, mean DAT-11 scores increased over time, and the results reached statistical significance at both 12-month (Assessment #2 and Assessment #4) and 15-month (Baseline and Assessment #4) follow-up intervals (Table 6.8).

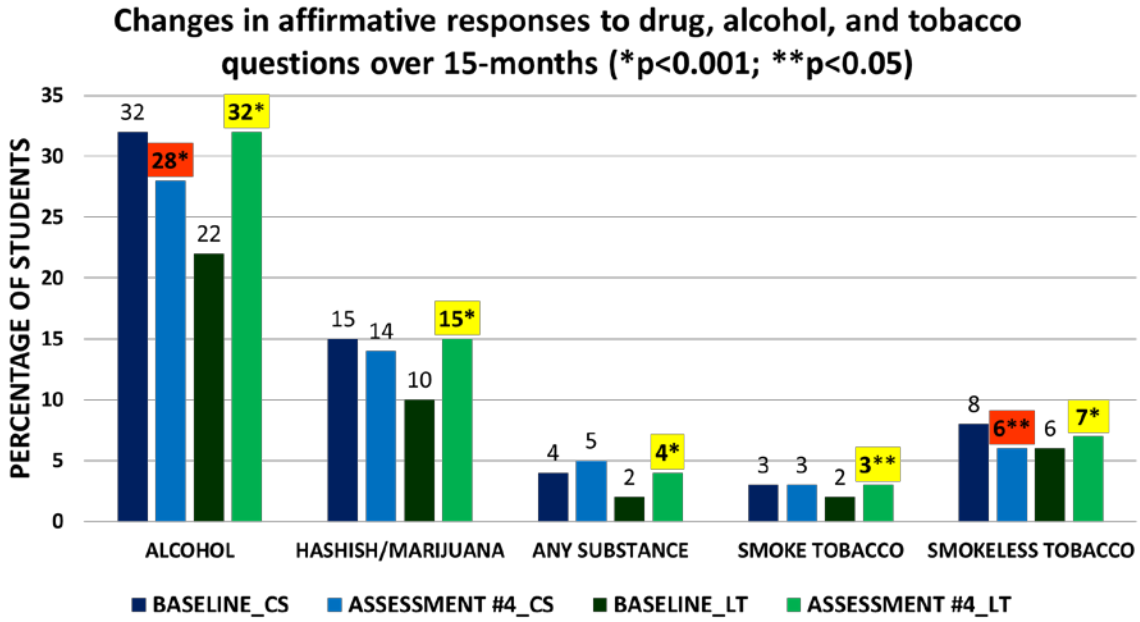
TABLE 6.8. CHANGES IN AFFIRMATIVE RESPONSES AND MEAN DAT-5 FOR STUDENTS IN THE TOP 10% FOR STUDENTS WITH ALL 4 ASSESSMENTS [1]

	Baseline Assessment #1 (n, n%) Year 1	**3-month Assessment #2 (n, n%) Year 1**	**7-month Assessment #3 (n, n%) Year 2**	**15-month Assessment #4 (n, n%) Year 2**
Students in the Top 10 % who did not participate in the intervention				
Alcohol	45, 44.1%	50, 49.0%	53, 52.0%	53, 52.0%*
Marijuana/Hashish	31, 30.4%	36, 35.3%	46, 45.1%	43, 42.2%++ +
Any Substance Use	9, 8.9%	12, 11.8%	17, 16.7%	19, 18.6% ++ +
Tobacco	15, 14.7%	11, 10.8%	19, 18.6%	13, 12.7%
Smokeless Tobacco	20, 19.6%	22, 21.6%	35, 34.3%	27, 26.5%*
Mean DAT-11 score (±SD)	2.27 (±2.83) (95%CI = 1.72 – 2.82)	2.32 (±2.69) (95%CI = 1.80 – 2.84)	3.36 (±3.18) (95%CI = 2.74 – 3.98)	**3.02 (±3.16)**++ (95%CI = 2.41 – 3.63)
Students in the Top 10 % who did participate in the intervention				
Alcohol	14, 21.9%	11, 17.2%	15, 23.4%	18, 28.1%+
Marijuana/Hashish	4, 6.3%	7, 10.9%	9, 14.1%	11, 17.2%*
Any Substance Use	3, 4.7%	2, 3.1%	3, 4.7%	6, 9.4%
Students in the Top 10 % who did participate in the intervention				
Tobacco	1, 1.6%	2, 3.1%	2, 3.1%	2, 3.1%
Smokeless Tobacco	1, 1.6%	2, 3.1%	4, 6.3%	4, 6.3%
Mean DAT-11 score (±SD)	0.63 (±1.41) (95%CI = 0.28 – 0.98)	0.72 (±1.59) (95%CI = 0.33 – 1.11)	1.05 (±1.98) (95%CI = 0.56 – 1.54)	1.22 (±2.19)*+ (95%CI = 0.68 – 1.76)

[l] Values in **bold** indicate an α=0.005 once the Bonferroni correction is applied to account for multiple comparisons
*** p<0.001 compared to Baseline
+++ p<0.001 comparing Assessment #2 to Assessment #4
** p<0.01 compared to Baseline
++ p<0.01 comparing Assessment #2 to Assessment #4
* p<0.05 compared to Baseline
+ p<0.05 comparing Assessment #2 to Assessment #4

For the students in the Top 10% who were offered the online intervention, but did not participate, their responses to the DAT-5 questions indicate a statistically significant increase in use reporting for all substances except for tobacco (Table 6.8). Marijuana/hashish and any substance use increased and reached statistical significance at both 12-month (Assessment #2 and Assessment #4) and 15-month (Baseline and Assessment #4) follow-up intervals (Table 6.8). Alcohol and smokeless tobacco use increased significantly during the 15-month duration of the program (Baseline and Assessment #4) (Table 6.8). Further, mean DAT-11 scores increased over time and were found to be statistically significant at both 12-month (Assessment #2 and Assessment #4) and 15-month (Baseline and Assessment #4) intervals (Table 6.8). A summary of cross-sectional and longitudinal data depicting the change is affirmative responses to drugs used over the 15-month project is illustrated in Figure 6.1.

Figure 6.1. Summary of cross-sectional and longitudinal data depicting change in affirmative responses to drugs used over the 15-month project



6.4 Discussion

At first glance, the results reported from the DAT-5 and DAT-11 may be alarming with outcomes indicating a highly statistically significant increase in reported use for most, if not all, substances during the 15 month EMPATHY program. However, the context of these responses is imperative: DAT-5 questions do not assess any form of risk of substance misuse, or the development of a substance use disorder. Further, unlike the CRAFFT Substance Use Screening Tool, the DAT-5 (or the DAT-11, for that matter) does not have discriminant properties and cannot provide information on the severity of risk behaviour. Essentially, the DAT-5 provides information on the prevalence of specific substances used by students in Grades 6 to 12 within a school-district. Further, this scale does not assess the frequency of substance misuse in the past 12-months.

Although the data collected from the DAT-11 is interesting and provides insight into the types of substances youth use, the mean "score" (this term is arbitrary) cannot have clinical significance since it is not a validated scale. Further, the first three questions of the DAT-11 are often used in primary care clinics as introductory, unscored questions that determine if the CRAFFT needs to be administered; however, these questions were included in the overall DAT score. As such, individuals who have experimented with the substances listed in the DAT-5 may have a higher overall DAT-11 score, therefore the meaning of mean differences has little bearing on actual risky substance using behaviour. The CRAFFT, through an extensive process to determine validity of this tool, can detect risk from scores that are ≥2; however, it remains unknown the validity of the DAT-11 and subsequent cut-off scores indicating risk of developing a substance use disorder.

On a positive note, the increased reporting of substances used in the past 12 months may be a reflection of increased comfort in disclosing this information. One of the significant benefits of implementing an SBIRT program is the ability to identify students opportunistically, but also as a format to begin discussing maladaptive behaviours with youth. This may be attributed to a change in overall culture across an entire school district.

As mentioned, the DAT-11 scale used to assess substance misuse in youth has not been validated, and does not provide information on the frequency of substances used. As such, the results presented in this paper should be used with caution. What this study does provide is the prevalence in substances used in the past 12-months reported by students in Grades 6 – 12 across an entire school district, over a 15-month period. Although changes in self-reported use of substances are

noted, and we may speculate a change in school culture has played a role in this observation, specific factors influencing this change remain unknown. Future studies implementing a robust control group may provide more insight into mediating and moderating factors of change, as in this current study it was unethical to apply this approach (Silverstone et al., 2015). Lastly, the data collected is based solely on student self-reporting of use. There are prior studies indicating these responses can be reliable (Flisher et al., 2004; Levy et al., 2004; Winters et al., 1990); however, triangulation of results would have produced more robust findings.

In conclusion, here we present data on a large community sample of students in Grades 6 – 12, or between the ages of 11 – 18 years. The use of alcohol continues to be the most widespread substance used, followed by marijuana/hashish. The results also indicate an increase in self-reported substance use with age. Changes in reported substance use are observed; however, both an increase and decrease in reporting is not synonymous with changes in risk behaviour, or risk of developing a substance use disorder. The use of a novel, un-validated scale only allows the data to illustrate prevalence rates of reporting over the 15-month EMPATHY program. Future research using validated scales assessing specific substances used during adolescence may provide more insight into frequency of use and amount in order to accurately assess risk.

Chapter 7: School SBIRT Challenges: Qualitative findings from EMPATHY

7.1 Abstract

Substance use during adolescence continues to be a growing concern considering evidence suggesting early use increases the risk of social and developmental delays. Screening, brief intervention, and referral to treatment (SBIRT) is a comprehensive prevention and early intervention program that shows promise through its 3-tiered framework. While well studied in adults, SBIRT has been much less commonly studied in youth. Here we describe perspective-based evidence from the coaches and counsellors facilitating school-based SBIRT through the EMPATHY project.

This qualitative study is part of a larger school-based SBIRT program (Empowering a Multimodal Pathway toward Healthy Youth, EMPATHY) which operated in Red Deer, Alberta from January 2014 to June 2015. The primary goal of this program was to reduce depression, anxiety, and suicidal thinking. All students in Grades 6 – 12 (ages 11-18) within a single school district were offered screening. This screening included measuring use of drugs, alcohol, and tobacco (DAT), followed by a brief school-based intervention (guided internet-based cognitive behavioural therapy) and, if needed, subsequent referral for treatment. Qualitative data on facilitator perspective of SBIRT processes was collected through in-person interviews in Phase I, and through phone interviews in Phase III. Nine out 10 coaches were interviewed in Phase I; and 6 out of 10 in Phase III. All four counsellors from the Primary Care Network were interviewed in Phase II. Data

collected was analyzed contemporaneously and enhanced by audio recorded interviews to ensure rigour.

Overall, engagement and interest in the EMPATHY program was reported to be high for those at-risk of maladaptive behaviour patterns; however, the two most significant barriers to engagement and long term support are directly related to the need for parental consent, and a systemic gap in treatment for children and youth with mild to moderate symptomology. Interestingly, therapeutic alliance built between facilitator and student was consistently reported to be a significant factor in the ease of facilitation of this school based SBIRT.

Barriers to engagement in mental health screening continues to be present; however, this was found to be external to the youth participating in the EMPATHY program. A more prominent obstacle when facilitating SBIRT was found to be systemic, more specifically timely access to appropriate treatment programs for youth with mild to moderate symptomology. The use of a training manual and computer technology may have allowed for ease of facilitation of components of SBIRT, in comparison to reported challenges and barriers preventing widespread implementation in primary care clinics. Further, therapeutic alliance was reported to play a significant role in the success of facilitation and student engagement, a finding noted in previous reviews examining factors aiding in compliance and success of substance use programs for adults.

7.2 Introduction

Currently, in both Canada and the United States, the rate of substance use continues to be concerning (Patton et al., 2014; Statistics Canada, 2013). In addition, mid to late adolescence appears to be the developmental stage in which substance misuse increases (Patton et al., 2014). Past evidence has shown that substance misuse during this time increases the risk of negative outcomes in social and academic capacities, specifically in areas of impulse control, motivation, and cognition (Carney & Myers, 2012). Indeed, previous studies have indicated that nearly 27% of Canadian students in Grade 7 (mean age 12.3) use alcohol, with nearly 50% engaging in binge drinking (consuming 5 or more drinks in one occasion) (Elgar & Pickett, 2012). This demonstrates an upward trend in the percentage of youth consuming alcohol which corresponds with increasing age: 86% of students in Grade 12 (aged 17 – 18) have consumed alcohol, and 50% have used an illicit drug (Elgar & Pickett, 2012). These substance use findings support the need for prevention and early intervention programming for youth.

Although there are a variety of interventions proposed, a widely suggested approach to reducing substance misuse, and related consequences, is the incorporation of routine screening with the opportunity for a brief intervention, and referral to treatment, if necessary; this approach is collectively known as SBIRT (Jensen et al., 2011; Toumbourou et al., 2007; Yuma-Guerrero et al., 2012). The theoretical construct of SBIRT as a comprehensive program can be depicted as a pyramid beginning as a universal intervention, narrowing into a secondary and tertiary intervention, demonstrating the versatility of this approach (Sterling et al., 2012). The focus is early identification of at-risk youth while having available resources for prompt intervention and

continued care, and may fit within current primary care practices during well and sick visits, or within school-based programming (Sterling et al., 2012). In addition, SBIRT continues to be a flexible approach that can be used as an initial stand-alone treatment, or in conjunction with more intense formats (Agerwala & McCance-Katz, 2012; Sterling et al., 2012). SBIRT clearly has the potential to be an effective and inclusive approach to the reduction of substance misuse; however, implementation in the two most frequented locations by youth – school and primary care clinics – has proved to be challenging (Sterling et al., 2012; Yuma-Guerrero et al., 2012) . Determining the best approach and setting for substance use prevention, or intervention, in youth remains uncertain.

7.3 Methods

The Materials and Methods for the EMPATHY study have been described in detail in Chapter 4.

7.3.1 Study Design

For insight into facilitator perspective on the SBIRT process and how it unfolds, including potential issues that may arise during implementation, we used a mixed methods intervention design to allow for sequential qualitative inquiry to investigate the social processes surrounding the EMPATHY program in Red Deer, Alberta, Canada. This qualitative inquiry builds on the larger EMPATHY program. We have a clear understanding of the need to identify risky substance using behaviours exhibited by youth, as well as the need to intervene early; however, little is known about the effectiveness of the 3-tiered SBIRT model on youth substance use outcomes. As the EMPATHY program unfolded in Year 1 (January/February 2014), it was clear that Resiliency

Coaches played a crucial role in facilitating the program, and may provide valuable insight into procedures. How did this SBIRT program unfold from the perspective of the Resiliency Coaches? This question was the starting point of our qualitative inquiry.

Since we found it important to understand what happens as Resiliency Coaches facilitate the SBIRT protocol and possible interactions between people guiding this process, semi-structured interviews to build on our quantitative data was found to be the best approach to the overarching mixed methods intervention design. Our study begins with open questions in the hopes of understanding potential issues that arise when implementing a school-based SBIRT from front-line facilitators of the program, rather than stakeholder perspective on the topic.

We asked questions that were open, such as:

- What was the process of facilitating the EMPATHY protocol?
- What were variations to the process specific to each component of SBIRT (i.e. Screening, Brief Intervention, and Referral to Treatment)?

7.3.2 Data Collection

Sampling Strategy

All Resiliency Coaches were invited, via email, to participate in this qualitative inquiry. The initial sample focused on interviewing 3 Resiliency Coaches who had experienced the start-up of the EMPATHY program (Year 1), as well as the progression to Year 2. The information gathered from the facilitators of this SBIRT program is paramount since there is a significant gap in literature discussing potential barriers or issues encountered when using this model in schools. Since our aim was to clearly disseminate issues that may arise when following the program protocol, it was

important to gain insight into potential variation in perspectives of the Resiliency Coaches by interviewing as many as possible to provide an accurate depiction of processes. In Phase I of this qualitative study, 9 out of 10 coaches were interviewed; 6 out of 10 were interviewed during a return visit in Phase III. This allowed for further investigation into consistencies in responses and, more importantly, identification of potentially deviant cases.

We extended our investigation from the Resiliency Coaches, to the mental health professionals responsible for following through the referral to treatment component of SBIRT. This decision, in part, was based on initial feedback from Resiliency Coaches who facilitated the SBIRT protocol in Year 1 of the program since there were consistent concerns about the applicability of referring students to the Primary Care Network. Furthermore, to confirm or disconfirm key concepts identified, Resiliency Coaches were invited to be interviewed a second time (Phase III, January 2016). A total of 13 participants were recruited. Telephone interviews followed the same format as face to face interviews, specifically in terms of duration, content, and quality.

Interviews

Interviews were in-depth and 30-45 minutes in duration. The researcher/interviewer (DMH) travelled to Red Deer, Alberta where the interviews took place. The first 3 Resiliency Coaches were interviewed at the schools they were located in, for their convenience. Semi-structured questions were used as a framework for the interview, and questions revolved around the research question (i.e. protocol versus actual facilitation; challenges versus successes). Phase I of the interviews was completed in one week during the month of April 2015.

After the first set of interviews, the remaining 6 Resiliency Coaches were interviewed, as well as 4 members of acute and specialized mental health treatment (3 Primary Care Network counsellors, and 1 Addiction & Mental Health therapist) who were responsible for treatment after the Referral

to Treatment component of the SBIRT protocol. The researcher travelled to Red Deer, Alberta to conduct face-to-face interviews with the remaining Resiliency Coaches, each interview taking place in the coach's school; and travelling to the Primary Care Network Head Office in Red Deer, Alberta to interview the 4 mental health professionals, as this was convenient for participants. The remaining Resiliency Coach interviews were part of Phase I of data collection, completed in April 2015; while Phase II of data collection – interviews with the mental health professionals – was completed in one week during the month of June 2015.

Phase III of data collection was a return visit with Resiliency Coaches (6 out of 10 were available) conducted by the researcher by telephone, for the convenience of participants. These interviews were completed in one week during the month of January 2016. Interviews conducted in June 2015 and January 2016 (Phase II and Phase III) were digitally recorded and transcribed by the researcher/interviewer (DMH), and comparison of audio recordings and transcripts were reviewed for accuracy (DMH & SMH) before analysis. The researcher also wrote detailed notes during and after each interview. Further, coding and refining concepts took approximately one month to complete per Phase for a total of 3 months.

It was made clear to all participants that they could withdraw consent to be interviewed at any time during and after the data collection process (pre-publication), and would be provided a copy of all publications that were the result of their shared experience.

Observation

Another facet of data collection involved immersing the researcher within the SBIRT processes to observe and attempt to take the view of the Resiliency Coach. Screening, facilitation of the Brief Intervention, and instruction during OVK lessons was observed and the experience was detailed

in extensive note-taking. Maintaining the privacy of students, more specialized counseling through the Referral to Treatment process was not observed.

7.3.3 Data Analysis

Content Analysis

Through the process of conventional content analysis, coding began with a general approach to the data in which as many recurrent ideas and details were observed and noted (Table 7.1). These broad ideas began with responses from the first few Resiliency Coaches interviewed, progressing toward more focused coding with the remaining interviews until a select set of content was observed to be central to the dataset as a whole. We developed our coding systems individually and through team discussions.

TABLE 7.1 SAMPLE OF TRANSCRIPT FROM SEMI-STRUCTURED INTERVIEWS FROM RESILIENCY COACHES AND INITIAL BROAD IDEAS

	Initial Broad Ideas
DMH: They would be offered the intervention – how did you normally notify the parents? **X: Um, with a phone call…um so, we had to talk with the parents before we could get permission from the student. So, we would phone home, explain the program and then let them know we would be sending home a consent form with their child.** DMH: Ok. And did you find any challenges with that? **X: Uh, yeah there were some um…getting a hold of parents sometimes with a phone call, with phones being disconnected um… or not returning phone calls was kind of a big one. So that, or you would make a phone call and it would be phone tag, those sorts of things. That was the biggest thing um…with kind of contacting them.**	• Parental consent before student assent • Reaching parents via phone problematic • Wording of informed consent • Letter home, alarming because of wording (informed consent) • Parental concern • Supporting parents to understand program/content • Not returning consent forms • Family dynamic conflicts with consent and student participation • Student already receiving support elsewhere

	Initial Broad Ideas
DMH: Ok, did you find some of the students…some of the parents may not have been too keen on having their child participate in this program? **X: Um…some weren't…I think the biggest thing was um… in the wording – so when we would call home we would sort of explain everything and so the phone calls seemed, for the most part to go pretty good, but then when the parents would get the letter home and the letter would state, like your child is at risk** DMH: Right **X: …of having a mental health disorder, or whatever…um, that freaked a lot of the parents out. And sometimes we would get phone calls of parents asking…** DMH: Right **X: …well what do you mean, we had to kind of re-explain it and um…we didn't…we didn't have many that outright refused. Like, we did have a few, but more it was like they would say yes, or they would think about it and then forms just wouldn't come back in.** DMH: Ok. And for the ones that did, you know, say outright no, did you know what the reasons were? **X: Ummmm…I had one or a couple that were a split family where one parent agreed, but the other one wouldn't or some would say their child was already being supported…** DMH: Ok **X: But, most didn't outright refuse, it was more they didn't, they just didn't send the consents back.**	• No outright refusal to provide consent for student participation

Memo Writing

Memo-writing is an integral component of observation techniques, and through the pragmatic lens of mixed methods design, and flexibility of this approach, the use of various sources enhanced our data. Memos were meticulously taken during and immediately after interviews reflecting what the researcher discovered from each participant. These memos included impressions and reactions of the interviewer to participant experiences while facilitating the EMPATHY protocol. Conceptual

memos were also produced reflecting thoughts about the codes as well as thoughts on processes and their variation for practical knowledge translation.

7.4 Results

7.4.1 Resiliency Coach Perspective on SBIRT through the EMPATHY Program

The first part of the interview was exploring the procedures for the school-based SBIRT at hand. Through coding transcripts and field notes, responses were grouped under the categories Screening, Brief Intervention, or Referral to Treatment with central themes detailed below and summarized in Table 7.2.

7.4.1.1 Screening

a) Implementation

Coaches found screening using dedicated tablets to be easy to implement for students in both Middle and High School (Grades 6 – 12). Generally, screening occurred during one 50-minute class period in either a classroom or gymnasium of the school. The PhD Candidate had the opportunity to shadow screening in both settings. Observations were that classroom screening can be challenging in terms of confidentiality depending on the set up of the classroom. This particular classroom had two to three students seated in desks grouped together. It was observed that some students were communicating with one another discretely during the screening period; however, screening in the gymnasium provided ample room for students to have adequate privacy while

inputting responses. In both settings, there were 2 support staff in addition to the Resiliency Coach to provide assistance with technical issues or questions regarding comprehension.

b) E-Screening

There is a pronounced shift away from paper or in-person screening towards using technology; however, there is limited evidence of the feasibility of e-screening within SBIRT (Knight et al., 2007). Through the EMPATHY protocol, coaches found the use of e-screening with dedicated tablets to be easy to use, with minimal technological glitches related to accessing the screening app, and uploading responses to a secure server. In addition, coaches reported that few students had issues navigating responses on the tablet; and those few that did tended to be in early Middle School (i.e. Grade 6).

c) Participation

The first component of SBIRT is universal screening, and since this was approved by Red Deer Public School Board as part of their Resiliency Training initiative, parental consent was not required. Generally, all students were eager to participate in the screening process; however a few students in Middle School (Grades 6 – 8) refused to participate. This was reported by two coaches who indicated students' reasons for refusing to participate were directly related to family dynamics (i.e. privacy, dysfunction). Coaches who facilitated in Year 1 of the program indicated some students were unaware of parental involvement if they were classified in the Top 10%. This was an issue in Year 2 of the program and these Coaches felt students may not have been completely truthful in order avoid parental involvement.

7.4.1.2 Brief Intervention

a) Engagement

For those students scoring an EMPATHY score in the Top 10% of their grade per school (detailed in the EMPATHY Protocol in Chapter 4), the Web-based CBT intervention "This Way Up" was offered and required both parental consent and student assent for participation. Coaches indicated that a significant barrier to receiving consent from parents is fear of student disclosure or exposure of family dynamics, followed by not wanting the student to miss class. Additionally, the fear of stigma, not being informed enough about the EMPATHY program, and the language used in the informed consent (i.e. "Risks to participation include discovering your child may have a mental illness") were also observed to be important barriers to engagement. Further, some students who did not provide assent were those who participated in "This Way Up" the year before and were reluctant to participate in the intervention the following year since content of the program remained the same.

b) E-Technology

Among the coaches interviewed, the unified impression of a Web-based therapeutic program, like "This Way Up", as a mental health intervention to reduce symptoms of depression and anxiety, and subsequently reduce substance misuse, was effective as a non-verbal way to begin the conversation regarding risk behaviours. Although this Web-based intervention as a technology was efficient and without concerns during its use, from their experience in the EMPATHY program, Resiliency Coaches found it unlikely to be effective as a stand-alone program promoting mental wellness behaviours. Coaches unanimously indicated that human connection and building a relationship with students is a critical feature that cannot be replaced with technology.

c) Content

In response to informal student feedback as well as their own impressions while participating in "This Way Up", Resiliency Coaches found the content to be informative and directly related to everyday life. The program consisted of 6 CBT modules or lessons which focus on taking a healthy perspective on life events, such as parental divorce, conflict with friends and family members, and failing an exam. Although this intervention was consistently viewed as an effective tool to open communication with students who may be experiencing mental health challenges, barriers related to content included Australian language (i.e. footie ball), use of a Space Martian to narrate, and comic/cartoon format. It was also identified that the existing format may be suitable for students in Middle School (Grades 6 – 8); however, a more mature intervention with real people in real-life scenarios would have been more accepted by students in High School (Grades 9 – 12).

d) External Support

Beyond the actual Web-based modules of the intervention, Resiliency Coaches reported the most significant factor ensuring student engagement and commitment to the program was therapeutic alliance. Therapeutic alliance centers on empathy, unconditional positive regard, and active listening without judgment, and is a concept that is challenging to describe in detail, and has yet to be quantified through a series of steps (Miller & Rose, 2009; Rubak et al., 2005). In fact, some students would assent to participate in the intervention, refuse to complete modules during their session, and opt for one-on- one time with the coach. Seeking additional support and guidance from coaches also occurred outside of the intervention setting (usually during one class period, or "Flex" time – spare period), creating an environment for co-interventions which is expected in a community-based setting. Further, aside from needing parental support to help encourage students to change their risk behaviour through this intervention program, buy-in from school teachers is

also required since students may be removed from class to complete their modules. Teacher concern is warranted in this area; it has been reported their concern is related to curriculum minutes which are lost for students who may already be struggling academically.

7.4.1.3 Referral to Treatment

a) Continuity of Care

Referrals for students who exhibited suicidal ideation (i.e. thoughts, self-harming, attempts) occurred throughout the intervention during the school year. These referrals were based on the severity of the situation: students exhibiting imminent risk of harming themselves were referred to Addiction & Mental Health (AMH) for acute care, including the possibility of inpatient treatment; while students displaying thoughts of suicidality, but with no immediate plan, or imminent risk of attempting, were referred to the Primary Care Network (PCN) for less intense care. Discrepancies in continuity of care from the EMPATHY intervention program to acute treatment were found to be related to referral wait times for students sent to less intense support, and some Resiliency Coaches found that their education and experience allowed them to provide this additional support considering their already formed therapeutic alliance. The connection with the PCN seemed to be strained for some Resiliency Coaches at the start of the EMPATHY program (Year 1), and this may be attributed to systemic challenges, such as case load of each mental health support staff. Indeed, the PCN generally caters to individuals over the age of 18, and it may have been challenging to accommodate youth. This presents a significant gap in services for youth requiring treatment for mild to moderate mental health issues who are under 18 years of age. In addition, some Resiliency Coaches struggled with their singular role to provide parents with the contact

information for referrals and to leave continued care in their hands. Low parental involvement and support may be the most significant factor breaking the fluidity of continuity of care. It was reported by all coaches that making contact with parents was the most difficult component of the intervention, and the lack of parental buy-in ultimately hindered the progress of the student. Barriers to parental buy-in were identified as stigma associated with mental health challenges; not identifying student need for external support; fear of exposure; transgenerational distrust of government initiatives; cultural diversity; and inconsistent transportation to access referral services.

7.4.1.4 School-based SBIRT as an integrated approach

Overall, Resiliency Coaches found SBIRT delivered through the EMPATHY program to be a beneficial prevention and early intervention program for youth that has the potential to enhance coping and resiliency skills, while reducing mental health stigma. However, in order to provide seamless and efficient care, qualified staff and support from parents and teachers is imperative for success. Noteworthy, through feedback from Resiliency Coaches as well as researcher observation, all members facilitating the program within the schools involved in the program displayed empathy toward students, as well as in conversation about students. Empathy as well as the ability to build therapeutic alliance may have created an environment that allowed students to participate in the SBIRT components with ease. As mentioned previously, therapeutic alliance appears to be a recurrent theme found in literature reviewed to examine existing substance use treatment programs for adults, and is also evident as an important component of the EMPATHY program.

TABLE 7.2. RESILIENCY COACH PERSPECTIVE ON IMPLEMENTING SBIRT

Screening	**Challenges**	**No Challenges**
• Implementation	• Confidentiality (classroom vs gymnasium)	• Screening took about 20 minutes (including instructions and retrieving tables)
• E-Screening	• In Year 2, uploading of student responses to secure server took longer	• Easy to use for most students • Minimal glitches to App • Automatic uploading to server
• Participation	• Concerns from a few students about parental involvement with positive screen (reason for refusing to participate)	
Brief Intervention		
• Engagement	• Participation in BI required parental consent • Missing class time • Same content 2 years in a row	
• E-Technology	• May not be effective without the relationship built between students and coaches	• Non-verbal way to open communication about risk behaviour
• Content	• Cultural content not applicable to students (Australian terminology) • Comic/cartoon format • More mature approach may have been more accepted by High School Students	• Informative • Transferable to student life
• External Support	• Seeking support from coaches, but not following through on BI – the need to ensure the health of students, but moving away from protocol	• Therapeutic alliance between coach and students

Referral to Treatment	Challenges	No Challenges
• Continuity of Care	• Wait times for students with mild to moderate symptoms • Case load of members of referral services • Gap in services for youth under 18 years of age with mild to moderate symptoms • Follow-up of referrals in the hands of parents – low parental involvement allowed some adolescents to fall between the cracks	

7.4.2 Referral Services (PCN/AMH) Perspective on SBIRT through EMPATHY Program

The first part of the interview with mental health support staff was exploring the procedures for the school-based SBIRT at hand, specifically their role in the Referral to Treatment component. Through coding transcripts and field notes, responses were grouped under categories applicable to referral services, such as assessments, external support, use of e-technology, and offering temporary support. The results are summarized in Table 7.3.

7.4.2.1 Specialized Mental Health Services

a) Informal assessments

Once students are referred to specialized treatment, either to the PCN for mild-moderate symptomology, or AMH for more intense treatment, mental health support staff begin their own risk assessment. This often occurs informally using clinical impressions or judgment, and topics explored include: past history of mental health concerns, family history and dynamic, extracurricular activities, bullying, and academics. This component of the referral protocol varies based on counsellor techniques and therapeutic style. Once risk is assessed, parents are often

included in the discussion of goals, also allowing for an informal evaluation of the parent-child dynamic. Students who are at risk of acting on suicidal ideation are invited to create a safety plan and sign a contract agreeing to the terms of staying safe for the time being. This component of the referral protocol is consistent across all support staff. Counselling approach and therapeutic techniques are highly personalized and challenging to generalize into a protocol beyond the risk assessment phase of treatment.

b) Parental support

As with the coaches facilitating the EMPATHY program, external mental health staff depend on parental support in order to follow through with referrals for treatment. Outside of the EMPATHY program, the PCN provides services for individuals 18 years of age or older and requiring consent from parents was viewed as a significant barrier to treatment; however, it was reported that parents were eager to assist in most cases. In a few cases, parents simply did not attend scheduled meetings with a counsellor and, although reasons for this remain unknown, we may speculate similar reasons identified by coaches (i.e. distrust, fear of exposure, minimizing severity, parental psychopathology).

c) E-technology

None of the mental health support staff had accessed the Web-intervention, "This Way Up". Despite this, some received feedback from students regarding their perspective on the program. Those working with students in Grades 8 – 12 were told the intervention did not contain mature content and appeared "silly"; however, students in Grades 6 – 7 seemed to find the content appropriate. From a theoretical standpoint, the counsellors described any form of online-web-based intervention as an adjunct to in-person therapy, and also indicated that it may benefit some more than others depending on individual learning styles.

d) Temporary support

Unlike the PCN, AMH services are for children and youth of all ages, but is generally suitable for those in imminent risk of self-injurious behaviour, or those with moderate to severe mental health concerns. The EMPATHY program operated for the entire school year; however, some students would continue to need consistent support over the summer months. Counsellors from the PCN indicated their role may end along with the school year and, if necessary, continue for a few sessions (3 to 4) over the summer. Unfortunately, funding for the EMPATHY program was terminated in June 2015 by the Provincial Government, and the role of the PCN in this program ended as well. Although students were directed to services available within the community if needed, this temporary care model is not ideal when viewing the potential loss of therapeutic relationships built between students and their counsellors. In contrast to this, students referred to AMH would continue to receive support services indefinitely; however, only for students with moderate to severe symptomology. This may be due to current case load, or because the PCN caters to individuals over the age of 18. In any case, all mental health support staff indicated the need for a dedicated team, similar to the Police and Crisis Team, within each school for consistent support. The question remains if the PCN is not equipped to work with children and youth, and AMH caters to those with moderate to severe risk factors, who will provide proactive support services for those experiencing mild to moderate symptoms?

7.4.2.2 School-based SBIRT as an integrated approach

From a theoretical perspective, the mental health support staff associated with the EMPATHY

program view SBIRT as potentially effective at identifying youth when symptoms of risk behaviour begin to appear, and may be a proactive approach preventing the onset of more severe symptoms or consequences. For it to be comprehensive within the school setting; however, the inclusion of a support team equipped to deal with all levels of severity of risk behaviour may ensure longevity, efficiency, and accuracy of this approach.

TABLE 7.3. MENTAL HEALTH PROFESSIONAL PERSPECTIVE ON FACILITATING REFERRAL TO TREATMENT WITHIN SCHOOL-BASED SBIRT

	Challenges	**No Challenges**
Referral to Treatment		
• **Informal Assessments**	• Approach to dealing with students once referred varies • Difficult to standardize into a protocol	• Based on the individual needs of the adolescent
• **Parental Support**	• PCN, outside of EMPATHY caters to 18+ • Parental consent barrier to treatment	• Most parents follow through with appointments
• **E-Technology**	• Students in Grades 8 – 12 found online intervention format to be silly	• Online programs may be effective based on learning style
• **Temporary Support**	• Primary Care Network referrals in place until the end of the school year	• Addiction & Mental Health Services could continue temporarily over summer months

7.5 Discussion

This study suggests that incorporating Screening, Brief Intervention, and Referral to Treatment within the school setting may be a feasible component of routine mental health care through our education system. The most prominent barrier across all coaches and mental health support staff is parental involvement and consent. Parental consent is crucial from an ethical standpoint within this research study; however, school counselling and support is available to students without parental involvement. In the event the recommendation to house a dedicated support team within each school is applied, the need for parental consent for mental health care may be eliminated. Current barriers to care include fear of exposure through student disclosure; denying challenges exist; and not wanting students to miss out on curriculum hours. Significant barriers to engagement for students, as second-hand information from coaches, include feelings of being different than peers; and having to participate in the same intervention as the year before.

An interesting finding from this qualitative research study is the need for flexible formatting for the intervention. This would mean students in early Middle School would receive an intervention that would increase in maturity, and possibly intensity, through subsequent years leading to the end of High School. This stepped approach may enhance online/web-based programming and may allow students to remain engaged and interested in new modules applicable to their developmental stage.

This study also suggests the need for specialized treatment programs catering to children and youth under the age of 18, but who are experiencing mild to moderate symptoms of mental health

challenges. Currently, the PCN provides mental health support to those over the age of 18 who have mild to moderate symptomology; and AMH caters to children and youth with severe mental health challenges. This illustrates a significant systemic gap in which proactive prevention and early intervention programs are needed, but can only work in conjunction with bridged continued care services within the community.

Of interest is the reason why coaches may not have followed the EMPATHY protocol. It was detailed by almost all coaches that students would agree to participate in the brief intervention only to have one on one time with the coach. This underscores the importance of relationships built through therapeutic alliance. As mentioned previously, therapeutic alliance is a recurrent theme found in the review of literature on adult treatment of alcohol use disorder, and found within the EMPATHY program. Could this be a critical feature that is needed for effective implementation of SBIRT in primary care clinics? Are we overly focused on the content when we should be examining the context of successful programs? These are important questions that need to be addressed in future studies.

7.5.1 Quality of the Study

During data collection, interviews in Phase II and III were digitally recorded. Phase I entailed informal discussions paired with research observations that were not digitally recorded; however, based on the mixed methods research design, data collection should come from a variety of sources and findings from Phase I were included and revisited in Phase III of the study. All interviews were transcribed (DMH), and checked for accuracy with recordings (DMH, SMH). In addition,

researcher/interviewer attention to detail during and after each interview is documented through case notes which allowed current ideas and thoughts to be logged for comparison between facilitator responses. Immediate reflection on the accounts given by each facilitator enhanced data analysis and provided a path for continued data collection. Further, if clarification of content was needed, or if participants needed to be re-interviewed, the researcher was able to contact these individuals after their initial interview. Coding processes occurred individually at the start of analysis, followed by as a team to identify any discrepancies until they were resolved.

Quality has also been ensured during data analysis through careful tracking of all records kept. Analysis of content not only provided a description of potential obstacles preventing widespread implementation of school-based SBIRT, but also provided key points that, if incorporated, could produce an effective model for the future.

7.5.2 Limitations

There are potential limitations to this study. Although each EMPATHY coach was invited to participate in an interview, not all accepted the opportunity. In addition, coaches were from varying backgrounds (i.e. music teacher, addictions counsellor, school counsellor) who received training specific to the EMPATHY program; however, level and type of experience in the mental health field differed and may contribute to their perspective on the program. This is also true of mental health support teams from the PCN and AMH: two members of the PCN had over 10 years of experience working with individuals over the age of 18; and one was a provisional counsellor and this was their first experience working with the community. One member of AMH services was

part of the EMPATHY program and carried over 20 years of experience working with children and youth with moderate to severe risk behaviours. Because of the diversity in support staff and varying levels of education and experience, the findings reported may not be generalizable to future coaches facilitating the EMPATHY program, or members of the PCN and AMH overall. In addition, one on one interviews with students and parents regarding their participation, or choice not to participate in this SBIRT program was planned, but was not undertaken since funding was terminated by the Provincial Government in June 2015. Feedback from students and parents would have provided important insight into barriers associated with the school-based SBIRT model. Future qualitative studies may benefit from this additional component of research to better understand parent perspective on school based mental health prevention and early intervention programming, as well as student perspective with increasing sophistication by grade.

In addition to this basic summary, it has been suggested that qualitative research studies can be assessed based on eight dimensions of quality (Tracy, 2010). Each dimension, and subsequent reference to the present study (both strengths and limitations), is detailed in Table 7.4.

TABLE 7.4 QUALITY OF QUALITATIVE INQUIRY INTO FACILITATOR PERSPECTIVE ON SCHOOL-BASED SBIRT

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	**Application to Qualitative Inquiry into EMPATHY Facilitation (Resiliency Coaches & Mental Health Specialists)**
1. Worthy Topic	• First-ever qualitative inquiry into perspective of facilitators of school-based SBIRT, including Referral to Treatment • Relevant and timely – there is a need to reduce the onset of substance use disorders; more information is needed about SBIRT processes to make an evidence-based recommendation • Provides insight into the capabilities of non-specialist mental health workers when implementing school-based SBIRT • Provided insight into the importance of therapeutic alliance between facilitator and student • Identified a significant gap in treatment services for youth under the age of 18 with mild to moderate symptomology
2. Rich Rigor	• Sampling of appropriate individuals to reach the goal of understanding more about SBIRT processes (facilitation of all 3 components: Screening, Brief Intervention, and Referral to Treatment) • Not all Resiliency Coaches participated – there may have been a differing perspective than that summarized in this study • Saturation within the sample was observed and no new information was identified during the return visit • Semi-structured interviews were used to ask specific questions about SBIRT processes; participants were encouraged to identify other areas they felt were important, and to elaborate as needed • Ensuring rigor, the reader is provided with a sample of raw data, coding rubric, and overall themes developed, allowing for transparency of the analysis process
3. Sincerity	• In order to be authentic and genuine, the PhD Candidate has produced a description of worldview, indicating the use of the pragmatic lens as focusing on answers to "real-world" problems • Through the format of the thesis, the PhD Candidate walks the reader through the discovery of SBIRT through extensive research on substance use disorders, and the reader is made

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	Application to Qualitative Inquiry into EMPATHY Facilitation (Resiliency Coaches & Mental Health Specialists)
	aware of significant background knowledge in the area prior to conducting this qualitative inquiry • In addition, the PhD Candidate has detailed limitations to the study and areas needing further investigation • One of the major disadvantages detailed by the PhD Candidate is the termination of funding for the EMPATHY program prior to the collection of data from planned research activities
4. Credibility	• As much as possible, credibility is achieved through displays of thick description, and triangulation • Thick description is best shown, rather than described and detailed quotes are presented to the reader • Triangulation occurred between feedback from Resiliency Coaches and Mental Health Specialists; however, credibility could have been enhanced further through interviews with students, parents, and teachers • A further step in the future could focus on crystallization through collecting data from a variety of sources, from multiple researchers, and various theoretical lenses
5. Resonance	• This qualitative inquiry provides insight into the challenges and successes of implementing a school-based intervention. This information may allow for transferability to other settings, populations, or circumstances working with the same age group, or focusing on substance misuse prevention • Sharing of perspectives may allow for naturalistic generalization in which, through the detailed representation of findings, the reader is able to come to their own conclusions through their own understanding of SBIRT processes
6. Significant Contribution	• This qualitative inquiry extends knowledge into the processes of SBIRT specific to the school-based setting, filling a prominent gap in current literature • Understanding the challenges and successes identified in the EMPATHY program may improve future program planning and practice • This inquiry provides potential direction for future studies which may generate ongoing research in the area of SBIRT and youth prevention and early intervention programs

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	Application to Qualitative Inquiry into EMPATHY Facilitation (Resiliency Coaches & Mental Health Specialists)
	• Theoretical significance – a shift from the content of the program to context is significant; is our focus on content misplaced? • Heuristic and practical significance – this inquiry may influence researchers, policymakers, and program developers in the future as the information provided sheds light on the challenges and successes of school-based SBIRT. This information is readily accessible and understandable to lay public • Methodological significance – overall, the thesis implements an advanced mixed-methods design (intervention) incorporating both quantitative and qualitative findings. Health research often focuses on empirical findings; however, the incorporation of participant feedback has created a richer view of SBIRT and the potential impact on adolescent substance misuse
7. Ethical	• Procedural Ethics – this qualitative inquiry was approved by the University of Alberta Research Ethics Board. All responses were kept anonymous to maintain the privacy and confidentiality of each participant. Participants were aware the data collected was for use in a research study examining SBIRT processes and participation was voluntary • Situational Ethics – the ends justified the means in terms of how and what types of data were collected; however, maintaining the privacy of students experiencing referral services was more important than observing the process • Relational Ethics– each member of the EMPATHY program interviewed was treated with respect. The PhD Candidate ensured each individual was aware of their significant contribution and importance to the success study, allowing for connectedness between researcher and researched • Exiting Ethics – the research is presented in an appropriate, providing knowledge to the reader on the processes on SBIRT, while clearly identifying strengths and limitations. This is done in the hopes of minimizing potential consequences that may arise from reader interpretation
8. Meaningful Coherence	• The current inquiry achieved its stated purpose – to identify the challenges and successes of SBIRT when implemented within the school setting, as compared to primary care clinics

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	Application to Qualitative Inquiry into EMPATHY Facilitation (Resiliency Coaches & Mental Health Specialists)
	• The use of open ended questions in a semi-structured interview format fits with the flexibility of the mixed methods paradigm, and the pragmatic worldview • Research question and findings are interconnected

7.6 Conclusion

Minimal barriers to engagement in mental health screening was found to be present; however, accessing appropriate acute or intense treatment programs in a timely manner, and receiving parental consent for intervention activities were found to be the most challenging components of SBIRT from facilitator perspective. Overall the school-based program, EMPATHY, incorporated non-specialist mental health care workers who, through empathy and development of a therapeutic alliance, minimized facilitation barriers with participants of the program. This is the first ever qualitative inquiry into the perspective of those facilitating a school-based SBIRT and the findings, although different from previous reports in primary care, provide insight into the importance of human connection, or therapeutic alliance, when addressing mental health issues, such as substance misuse. This finding alone has future implications, and may result in a different approach to the SBIRT model, regardless of the program setting.

Chapter 8: Qualitative findings from the EMPATHY program regarding Favorite Skills Learned by Students in Grades 6 – 8

8.1 Abstract:

Despite a decrease in youth substance use observed in recent Canadian statistics, drug use during adolescence continues to be concerning. Some evidence suggests that early substance use may increase the risk of delays in both social and academic capacities. Screening, Brief Intervention, and Referral to Treatment (SBIRT) is a comprehensive 3-tiered prevention and early intervention program that may delay, if not prevent, substance misuse in youth. Currently, evidence of the effectiveness of SBIRT in youth populations is sparse. In addition, symptoms of depression and anxiety often co-occur with substance misuse, and universal programs enhancing youth resiliency have produced mixed results. Here we provide results from a qualitative inquiry into the view on universal Resiliency Lessons experienced by students in Grades 6 – 8 who were part of the larger SBIRT program, known as EMPATHY.

This study was part of a larger school-based intervention program (Empowering a Multimodal Pathway toward Healthy Youth, EMPATHY), whose primary goal is to reduce depression and suicidal thinking. Qualitative data on student perspective on Op Volle Kracht (OVK) Resiliency Lessons was collected through anonymous responses, reported via electronic tablet. Out of the larger EMPATHY study population, 157 students in Grade 6; 118 students in Grade 7; and 94 students in Grade 8 participated in this qualitative study. Through the mixed methods intervention design, the use of summative content analysis and coding identified 4 main themes.

Students across all Grades found learning new skills to be the most favoured feature of Resiliency Lessons, specifically learning how to "bounce-back" from difficult situations, followed by stress relief and relaxation techniques. Students in Grade 8 seemed to favor incentives much more than their younger peers while the need for an interactive program decreased as age increased. Although some students expressed disinterest in the program, their reasons were not reported in detail beyond finding the content boring, neutral, or leaving no response.

This is the first ever qualitative inquiry into the perspective of students participating in OVK Resiliency Lessons. Overall, skills training was the most valued feature, underscoring the importance of teaching students ways of dealing with challenging situations. Interaction with the Resiliency Coach was also valued, reinforcing the role of relationship building, or therapeutic alliance, during the EMPATHY program. Further inquiry into specific content students may have found boring, or other areas of dislike, would be beneficial for future program development, as well as responses from a larger sample of students

8.2 Introduction

Although there is evidence of declining rates of substance use by youth, use of drugs by this age group continues to be concerning (Canadian Center on Substance Abuse, 2014). Currently, youth between 15 and 24 years of age exhibit the highest risk through increased rates of substance misuse than any other age group (Canadian Center on Substance Abuse, 2014; Leatherdale et al., 2008; Patton et al., 2014). Despite the reported decline in use, including alcohol, any use of drugs may increase the likelihood of consequences to the developing brain, negatively impacting impulse

control, motivation, and cognition (Carney & Myers, 2012; Curtis et al., 2014; Levy & Williams, 2016; Squeglia et al., 2009). Substance use in adolescence also increases the risk of mental health problems, such as depression, suicidality, overall morbidity, and mortality (Diego et al., 2003; Mitchell et al., 2016). Substance use statistics in Canada have suggested approximately 25% of youth around 12 – 13 years of age (Grade 7) use alcohol, and just under 13% consume 5 or more drinks during one occasion (known as binge drinking) (Elgar & Pickett, 2012; Miller et al. 2007). These rates are observed to increase with age, subsequently increasing the risk of morbidity and mortality (Elgar & Pickett, 2012). In fact, Canadian statistics also show that 86% of Grade 12 students engage in alcohol use, with over 68% having experienced binge drinking (Elgar & Pickett, 2012). Further, by Grade 12 approximately 50% of students have tried an illicit substance (Elgar & Pickett, 2012). These findings alone suggest that youth substance use, even with declining rates, continues to be an area of concern in need of early prevention and intervention strategies.

Here we describe student feedback on the universal prevention program *Op Volle Kracht (OVK*) for symptoms of depression. This component of the program is contained within a larger school-based SBIRT program (EMPATHY), in which we aimed to examine the effectiveness of SBIRT on youth mental health outcomes, as research delineating evidence-based approaches is sparse. Previously we have published baseline data that show the large number of students that use drugs and alcohol (Hamza et al., submitted; Silverstone et al., 2015).

8.3 Methods

The Materials and Methods for the EMPATHY study have been described in detail in Chapter 4.

8.3.1 Study Design

For insight into the perspective of students in Grades 6 – 8 who experienced the OVK program, we used a mixed methods design to assess changes in CRAFFT substance use scores (presented earlier), as well as qualitative inquiry into social processes surrounding the OVK component of the EMPATHY program which may also provide insight into observed changes in CRAFFT scores. We have a clear understanding of the need for early prevention strategies targeting symptoms of mental health issues, such as depression, suicidality, anxiety, and substance use; however, little is known about the opinions and responses of youth who engage in programs designed for them. As the EMPATHY program unfolded in Year 1 (January/February 2014), it became clear that responses from students may be invaluable to aid in the creation of appealing and useful programs in the future. This focus on youth feedback was the second stage of our qualitative inquiry following Resiliency Coach and mental health counselor/therapist perspective on SBIRT facilitation.

Since we found it important to understand student perspective on the positive and negative aspects of the 16 lesson OVK program, including possible interactions between people guiding this process, the most appropriate method was to provide students with a semi-structured approach to share their thoughts. Our study begins with a predetermined open-ended question posed to students

in the hopes of understanding potential positive and negative attributes of the OVK program, rather than focusing solely on symptom outcomes. There is evidence suggesting treatment satisfaction may play a significant role on positive outcomes, and this was discovered during literature reviews detailed in Chapters 1 and 2.

The question posed to students:

- What did you like about Resiliency Lessons?

8.3.2 Data Collection

Initial Sampling

Our main purpose for examining the perceptions of students who experienced OVK was to produce a summary of the aspects of the program that are appealing, as well as those that may pose challenges because of lack of interest, or dislike. Data collection began with a sampling strategy where we invited students in Grades 6 – 8 who experienced OVK lessons to provide feedback on what they liked about the program. Although our goal was to progress toward more in-depth interviews, funding for the EMPATHY program was terminated in June 2015, before we were able to move into this phase of our qualitative inquiry. Had funding continued, we had planned to invite students who had high risk scores for substance misuse to provide feedback on their experiences with OVK lessons. Further, another planned phase of inquiry included interviewing students who had experienced these lessons in both Year 1 and 2 to see if their perspective differed from those who engaged in the program in one year only. This would be a starting point in which the outcomes of our interviews would guide further inquiry, possibly interviewing parents and teachers to see if

they noticed a difference in resiliency factors (i.e. relaxation, problem-solving skills, assertiveness, and self-efficacy).

Open, Semi-Structured Question

Students in Grades 6 – 8 were invited to provide feedback on OVK lessons anonymously, and through the use of an electronic tablet. Participation was voluntary. No personal information was collected; however, each response was paired with the student's Grade. We wanted to determine if the lessons were preferred more by one age group, and if the factors of interest differed with increasing age. Resiliency Coaches, just as they had facilitated the screening process of the larger EMPATHY program, handed out electronic tablets to each student during one 50-minute class period. Most responses were completed with tablets handed back to coaches within 20 minutes. Responses were collected a few months prior to 15-month follow-up of the EMPATHY study in April/May 2015. The data was uploaded from the tablets to a secure server and the researcher (DMH) received the data shortly thereafter via Excel spreadsheet. A small sample size is noted in comparison to the overall number of students in the EMPATHY program per Grade. Classes who had completed all other SBIRT activities in the larger program were given the opportunity to provide feedback first. As mentioned, funding was terminated before further responses could be collected.

8.3.3 Analysis

Content Analysis

The analysis strategy focused on both summative content analysis and interpretation in which as many ideas and details were noted and initially coded. These broad ideas began with a brief

examination of the first few responses from students from each Grade (Table 8.1). This analysis progressed toward more focused coding with remaining responses until a select set of content was observed to be central to student responses as a whole. We developed our coding systems individually and through team discussions to ensure internal validity of inter-rater procedures. Any discrepancies were discussed until a consensus was reached.

TABLE 8.1. SAMPLE RESPONSES FROM STUDENTS IN GRADE 6 -8 WHO EXPERIENCED OVK LESSONS AND INITIAL CODING PROCESS

Sample Response to: "What did you like about Resiliency Lessons?"	**Initial Broad Coding**
Grade 6: "I learned different things so I can stand up for myself when I get bullied or something like that. I also liked the brain games when you are scared of like a test coming up or a field trip […]. I also like the mind-traps […] and muscle relaxation"	• Learning new things • Confidence/self-efficacy • Self-awareness • Interactive games/activities • Resiliency to challenges • Thinking through problems • Stress/relaxation skills
Grade 7: "I like how we talked about a bunch of different situations to use resiliency. And we also talked about […] strategies […] and how one negative thought decides how everything after that plays out"	• Discussions • Applicable situations/Real-life • Strategies/skills • Examples • Resiliency defined • Thoughts to behaviours • Self-awareness
Grade 8: "How to bounce back from bad situations and how to change my mood and thoughts on the spot. I learned not to get stuck in a fixed mind set or a mind trap, that events turn into thoughts that turn into feeling that turn into actions"	• Bounce-back/resilience • Dealing with challenges • Modifying mood/feelings • Self-awareness • Mind-traps/cognitive schemas • Sequence: thoughts, feelings, behaviours • Skills/strategies

Through broad coding followed by focused coding, we were able to identify four prominent categories in which to organize our detailed findings on student perspective on participating in OVK lessons. These four categories are: engaging, skills training, incentives, and overall disinterest. Under each category, the researchers (DMH, SMH) highlighted factors consistently found in the content of student responses (Table 8.2).

TABLE 8.2. CATEGORIES DEVELOPED FROM FOCUSED CODING OF STUDENT RESPONSES ABOUT OVK LESSONS (GRADES 6 – 8)

Focused Categories	**Coding Rubric of Responses**
Engaging	• Fun/Interactive • Activities/Games • Videos • Stories
Skills Training	• Self-talk • Resiliency/ "Bouncing Back" • Family/Peer Conflict • Stress Relief/Relaxation • Mind Traps
Incentives	• Candy • No Class/Test • Socialization • Resiliency Coach
Disinterest	• Boring • Workbooks • Mandatory • Offensive • Neutral • Blank

8.4 Results

8.4.1 Grade 6

The overall EMPATHY study population of Grade 6 (mean age 11.3 year) students varied from 711 students at the beginning of Year 2 of the program (September/October 2014, Assessment #3), to 719 students at the end of Year 2 of the program (May/June 2015, Assessment #4). Of this population, 157 Grade 6 students provided feedback on the OVK lessons.

For the category of engaging, 43.9% of Grade 6 students found the content, specifically the games and activities to practice newly learned skills, to be fun and interactive (Table 8.3). A larger group of students (59.2%) commented on the skills training received during lessons, with learning how to "bounce-back" as the most favored feature, followed by stress relief and relaxation techniques (Table 8.3). Surprisingly, a small percentage of students (6.4%) reported incentives as being what they liked most about OVK (Table 8.3). The most prominent incentive to participate was their ability to interact with the Resiliency Coach (Table 8.3). A small percentage of students (8.3%) indicated disinterest with the program, often responding with "nothing" (38%) when posed the open question of what they liked about Resiliency Lessons (Table 8.3).

TABLE 8.3. RESPONSES FROM STUDENTS IN GRADES 6 (N=157) WHO PARTICIPATED IN OVK LESSONS BASED ON CODING RUBRIC

Focused Categories	**Coding Rubric of Responses**
Engaging (n=69, 43.9%)	• Fun/Interactive (30%) • Activities/Games (54%) • Videos (15%) • Stories (1%)
Skills Training (n=93, 59.2%)	• Self-talk (9%) • Resiliency/ "Bouncing Back" (30%) • Family/Peer Conflict (19%) • Stress Relief/Relaxation (25%) • Mind Traps (12%) • Generic "Skills" (5%)
Incentives (n=10, 6.4%)	• Candy (20%) • No Class/Test (20%) • Socialization (10%) • Resiliency Coach (50%)
Disinterest (n=13, 8.3%)	• Boring (7%) • "Nothing" (38%) • Content not applicable (8%)

Focused Categories	Coding Rubric of Responses
	• Workbooks (8%) • Mandatory (8%) • Offensive (8%) • Neutral (15%) • Blank (8%)

8.4.2 Grade 7

The overall EMPATHY study population of Grade 7 students (mean age 12.3 years) varied from 412 students at the beginning of Year 1 of the program (January/February 2014, Baseline), 433 students in Assessment #2 (May/June 2014), 712 in Assessment #3 (September /October 2014), and 700 students at the end of Year 2 of the program (May/June 2015, Assessment #4). Of this population, 115 Grade 7 students provided feedback on OVK lessons.

For the category of engaging, 32.2% of Grade 7 students found the content, specifically the games and activities to practice newly learned skills (60%) to be their most favoured aspect of the program (Table 8.4). Over three-quarters of students (76.3%) found the skills training received during lessons to be memorable, specifically learning how to relieve stress (37%) and "bouncing-back" (22%) (Table 8.4). A larger percentage of Grade 7 students (15.3%), than Grade 6 students, reported incentives as being what they liked most about OVK, specifically their ability to interact with the Resiliency Coach (56%), followed by not having the scheduled class, or delayed test-taking (33%) (Table 8.4). Some students indicated disinterest with the program (11.9%), often responding with "nothing" (29%), a neutral response (29%), or finding the lessons boring (28%) (Table 8.4).

TABLE 8.4. RESPONSES FROM STUDENTS IN GRADE 7 (N=118) WHO PARTICIPATED IN OVK LESSONS BASED ON CODING RUBRIC

Focused Categories	**Coding Rubric of Responses**
Engaging (n=38, 32.2%)	• Fun/Interactive (16%) • Activities/Games (60%) • Videos (19%) • Stories (5%)
Skills Training (n=90, 76.3%)	• Self-talk (7%) • Resiliency/ "Bouncing Back" (22%) • Family/Peer Conflict (14%) • Stress Relief/Relaxation (37%) • Mind Traps (11%) • Generic "Skills" (9%)
Incentives (n=18, 15.3%)	• Candy (11%) • No Class/Test (33%) • Socialization (0%) • Resiliency Coach (56%)
Disinterest (n=14, 11.9%)	• Boring (28%) • "Nothing" (29%) • Content not applicable (0%) • Workbooks (0%) • Mandatory (0%) • Offensive (7%) • Neutral (29%) • Blank (7%)

8.4.3 Grade 8

The overall EMPATHY study population of Grade 8 students (mean age 13.3 years) varied from 389 students at the beginning of Year 1 of the program (January/February 2014, Baseline), 428 students in Assessment #2 (May/June 2014), 632 in Assessment #3 (September /October 2014),

and 623 students at the end of Year 2 of the program (May/June 2015, Assessment #4). Of this population, 94 Grade 8 students provided feedback on OVK lessons.

Only 16% of students in Grade 8 found the content of lessons engaging, specifically the games and activities (67%) followed by overall fun experienced through the interactive nature of the program (33%) (Table 8.5). Despite this finding, responses indicate skills training to be the most valued by this age-group (93.6%), specifically learning how to relieve stress (23%), identifying and countering "mind-traps (23%), and learning how to bounce back from difficult situations (36%) (Table 8.5). Students in Grade 8 exhibit the largest percentage (16.0%) of all Grades that listed incentives as being what they liked most about OVK; however, unlike the previous two Grades, Grade 8 students valued missing class or delayed test-taking (47%) over their ability to interact with the Resiliency Coach (40%) (Table 8.5). Interestingly, Grade 8 students, in comparison to the other two Grades, reported the lowest rate (6.4%) of disinterest in OVK lessons (Table 8.5). In this category, students often did not leave a response (33%) or indicated the lessons were boring (33%) (Table 8.5).

TABLE 8.5. RESPONSES FROM STUDENTS IN GRADE 8 (N=94) WHO PARTICIPATED IN OVK LESSONS BASED ON CODING RUBRIC

Focused Categories	**Coding Rubric of Responses**
Engaging (n=15, 16.0%)	• Fun/Interactive (33%) • Activities/Games (67%) • Videos (0%) • Stories (0%)
Skills Training (n=88, 93.6%)	• Self-talk (1%) • Resiliency/ "Bouncing Back" (36%) • Family/Peer Conflict (7%) • Stress Relief/Relaxation (23%)

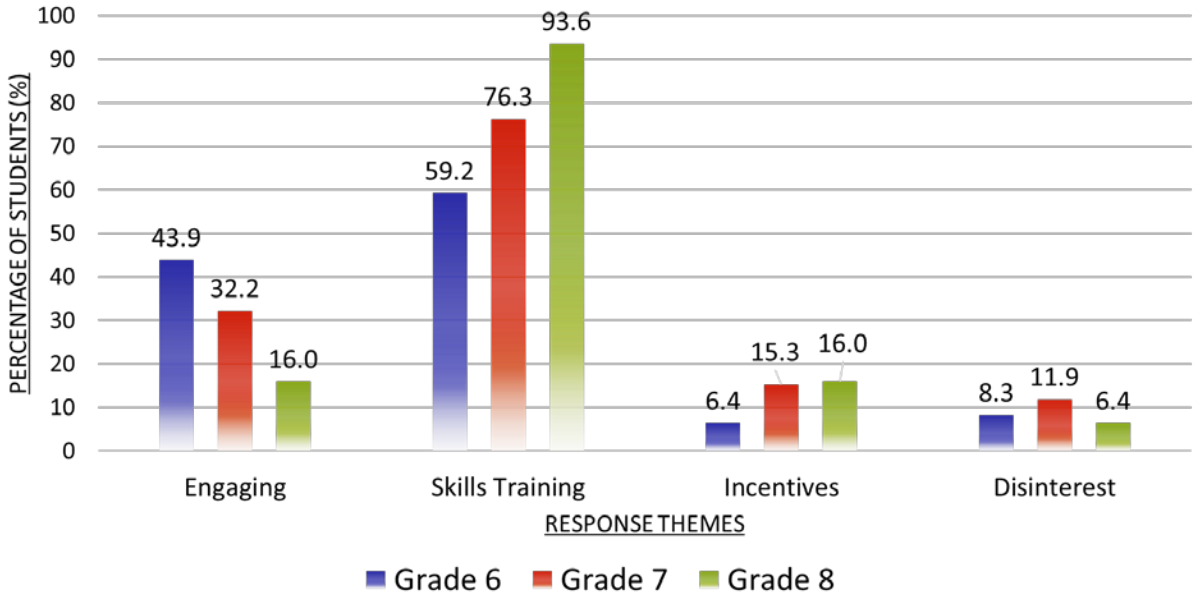
Focused Categories	Coding Rubric of Responses
	• Mind Traps (23%) • Generic "Skills" (10%)
Incentives (n=15, 16.0%)	• Candy (13%) • No Class/Test (47%) • Socialization (0%) • Resiliency Coach (40%)
Disinterest (n=6, 6.4%)	• Boring (33%) • "Nothing" (17%) • Content not applicable (0%) • Workbooks (0%) • Mandatory (0%) • Offensive (0%) • Neutral (17%) • Blank (33%)

8.5 Discussion

The present qualitative inquiry into aspects of OVK Resiliency Lessons is the first of its kind and provides invaluable information, such as factors of interest that vary with increasing age. Of particular interest is the consistent perceived value and benefit of skills training from the view of students who actually experienced the program (Figure 8.1). This suggests that concepts taught to students, such as cognitive sequencing of thoughts to feelings, and subsequent behaviours, is well received by youth 11 – 13 years of age. Further, concepts such as "bouncing-back" from difficult situations and overall resiliency to combat "mind-traps", or cognitive schemas, were consistently found to be memorable factors in the experience. Findings also suggest the engaging nature of the program, specifically in terms of activities and games, decreased in importance as age increased (Figure 8.1). While the importance of the interactive nature decreased, the weight of skills learned through the program consistently increased with age from 59.2% in Grade 6, 76.3% in Grade 7,

and 93.6% in Grade 8 (Figure 8.1). Another interesting finding is the more than two-fold increased importance of incentives associated with the OVK program from Grade 6 to Grades 7 and 8 (Figure 8.1). There is some evidence that reward development peaks during adolescence (Van Leijenhorst et al., 2010), especially in terms of incentive-based motivation (Casey & Jones, 2010), and this may explain why a higher percentage of students in Grades 7 and 8 (mean age 12.3 and 13.3, respectively) reported incentives as a significant component of OVK lessons versus their younger peers (Figure 8.1). However, the importance differed from Grades 6 and 7 to Grade 8 from the ability to interact with the Resiliency Coach, to missing scheduled class or delayed test-taking, respectively (Table 8.3 – 8.5). Our findings also indicate that students in Grade 7 reported more disinterest in the program compared with younger and older peers (Figure 8.1). This difference in interest level in the OVK program may be an area in need of further research.

Figure 8.1. Summary of focused coding categories from student responses about OVK Lessons for Grades 6 – 8



8.5.1 Limitations

Although some students across all three Grades found the content to be boring, had a neutral response, or didn't respond at all, the reasons for their views remain unknown. Further qualitative inquiry through other methods, such as focus groups or interviews would have been beneficial to identify areas for improvement. Additionally, the question posed to students may have been leading, encouraging the student to answer with positive views. Future research into this area may benefit from a more neutral statement, such as "What are your thoughts on Resiliency Lessons?". This neutral approach may prompt students to respond with more content in their perspective, positive or negative. Lastly, although the results of this study are interesting and serve as an interpretation of the impact of OVK from actual participants of the program, as with any qualitative inquiry, the results cannot be generalized, and this is a limitation of the study.

In addition to this basic summary, the present study has been assessed based on eight dimensions of quality (Tracy, 2010). Each dimension, and subsequent reference to the present study (both strengths and limitations) is detailed in Table 8.5.

TABLE 8.6 QUALITY OF QUALITATIVE INQUIRY INTO STUDENT PERSPECTIVE AFTER EXPERIENCING OVK RESILIENCY LESSONS

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	**Application to Qualitative Inquiry into Student Perspective on OVK Resiliency Lessons**
1. Worthy Topic	• First-ever qualitative inquiry into student perspective on OVK Resiliency Lessons • Relevant and timely – current shift toward patient-centered care and lived experience; this inquiry provides important feedback from actual participants of OVK

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	**Application to Qualitative Inquiry into Student Perspective on OVK Resiliency Lessons**
	• Provides insight into liked/valued components of the program • Provides insight into the importance of therapeutic alliance between Resiliency Coach and student • Identifies factors encouraging student engagement which may assist future program development
2. Rich Rigor	• Sampling of appropriate individuals to reach the goal of understanding more about student perspective on OVK • Not all students who participated in program provided feedback due to termination of program funding • Saturation within the sample was observed and no new information was identified • An open ended question was used to prompt feedback; however, use of a neutral question, and other research methods would have enhanced rigor (planned, but not undertaken due to termination of program funding) • Ensuring rigor, the reader is provided with a sample of raw data, coding rubric, and overall themes developed, allowing for transparency of the analysis process
3. Sincerity	• In order to be authentic and genuine, the PhD Candidate has produced a description of worldview, indicating the use of the pragmatic lens as focusing on answers to "real-world" problems • In addition, the PhD Candidate has detailed limitations to the study and areas needing further investigation • One of the major disadvantages detailed by the PhD Candidate is the termination of funding for the EMPATHY program prior to the collection of data from planned research activities
4. Credibility	• As much as possible, credibility is achieved through displays of thick description, and triangulation • Thick description is best shown, rather than described and detailed quotes are presented to the reader • Triangulation was not possible in this component of the thesis due to termination of program funding; however future research would benefit from focus groups and one-on-one interviews with students, where appropriate

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	Application to Qualitative Inquiry into Student Perspective on OVK Resiliency Lessons
	• A further step in the future could focus on crystallization through collecting data from a variety of sources (i.e. parents, teachers, peers), from multiple researchers, and various theoretical lenses
5. Resonance	• This qualitative inquiry provides insight into features of OVK Resiliency Lessons that were of interest or valued by students participating in the program. This information may allow for transferability to other settings, populations, or circumstances working with the same age group, or focusing on universal prevention programs • Sharing of perspectives may allow for naturalistic generalization in which, through the detailed representation of findings, the reader is able to come to their own conclusions through their own understanding of feedback provided by students
6. Significant Contribution	• This qualitative inquiry extends knowledge into content and context valued by students experiencing a universal prevention program • Understanding these valued features may enhance future program development • This inquiry provides potential direction for future studies which may generate ongoing research in the area of universal school-based programs • Theoretical significance – a shift from the emphasis on interactive programming to focusing on actual skills gained from the program • Heuristic and practical significance – this inquiry may influence researchers, policymakers, and program developers in the future as the information provided sheds light on valued features of Resiliency Lessons. This information is readily accessible and understandable to lay public • Methodological significance – overall, the thesis implements an advanced mixed-methods design (intervention) incorporating both quantitative and qualitative findings. Health research often focuses on empirical findings; however, the incorporation of

Eight "Big-Tent" Criteria for Qualitative Quality (Tracy, 2010)	Application to Qualitative Inquiry into Student Perspective on OVK Resiliency Lessons
	participant feedback has created a richer view of school-based programs and the potential impact on adolescent mental health
7. Ethical	• Procedural Ethics – this qualitative inquiry was approved by the University of Alberta Research Ethics Board. All responses were kept anonymous to maintain the privacy and confidentiality of each participant. Participants were aware the data collected was for use in a research study examining SBIRT processes and participation was voluntary • Situational Ethics – the ends justified the means in terms of how and what types of data were collected – do no harm • Relational Ethics– all students were treated with respect during the course of the EMPATHY program, and their needs were placed before the needs of the study. Students were informed by Resiliency Coaches that their contribution was significant and important for the success of the study, allowing for connectedness between researcher and researched • Exiting Ethics – the research is presented in an appropriate manner, providing knowledge to the reader on student feedback on OVK Resiliency Lessons, while clearly identifying strengths and limitations. This is done in the hopes of minimizing potential consequences that may arise from reader interpretation
8. Meaningful Coherence	• The current inquiry achieved its stated purpose – to identify components of OVK Resiliency Lessons that are valued by students experiencing the program • The use of an open ended question fits with the flexibility of the mixed methods paradigm and the pragmatic worldview • Research question and findings are interconnected

8.6 Conclusion

The Dutch version of the Penn Resiliency Program, *Op Volle Kracht (OVK),* is a relatively new program implemented in a population of youth from low-income homes. The present study

includes the application of OVK in a larger population of students between the ages of 11 and 13 years as part of an SBIRT program, known as EMPATHY. Here we present the first ever qualitative inquiry into responses from students in Grades 6 – 8 who experienced this program. Responses from over 300 students illustrate the importance of resiliency skills training to this age group, specifically learning how to "bounce-back" from negative situations, followed by stress relief and relaxation techniques. Another valued factor was the ability to interact with the Resiliency Coach, highlighting therapeutic alliance as a recurrent theme within the present thesis, as well as in past literature.

Chapter 9: Discussion and Conclusions

9.1 General Discussion

The first aim of the current thesis was to test the effectiveness of the comprehensive public health approach to youth substance use treatment, known as SBIRT (Screening, Brief Intervention, and Referral to Treatment). More specifically, to examine substance use outcomes of students in Grades 6 – 12 with the implementation of the school-based SBIRT, known as EMPATHY (Empowering a Multimodal Pathway toward Healthy Youth). The findings extend knowledge on worldwide youth substance use prevention approaches by providing insight into the effectiveness of SBIRT within a school context, and across an entire school district. Although SBIRT offers an integrative approach to the treatment of substance misuse through opportunistic screening of otherwise overlooked cases of substance misuse, research into the effectiveness of this 3-tiered approach is still in its infancy in terms of applicability with youth who engage in substance misuse. Despite this, three major health organizations, The American Academy of Pediatrics, the Substance Abuse and Mental Health Administration, and the National Institute of Alcohol Abuse and Alcoholism, have recommended its immediate implementation with youth presenting at primary care clinics. Because of these factors: (1) SBIRT understudied in youth, specifically effectiveness with those at risk of developing a substance use disorder, and (2) recommendations by three major organizations without an evidence-base of effectiveness; (3) along with a strong focus on primary care barriers and challenges to implementation, the second aim of this thesis was to increase knowledge on facilitator perspective on school-based SBIRT processes and potential challenges or barriers to successful application of the program. In addition, it was of interest to determine key components of universal prevention programs that appeal to youth who experience

them, and gaining insight into student perspective on Resiliency Lessons was essential and novel to existing research. A summary of unique contributions to research undertaken in this thesis are described in Table 9.1.

TABLE 9.1 UNIQUE CONTRIBUTIONS TO RESEARCH UNDERTAKEN IN THIS THESIS

	Unique Contributions to Research
1. Methodology	• Explicit use of an advanced mixed methods design integrating both quantitative and qualitative research (mixed methods intervention design)
2. Adolescent Substance Misuse	• Clear delineation of CRAFFT Substance Use Scores by grade, severity, and gender • Information on prevalence of substance misuse, and specific substances used across an entire school district • Information on co-occurring risk of depression and anxiety in students at risk of developing a substance use disorder • Clear delineation of affirmative responses to CRAFFT questions, potentially identifying target factors associated with substance misuse in youth
3. Universal Prevention Programs	• Inquiry into student feedback on OVK Resiliency Lessons to understand program features valued
4. Screening, Brief Intervention, and Referral to Treatment (SBIRT)	• Inquiry into facilitator experience when implementing SBIRT, specifically within a school setting • Inquiry into facilitator experience of the Referral to Treatment component of SBIRT and identification of prominent gap in services offered to youth

In this General Discussion, central findings are summarized and discussed within the framework of existing knowledge. Further, this discussion will also include opportunities for improving substance misuse prevention and intervention through suggested future directions.

9.2 Summary

9.2.1 Substance misuse treatment for youth and adults: Similar, yet different

The reviews of adult alcohol use disorder within the scope of current treatment modalities and settings provided foundational information on approaches used to treat substance misuse. Adult treatment approaches are relevant to this PhD thesis since, upon closer examination of treatment modalities and settings, the graduated framework used with youth appears to be an application of the adult stepped-approach. When comparing adult and youth substance misuse, a significant difference between these two age groups is attributed to reasons for initiating use besides the obvious difference in developmental stage and understanding of potential consequences associated with substance use; however, the same theoretical underpinnings of treatment still apply (i.e. social control, behavioural economics, social learning, and stress and coping theory). Indeed, youth are more readily influenced by their peers, have a lower ability for critical thinking and decision making, and are more reward motivated. This is often attributed to the developmental stage of youth and varying maturation of brain regions associated with motivation, reward, and overall executive function. This difference in initiation of substance use between adults and youth was intriguing since SBIRT has shown effectiveness in some adult populations; however, a lack of evidence of its effectiveness with youth has prevented a general evidence-driven recommendation for use. Is the format of SBIRT applicable to both youth and adults, but specific content of brief interventions the key to success with youth who engage in substance misuse?

9.2.2 School-Based SBIRT: Substance Use Findings & Future Directions

Substance use findings from the EMPATHY program are described in detail. Initial findings were from extracted CRAFFT scores contained within the overall DAT scale administered to students. The CRAFFT scores were extracted for ease of comparison with other studies, as well as being a validated tool for use with youth. Results indicate a statistically significant reduction in CRAFFT Substance Use Scores, and subsequent depression and anxiety scores over time. Although the reduction in mean substance use scores for the cross-sectional cohort did not reach statistical significance, there was a significant reduction in the number of students at risk of developing a substance use disorder at 15-month follow-up. For the longitudinal cohort, there was a statistically significant reduction in CRAFFT mean scores, as well as a statistically significant reduction in the number of students at risk of developing a substance use disorder. In addition, a statistically significant reduction in mean depression and anxiety scores, as well as a significant decrease in the number of students at risk of either a depressive or anxiety disorder was found for both longitudinal and cross-sectional cohorts.

These findings are promising regarding the potential impact of SBIRT on substance use behaviours; however, there are limitations to this study. First and foremost is lack of a robust control group; however, incorporating the methods of a proper experimental design would have been unethical. Future studies providing treatment to youth displaying imminent risk separate from the remainder of the study could incorporate a control group, resulting in more robust results. In addition, this study relied on self-reporting of behaviours without any form of independent, objective measurement. Although there is some evidence of relative reliability of responses when

screening students using a computer or tablet, present findings would have been more robust if the reliability of responses were confirmed. Although there were plans to examine the outcomes of youth referred to treatment, funding for the EMPATHY program was terminated before this component of the study could be investigated. This is a limitation since the majority of, if not all, studies attempting to determine the effectiveness of SBIRT have not examined this component in detail and its potential effect on substance use outcomes remains unknown. Additionally, a small number of students who were at risk of a substance use disorder and were classified in the Top 10% actually participated in the brief intervention offered. It would be beneficial to understand the reasons why students (and their parents) chose not to take up this opportunity and this could be done through qualitative inquiry, such as interviews or focus groups in the future.

Additional results were obtained from the remainder of the questions in the Drug, Alcohol, and Tobacco (DAT-11) screen administered to youth participating in the EMPATHY program. Briefly, the same methods as the CRAFFT analysis were utilized; however, critical differences between the findings from the CRAFFT and the DAT-11 (and DAT-5) need to be recognized: (1) the CRAFFT is a validated scale with discriminant properties that can assess risk and severity; (2) the DAT-11 is a novel scale that has not been validated and the questions outside of the CRAFFT assess use of substances in the past year, but not frequency of use, or subsequent severity.

Findings from the cross-sectional cohort indicate a reduction in the number of students who use substances, specifically statistically significant findings for alcohol and smokeless tobacco use for the entire population. In addition, there was a significant reduction in mean DAT-11 scores; however, this value does not hold meaning in terms of risk of developing a substance use disorder.

For the longitudinal cohort, an increase in responses to all DAT-5 questions is noted indicating an increase in self-reported substance use in the past 12-months. This increase is also evident for the mean DAT-11 score for this cohort. Although the results may appear alarming at first, possibly interpreted as an increase in substance use over the duration of this school-based SBIRT, the DAT-11 as a whole does not assess risk of developing a disorder. Essentially, the DAT-5 (the remaining questions after extracting the 6-item CRAFFT) can only provide information on the prevalence of substances used by students in Grades 6 – 12 in the past year.

The increase in self-reported substance use may be a positive reflection on the EMPATHY program. It could be indicative of relative comfort of students to disclose substance use. Potentially, this noted increase in reporting, specifically with the longitudinal cohort, may simply be the result of students under-reporting at Baseline, and providing more accurate responses at 15-month follow-up. Or, the increase in responses is a reflection of increasing age from Year 1 of the program to Year 2, and if so, an increase in substance involvement is expected as it has been detailed in studies examining the trajectory of youth engagement in drug use. Potentially, the increase in responses may be attributed to over-reporting which may be the result of thinking retrospectively about substance use in the past year.

The most prominent limitation to this component of the thesis is the use of a novel scale that has not undergone extensive validation. Further, the lack of discriminant properties and information on the frequency of use (i.e. experimentation versus long-term use) has rendered the findings from this scale to have little meaning beyond prevalence rates of specific substances used. Changes to responses on the DAT-5 may be the result of prior under-reporting, or current over-reporting, or

possibly accurate reporting of use. This is another limitation, since the results rely fully of student self-reports without the use of triangulation (i.e. parent, peer, teacher confirmation; and/or bioverification with blood, urine). In addition, it is challenging, if not nearly impossible, to determine which component(s) of the EMPATHY program facilitated a change in substance use. Without the incorporation of a robust control group and rigorous experimental conditions, one can only speculate what factors could have influenced a change in responses. Despite this, information into specific substances used by youth is important, especially for targeted interventions, and future studies may benefit from administering a validated screening tool assessing this.

9.2.3 School-Based SBIRT – Facilitator Perspective: Qualitative Findings & Future Directions

Another novel component of this thesis is the incorporation of qualitative inquiry into the perspective of facilitators through school-based SBIRT processes. As mentioned previously, there is an abundance of research studies examining the feasibility of implementation of SBIRT within primary care clinics, including qualitative inquiry into the challenges and barriers perceived by clinicians. Further, a new wave of research has focused on incorporating SBIRT training into the curriculum of medical students as a way to build clinician skills and confidence to facilitate the SBIRT process. To date, there has been no qualitative inquiry into school-based SBIRT processes, despite being a setting in which the largest number of youth can be assessed and treated. Through one on one interviews with Resiliency Coaches facilitating screening and brief intervention components of SBIRT, as well as interviewing the mental health counselors responsible for the referral to treatment component of SBIRT, challenges and areas for improvement were identified.

For example, a prominent challenge experienced was the wait times to access referral to treatment services, and the lack of services that cater to youth under the age of 18 who have mild to moderate symptomology. Indeed this seemed to be problematic at 15-month follow-up since at this time the Provincial Government terminated funding for the EMPATHY program, and this also meant termination of provisional mental health services for students who were in need of mental health support, but were not in imminent risk. Another challenge for both Resiliency Coaches and counsellors was the need for parental support to progress through the SBIRT phases. More specifically, in order for youth to participate in the brief intervention, parental consent (and student assent) was required. Furthermore, parental support was required to facilitate the referral to treatment process by maintaining contact with the counsellors and making time for appointments. In the future, considering the creation of school-based health centers may counter these challenges in which specialized services would be available for school-aged students, regardless of their severity, and the need for parental consent to access services would not be needed. In addition, the confidentiality of students would be maintained, encouraging full disclosure. Although likely a costly endeavour in the short-term, in the long-term this approach may influence the success of school-based SBIRT when facilitated by a dedicated team housed within schools.

A significant finding from this qualitative inquiry is the importance of therapeutic alliance. All Resiliency Coaches reported the need to build therapeutic alliance with students, and from their perspective, this is the influencing factor determining the success of this school-based SBIRT. They argue that without this alliance and approachability, students may have been more reluctant to participate in SBIRT activities.

Although all Resiliency Coaches were given the opportunity to participate in this qualitative inquiry, not all of them accepted the opportunity, preventing insight into a potentially different perspective. In addition, staff members came from diverse backgrounds and their perspective on the facilitation process may have reflected their prior experiences. As with any qualitative inquiry, the findings are to present information on specific experiences and these experiences may not be generalizable. Future research investigating the challenges and barriers of staff facilitating a school-based SBIRT protocol is needed for comparison and for further insight into potential barriers of widespread implementation of this approach, as well as the perspective of students and parents.

9.2.4 School-Based SBIRT – Student Perspective: Qualitative Findings & Future Directions

The final chapter in this thesis examined student perspective on which components of a universal prevention program, Op Volle Kracht (OVK) they most valued. This is the first ever qualitative inquiry into the OVK program. This program was presented to students in Grades 6 – 8 during class time devoted to health topics. The program included 8 sessions instructing youth on cognitive behavioural concepts, such as how thoughts lead to feelings, which then leads to actions; followed by another 8 sessions focusing on social competence skills, such as resistance and assertiveness training, and relaxation techniques. Students responded to an open-ended question ("What did you like about Resiliency Lessons?") posed via electronic tablet. The most valued component was learning how to "bounce-back" from difficult situations, followed by stress relief and relaxation techniques. In Grade 6 and 7, a significant incentive to participate was the ability to interact with the Resiliency Coach, while delaying a test or missing scheduled class was a significant incentive

for students in Grade 8. The activities and games incorporated into the OVK program were more appealing for younger students than for those in later Middle School; however, skills training increased in importance with increasing age.

This qualitative inquiry is the basis of future studies examining the interest of youth participating in universal prevention programming, since the appeal of the content and format may influence engagement in the program. The inquiry presented in this thesis is only the beginning of an area needing further research; however, there are limitations to this current study. As mentioned, funding was terminated around the time the first set of responses from students was collected, meaning this study has the limitation of not collecting data from a larger sample of students, preventing sampling saturation, and potential inquiry into diverse responses. This means that if more responses were collected, the summary statement that students prefer program content that teaches skills over being fun and interactive, may no longer be valid. Additional forms of qualitative inquiry could have produced more in-depth insight into the view of students through the use of focus groups or one on one interviews. These responses could then have been triangulated through interviews with parents and teachers. In addition, the way in which the question was posed to students may have been leading, and future questions should apply a more neutral tone (i.e. "What are your thoughts on Resiliency Lessons"). As with any qualitative inquiry, the findings presented here are interesting, but can only serve as the interpretation of students within the EMPATHY study participating in OVK lessons, and the findings cannot be generalized to other populations.

9.3 Conclusion

The studies presented in this thesis were among the first to incorporate all three components of SBIRT across an entire school district of students in Grades 6 – 12 over a 15-month period. Overall this thesis provides evidence that this 3-tiered process does not increase risk of developing a substance use disorder, and subsequent depression and anxiety, in youth experiencing this multimodal school-based SBIRT approach. Although a significant reduction in substance use behaviours is noted, it remains unclear which component of SBIRT contributed or influenced change. Future research incorporating a robust control group (if possible when dealing with risk behaviours and/or community based settings) may provide valuable insight into mediating and moderating factors to ensure these components are included in future programs for the prevention and early intervention of youth substance misuse. Suggestions for future research are included to clearly delineate the role and influence of SBIRT processes to enable widespread use in schools for the promotion of opportunistic identification and treatment of youth engaging in risky behaviour. Despite the limitations of this mixed methods intervention study, the information gained has provided an initial stepping-stone to close the gap in literature focusing on school-based SBIRT programs incorporating all three components of this approach. This study also provides a framework for future studies to examine adolescent substance misuse programs from a variety of lenses using the mixed methods research design. The combination of empirical and perspective/experience-based evidence will only enhance the development of future programs that are both relevant to adolescent life, and effective in preventing the onset of mental health disorders.

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Appendix

LIST OF QUESTIONS USED IN THE SBIRT SCREENING TO DETERMINE EMPATHY SCORE [1]

Source of question [c]	**Question Number**	**Stem Questions (where appropriate)**	**Individual Questions**	**Scoring Range for each question**
List of questions asked to determine depression score and suicide risk				
PHQ-9	1	Over the past 2 weeks, how often have you been bothered by:	Little interest or pleasure in doing things	0 to 3
PHQ-9	2	Over the past 2 weeks, how often have you been bothered by:	Feeling down, depressed, or hopeless	0 to 3
PHQ-9	3	Over the past 2 weeks, how often have you been bothered by:	Trouble falling or staying asleep, or sleeping too much	0 to 3
PHQ-9	4	Over the past 2 weeks, how often have you been bothered by:	Feeling tired or having little energy	0 to 3
PHQ-9	5	Over the past 2 weeks, how often have you been bothered by:	Poor appetite or over eating	0 to 3
PHQ-9	6	Over the past 2 weeks, how often have you been bothered by:	Feeling bad about yourself-or that you are a failure or have let yourself or your family down	0 to 3
PHQ-9	7	Over the past 2 weeks, how often have you been bothered by:	Trouble concentrating on things, such as reading or watching TV	0 to 3
PHQ-9	8	Over the past 2 weeks, how often have you been bothered by:	Moving or speaking so slowly that other people could have noticed. Or the opposite-being so fidgety or restless that you have been moving around a lot more than usual	0 to 3
PHQ-9 [b]	9	Over the past 2 weeks, how often have you been bothered by:	Thoughts of hurting yourself	0 to 3
PHQ-9 [b]	10	Over the past 2 weeks, how often have you been bothered by:	***Thoughts that you would be better off dead*** [c]	0 to 3

Source of question [c]	Question Number	Stem Questions (where appropriate)	Individual Questions	Scoring Range for each question
PHQ-9	11	If you checked off "any problems", how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?		0 to 3
PHQ-9	12	Only if scored 1, 2, or 3 on question 9 does this question get asked	***Has there been a time in the past month when you have had serious thoughts about ending your life?*** [c]	Yes or No
	13	Only if scored 1, 2, or 3 on question 9 was this question asked	***Have you ever, in your WHOLE LIFE, tried to kill yourself or made a suicide attempt?*** [c]	Yes or No
			Unmodified maximum possible raw score =	**33**
List of questions asked to determine anxiety score [d]				
HAD scale	1		I feel tense or wound up	0 to 3
HAD scale	2		I get a sort of frightened feeling as if something bad is about to happen	0 to 3
HAD scale	3		Worrying thoughts go through my mind	0 to 3
HAD scale	4		I can sit at ease and feel relaxed	0 to 3
HAD scale	5		I get a sort of frightened feeling like butterflies in the stomach	0 to 3
HAD scale	6		I feel restless and have to be on the move	0 to 3
HAD scale	7		I get sudden feelings of panic	0 to 3
			Unmodified maximum possible raw score =	**21**
List of questions asked to determine drug, alcohol, and tobacco (DAT) score [e]				
CRAFFT	1		During the past 12 months, did you drink any alcohol (more than a few sips)?	0 or 1
CRAFFT	2		During the past 12 months, did you smoke any marijuana or hashish?	0 or 1

Source of question [c]	Question Number	Stem Questions (where appropriate)	Individual Questions	Scoring Range for each question
CRAFFT	3		During the past 12 months, did you use anything else to get high?	0 or 1
CRAFFT	4		During the past 12 months, have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	0 or 1
CRAFFT	5		During the past 12 months, do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?	0 or 1
CRAFFT	6		During the past 12 months, do you ever use alcohol or drugs while you are by yourself, or ALONE?	0 or 1
CRAFFT	7		During the past 12 months, do you every FORGET things you did while using alcohol or drugs?	0 or 1
CRAFFT	8		During the past 12 months, do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use?	0 or 1
CRAFFT	9		During the past 12 months, have you ever gotten into TROUBLE while you were using alcohol or drugs?	0 or 1
	10		During the past 12 months, did you smoke tobacco products?	0 or 1
	11		During the past 12 months, did you use smokeless tobacco products?	0 or 1
			Unmodified maximum possible raw score =	**11**

[l] Table taken from original EMPATHY Protocol (Silverstone et al., 2015)

[a] The original source of most of the questions used was the 9-item patient health questionnaire (PHQ-9)
[b] While we asked these two questions separately, they are a single question in the original PHQ-9
[c] These three questions were used to determine suicide risk
[d] The original source of the questions used was the 7-items regarding anxiety contained within the Hospital Anxiety and Depression Scale

[e] The original source of the questions was the CRAAFT questionnaire which is well validated for use in youth. It is named the CRAFFT scale because of the 6 questions relating to specific risks involved with drug and alcohol abuse (in our study they were questions 4 – 9, with the key words involved in the acronym shown in capital letters).