Readiness to Change, Trait Emotional Intelligence, and Client Fit in Wilderness Therapy

by

Addison J. Mott
Bachelor of Arts, McGill University, 2013

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

Master of Arts

in the School of Child and Youth Care

Supervisory Committee

Readiness to Change, Trait Emotional Intelligence, and Client Fit in Wilderness Therapy

by

Addison J. Mott
Bachelor of Arts, McGill University, 2013

Supervisory Committee

Dr. Nevin Harper, School of Child and Youth Care
Supervisor

Dr. Doug Magnuson, School of Child and Youth Care
Departmental Member

Abstract

Background: Wilderness therapy is one type of residential treatment that has been shown to successfully engage adolescents in mental health and substance use treatment. A growing body of wilderness therapy outcomes research supports this and wilderness therapy is being increasingly recognized as a legitimate intervention for adolescents experiencing challenges with mental health and substance use. Some evidence suggests that not all elements of wilderness therapy necessarily work the same for all clients. The question of client fit in wilderness therapy, or what works for whom, is one that has yet to receive much empirical attention in the literature. **Purpose**: The purpose of this study is to examine how participation in one Canadian wilderness therapy program effects two outcome variables, trait emotional intelligence and readiness to change, and how client fit moderates these relationship. Specifically, this research examines: (1) changes in clients' trait emotional intelligence from pre- to post-wilderness therapy, (2) changes in clients' readiness to change from pre- to post-wilderness therapy, and (3) if these changes differ by pre-treatment client-level variables – sex, age, funding, digital interference in everyday life, or substance abuse severity. **Methodology**: Research was conducted with 48 participants ranging in age from 14 to 20 years. A longitudinal case study design was employed. Data were gathered by program staff using standardized data collection tools, modified versions of standardized tools, and administrative forms.

Findings/Conclusions: Findings indicate that participation in this Canadian wilderness therapy program leads to statistically significant increases in readiness to change but not trait emotional intelligence. On average, participants who experienced interference in their everyday life due to video games or online activity before wilderness therapy had

larger trait emotional intelligence change scores, while participants who experienced interference in their everyday life due to a virtual relationship had larger changes in readiness to change. None of the client-level pre-treatment variables included in this study significantly predicted increases in readiness to change following wilderness therapy.

Table of Contents

Supervisory Committee ii
Abstract iii
Table of Contents v
List of Tables vii
Acknowledgments viii
Chapter 1: Introduction 1
1.1 Overview 1
1.2 Purpose of the Research 2
1.3 Research Questions 3
1.4 Delimitations 3
1.5 Limitations 3
Chapter 2: Literature Review 5
2.1 Overview 5
2.2 Residential Treatment 5
2.3 Wilderness Therapy 8
2.3.1 Outcomes of Wilderness Therapy 9
2.3.2 Clinical Model 12
2.3.3 Client Fit 12
2.3.4 Pine River Institute 13
2.4 Emotional Intelligence 16
2.5 Readiness to Change 19
Chapter 3: Methods 21
3.1 Overview 21
3.2 Research Design 21
3.3 Ethics 21
3.4 Recruitment and Sampling 21
3.5 Instruments 22
3.5.1 Client Demographic Information 22
3.5.2 Substance Abuse Severity 22
3.5.3 Digital Interference 23
3.5.4 Trait Emotional Intelligence 24
3.5.5 Readiness to Change 25
3.6 Procedures 25
3.7 Data Analysis 26
3.7.1 Missing Data 26
3.7.2 Does participation in PRI's WT component increase trait emotional intelligence? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference? 27
3.7.3 Does participation in PRI's WT component increase readiness to change? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference? 28
Chapter 4: Findings 29
4.1 Overview 29
4.2 Sample 29

4.3 Descriptive Statistics 29
4.4 Does participation in PRI's WT component increase trait emotional intelligence? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference? 32
4.5 Does participation in PRI's WT component increase readiness to change? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference? 33
Chapter 5: Discussion and Conclusion 36
5.1 Overview 36
5.2 Outcomes: Emotional Intelligence and Readiness to Change 37
5.3 Client Fit 40
5.4 Implications and Future Research 42
5.5 Strengths of the Study 43
5.6 Limitations of the Study 43
Bibliography 46
Appendix A – University of Victoria Human Research Ethics 64
Appendix B – Data Sharing Agreement 65
Appendix C – Drug History Questionnaire 69
Appendix D – Trait Emotional Intelligence Questionnaire-Short Form 73
Appendix E – University of Rhode Island Change Assessment 74
Appendix F – Density Plots 75
Appendix G – Data Analysis Code 76

List of Tables

Table 1 Overview of data collection 26
Table 2 Descriptive statistics for predictor variables (n = 48) 30
Table 3 Descriptive statistics for outcome variables 31
Table 4 Shapiro-Wilk tests (n = 48) 31
Table 5 Correlations between predictor variables 32
Table 6 Correlations between predictor variables and TEIQue-SF scores 33
Table 7 Correlations between predictor variables and URICA scores 34
Table 8 Multivariable linear regression model client-level variables and Δ URICA 35

Acknowledgments

I wish to thank and acknowledge those who have supported me in completing my Master's thesis with particular appreciation to Dr. Nevin Harper and Dr. Doug Magnuson who have supported this work. Dr. Nevin Harper has provided unwavering belief in my academic capacity, numerous opportunities to engage in meaningful and formative projects, and understanding about all that has happened over the past 4 years. Dr. Doug Magnuson has expanded my understanding of research methods and analytic tools, and has pushed and inspired me to think more deeply about the questions I ask.

A special thanks to Dr. Laura Mills, Jennifer Bingley, and all the staff at Pine River Institute who made this study possible.

Chapter 1: Introduction

1.1 Overview

Adolescents in Canada are the most likely age group to experience mental illness and problematic substance use that causes significant impairment (MHCC, 2013; Pearson et al., 2013; Thompson et al., 2018). Evidence suggests that few young people with mental disorders that cause significant impairment receive specialized treatment services and that adolescents who have problematic substance use are unlikely to get access to successful treatment (Leatherdale & Ahmed, 2010; Thompson et al., 2018; Waddell, 2005). Further, while some adolescents' mental health care and substance abuse treatment needs may be met in the community, the need for intensive and alternative supports remains for others (Whittaker et al., 2014).

Wilderness therapy (WT) is one type of residential treatment that has been shown to successfully engage some adolescents in mental health and substance use treatment whose needs may not be effectively met in the community because of emotional issues, behavioural issues, and delinquency (Bowen & Neill, 2013; Gillis et al., 2016; Harper, 2017; Russell, 2007a). Some WT outcomes research highlights positive impacts across emotional, behavioural, and mental health outcomes, while results have been mixed for substance use outcomes. This research has lent support to WT becoming increasingly recognized as a legitimate intervention for adolescents experiencing challenges with mental illness and problematic substance use.

Recently, a clinical model of WT has been proposed for a range of treatment models (Fernee et al., 2017). This model proposes three therapeutic mechanisms that

work in collaboration to facilitate WT outcomes: wilderness environment, physicality, and social milieu (Fernee et al., 2017). In doing so, it provides a foundation for empirical study and theoretical refinement, both of which have been called for from within the WT literature (Beringer, 2004; Fernee et al., 2019; Harper et al., 2018). One such area is that of client fit: Which client profiles may respond better or worse to WT interventions? To this end, Harper et al. (2019) showed that not all elements of the aforementioned clinical model necessarily work the same for all clients and the authors called for further inquiry into client 'fit' for WT.

While many WT programs exist internationally (Norton et al., 2015), only a few are located in Canada. The present study aims to share findings from the WT component of Pine River Institute (PRI), one Residential Treatment Centre in Canada. The two paramount therapeutic goals of PRI's WT component are to support clients to develop Trait Emotional Intelligence (TEI) and Readiness to Change (RC) (L. Mills, personal communication, June 15, 2019). Previous studies at PRI indicate that adolescents have experienced significant positive outcomes from pre-treatment to 1-2 years post-treatment across substance use, relationships, school success, and mental, physical, and behavioural health (Creighton & Mills, 2016; Mills et al., 2013; http://pineriverinstitute.com/our-program/, n.d.). However, the impact that PRI's WT component has on TEI and RC has not been considered in previous research.

1.2 Purpose of the Research

The purpose of this research is to examine how client fit moderates the relationship between participation in one Canadian WT program, at Pine River Institute (PRI), and two key outcome variables: changes in participants' Trait Emotional

Intelligence (TEI) and Readiness to Change (RC). Specifically, this research examines: (1) changes in clients' TEI from pre-WT to post-WT, (2) changes in clients' RC from pre-WT to post-WT, and (3) if these changes differ by pre-treatment client-level variables – sex, age, funding, digital interference, or substance abuse severity.

1.3 Research Questions

1) Does participation in PRI's WT component increase trait emotional intelligence? Does this differ by pre-treatment client-level variables – sex, age, funding, digital interference, and substance abuse severity?

2) Does participation in PRI's WT component increase readiness to change? Does this differ by pre-treatment client-level variables – sex, age, funding, digital interference, and substance abuse severity?

1.4 Delimitations

This study was delimited to adolescents admitted to PRI between the ages of 13 and 20. This study was also delimited by the demographic characteristics of the participants; there was no attempt to establish a sample that was representative of other WT programs in Canada or elsewhere. In addition, this study was delimited by the instruments used to measure the variables considered.

1.5 Limitations

This study had a number of limitations. Data were included from clients who participated in PRI's WT between November 2016 and October 2019. The study did not consider possible program changes or changes in the population served during this time that may have influenced the results. This study also did not consider process factors that

may have mediated or moderated WT outcomes. Finally, three of the six continuous variables did not meet the assumption of normality inherent to the parametric statistics used, and the statistical power to detect statistical significance was limited due to the relatively small sample size.

Chapter 2: Literature Review

2.1 Overview

This chapter begins with an overview of residential treatment centers (RTCs) and wilderness therapy (WT). This is followed by an overview of outcomes research in WT, the recently proposed WT clinical model, client fit, and description of the site and context for this study, Pine River Institute (PRI). The chapter concludes by describing emotional intelligence (EI), readiness to change (RC), and their relationships with adolescent mental health and substance use.

2.2 Residential Treatment

Young people (aged 15 to 24) in Canada are more likely to experience mental illness than any other age group (Pearson et al., 2013). The Mental Health Commission of Canada (2013) estimated that 10-20% of adolescents in Canada experience mental health issues or disorders; the rate of mental health issues among adolescents in Canada has remained consistent since the early 2000's (McEwan et al., 2007; Waddell et al., 2002). Canada has the third highest rate of youth suicide in the industrial world (MHCC, 2013). Despite this, Waddell et al. (2005) estimated that fewer than 1 in 5 young people (aged 4 to 17) with mental disorders that caused significant impairment at home, school, and in the community receive specialized treatment services. Pearson et al. (2013) estimate that the prevalence of substance use disorders in Canada is 4%, with young people ages 15-24 having the highest prevalence, at 11.9%. More broadly, Canadian adolescents and young adults (aged 12-30) are the most likely age group to engage in substance abuse, however, experience relatively low rates of successful treatment (Hammond et al., 2011;

Leatherdale & Ahmed, 2010; Leatherdale & Burkhalter, 2012; Thompson et al., 2018; Young et al., 2012). For example, Canadians under 25 years access substance use services less frequently than those 25 years and over (McQuaid & Gioacchino, 2017). Taken together, this suggests that many of the mental health care and substance abuse treatment needs of adolescents and young adults in Canada are not supported by successful services (Kirby & Keon, 2006; Kutcher, 2011; Malla et al., 2018). This gap has also been documented internationally (Rocha et al., 2015; Ozechowski & Waldron, 2010; UNODC, 2018).

Many adolescents' mental health care and substance abuse treatment needs may be met in the community through services such as school-based wrap-around support, community-based counselling, or outpatient psychiatric services. However, it has been suggested that the need for intensive supports remains for some adolescents whose needs cannot be effectively met in the community (McCurdy & McIntyre, 2004; Whittaker et al., 2014). RTCs are one such intensive intervention for adolescents (Hair, 2005).

RTC has been used as an umbrella term in existing literature. There is considerable variability across RTCs in program duration, qualifications of staff, populations served, and therapeutic milieus (Butler & McPherson, 2007). This variation between programs is reflected in the fact that a consistent and concise definition of RTCs has not been established (Baker & Calderon, 2004; Butler & McPherson, 2007; Lee, 2008). Despite this, one definition of RTCs that has been proposed is programming that includes therapeutic services and provides necessities such as housing and food to residents (Bates et al., 1997). Butler and McPherson (2007) describe five common factors across RTCs including: (1) therapeutic milieu, (2) multidisciplinary core team, (3)

deliberate client supervision, (4) intensive staff supervision and training, and (5) consistent clinical/administrative oversight.

RTCs for adolescents have been called a radical intervention and are considered a 'last resort' solution in many countries (Stockholm Declaration on Children and Residential Care (May 2003), cited in Anglin & Knorth, 2004). This may be, in part, because of skepticism about RTCs' effectiveness (Knorth et al., 2008).

There have been mixed findings regarding RTCs' effectiveness for adolescents, and existing meta-analyses are limited by the lack of experimental studies and cross-program variability. In one meta-analysis of 27 pre- and quasi-experimental research papers, Knorth et al. (2008) calculated overall effect sizes for the 7 pre-experimental studies examined. The weighted mean effect sizes ranged from .45 (internalized problem behaviour) to .60 (externalizing problem behaviour; behaviour problems in general). These authors concluded that existing quasi-experimental studies illustrate that RTCs focusing on family involvement and applying behaviour-therapeutic methods have the most promising short-term outcomes, but there is little evidence for long-term outcomes of RTCs. The authors also note that many studies lack specific descriptions of the residential intervention program. Other studies have found evidence suggesting adolescents may exhibit promising improvements during their time in RTCs, but that clients often regress to pre-treatment behaviours following reintegration into the community (Boyer et al., 2009; Gallagher & Green, 2012; Lyons et al., 2009; Tahhan et al., 2010).

Recent research is working on how to best maintain effective RTCs as options in the continuum of care for those adolescents in need of intensive intervention (Grietens,

2014; Whittaker et al., 2016). For example, better outcomes have been shown to be correlated with appropriate screening of adolescents in RTCs (McIntosh et al., 2010). Other factors that have been identified as increasing the likelihood that adolescents will experience positive outcomes include the clinical skills of staff, motivation of clients**,** the structure of the program, and the quality of the RTCs' therapeutic milieu (Boyer et al., 2009; Jordan et al., 2009; Shiendling, 2000). Other literature has critiqued RTCs by highlighting the need to instead invest in family and community-level interventions and prevention mechanisms to avoid the separation of family experienced by adolescents in RTCs (Pumariega, 2007; Whitehead et al., 2007).

2.3 Wilderness Therapy

Wilderness Therapy (WT) is one type of residential treatment that has been shown to successfully engage some adolescents in treatment who are struggling with heightened problem behaviours, substance use, and mental health issues (Bowen & Neill, 2013; Gillis et al., 2016; Harper, 2017; Russell, 2001; Russell, 2007a). For example, Russell (2007b) noted that adolescent engagement in WT in the United States is higher than engagement in conventional community-based practices and showed treatment completion at 93% in this study.

Becker and Russell (2016) argue that models of WT are too varied to be described as one modality, but that given the developing evidence base, this approach deserves further study. Despite the diversity across WT programs, common factors include outdoor travel and living, challenge and risk, a 24/7 milieu, connecting with nature, reflection, and experiential learning through planned activities (Becker & Russell, 2016; Harper et al., 2015; Gabrielsen & Harper, 2017; Gass et al., 2012; Norton et al., 2015).

WT often operates in a comparable manner to non-wilderness RTCs both therapeutically and administratively (Harper & Russell, 2008; Williams, 2000).

Hundreds of WT programs operate in the United States which provide treatment programming to more than 10,000 adolescents per year and, as an industry, generate revenues between 100 and 300 million dollars (Russell et al., 2008). According to a recent survey of 28 WT programs across 14 states, the average cost of WT is $558.00 per day and the average enrolment fee[1] is $3194.00; this reflects a 9% increase in cost per day and 28% increase in enrollment fee from a similar survey conducted in 2017 (Wilder, 2020). In contrast to the United States, there are only a few RTCs in Canada that include a WT component (Harper et al., 2019).

2.3.1 Outcomes of Wilderness Therapy

While WT is gaining support as an engaging approach for adolescent populations, a firmly established and theoretically supported evidence base has yet to be established (Becker & Russell, 2016; Dobud & Harper, 2018). Recent meta-analyses of WT treatment outcomes nonetheless support WT as a promising alternative to traditional RTC models (Bettmann et al., 2016; Bowen & Neill, 2013; Gillis et al., 2016). Bettman et al. (2016) conducted a meta-analysis based on 36 studies, totalling 2399 clients who had participated in private-pay WT programs. These authors found medium effect sizes for all six constructs assessed: self-esteem, locus of control, behavioural observations, personal effectiveness, clinical measures, and interpersonal measures (Bettman et al., 2016). Bowen and Neill (2013) conducted a meta-analysis on 197 studies with over 17,000

[1] Wilder (2020) defined an enrollment fee as "…a common one-time fee charged by wilderness therapy programs that generally covers the cost of all necessary (and replacement) clothing and gear provided to the arriving client". (n.p.)

clients. This study found positive pre- to post-treatment outcomes with moderate effect sizes across family functioning, physical health, interpersonal and intrapersonal communication, clinical and behavioural problems, family functioning, and school performance; post-treatment outcomes were also found to be maintained, on average, for six months. One notable limitation of this analysis is that it included several studies about programs that were one day in duration, minimizing the generalizability of these findings to WT. Gillis et al. (2016) conducted a meta-analysis comparing wilderness and non-wilderness treatment programs. This study found that parents reported improvements in adolescents' behaviour using the Youth Outcome Questionnaire (Burlingame et al., 2004) following WT. Adolescents also reported improvements in their behaviour following WT using the Youth Outcome Questionnaire Self-Report. However, adolescents reported greater improvements following non-wilderness treatment.

Research provides mixed support for the use of WT as an effective intervention for adolescents experiencing substance use challenges. One study of three WT programs found that adolescents with addiction challenges experienced clinically reduced substance use scores pre- to post-treatment (Lewis, 2013). Paquette and Vitaro (2014) found that young offenders who participated in one of two WT programs in Scotland, lasting either 8-10 days or 17-20 days, engaged in lower alcohol and drug consumption following treatment. Russell (2007a) found that adolescents with substance use diagnoses showed significant improvements on the Personal Experience Inventory (Winters & Henly, 1989), a standardized measure used to identify problems commonly associated with adolescent substance use. At a 6-month follow-up, 50% of participants reported using alcohol at least three times in the preceding three months and approximately 60%

of substance-using participants reported using marijuana. Further, Harper et al. (2007) found that adolescents who participated in a 21-day WT program experienced decreased drug and alcohol use at a 12-month follow-up. This was coupled with maintenance of positive behavioural and mental health outcomes, and deterioration in some aspects of family functioning, which saw initial improvements following WT.

Research also lends some support for the use of WT as an effective intervention for adolescents experiencing mental illness as there are many indications that WT programs have positive psychological effects. For example, Russell (2002) found significant emotional and social changes as measured by the Youth Outcome Questionnaire following client participation in WT and that these changes were maintained 12 months post-intervention. Kingston et al. (1997) found statistically significant improvements in clients' self-reported challenges with self-esteem, attention, and social difficulties. Crisp and Hinch (2004) found statistically and clinically significant reductions in youth WT participant's mental illness symptoms which was maintained at the 2-year follow-up.

While this growing evidence base is promising, longitudinal WT outcomes research is often limited by the fact that nearly half of WT clients transition into another form of residential therapy after WT (Russell et al., 2008). Further, methodologically sound comparisons across programs are often limited by major differences between programs such as populations serviced, program structure, and program length. WT has also been criticized for a lack of theoretical development and understanding about why utilizing wilderness environments are a necessary component of treatment (Dobud & Harper, 2018).

2.3.2 Clinical Model

A clinical model of WT has recently been proposed for a range of treatment programs that use wilderness as part of the intervention (Fernee et al., 2017). This model, which was developed through a qualitative review using a realist synthesis approach (Danermark et al., 2002; Maxwell, 2012), described the hypothetical therapeutic mechanisms that worked to facilitate the outcomes of the primary studies included. The review proposed three therapeutic factors: the wilderness environment, the psychosocial self, and the physical self (Fernee et al., 2017). The *wilderness environment* in this model was a catalyst for change through venturing outdoors, disconnecting from elements of modern life, such as technology, and having a sense of reconnecting with nature; *physicality* of the intervention, the second therapeutic mechanism described, included actual lived physical experience and mind-body stabilizing and restructuring; *social milieu*, the third therapeutic mechanism, involved a balance between vulnerability and support, and the therapy that was provided.

The clinical model was proposed to allow for more accurate descriptions of the WT treatment process, to provide a foundation for future empirical study, and to support theoretical refinement (Fernee et al., 2019). It is noteworthy that this model is limited by the fact that it was based on a small number of qualitative studies, all of which included WT programs in the United States. Further, it does not address the question of client fit: which client profiles may respond better or worse to WT interventions?

2.3.3 Client Fit

Recent research has highlighted the need to consider client fit for WT upon initial contact with clients and their families (Harper et al., 2019). In their qualitative analysis of

participants' experiences and perceived outcomes following time in WT, Harper et al. (2019) found that not all elements of Fernee et al.'s (2018) clinical model necessarily work for all clients. For example, Harper et al. (2019) found that, while challenging aspects of wilderness – those related to outdoor travel and living - were a central theme of participants' overall experiences, they had varying impacts; some participants described challenging aspects of wilderness as contributing positively to their change process while others stated that they found these aspects of their experience to be the least helpful to supporting change.

Another study found that clinical outcomes did not differ between WT programs and non-WT RTCs (Magle-Haberek et al., 2012). From a clinical client-centered and ethical practice perspective, this suggests that adolescents should be admitted to the treatment which best suits their needs, highlighting the importance of further investigating client fit (Harper et al., 2019). Other researchers have identified the need to further investigate clinically meaningful differences between WT clients by, for example, considering the way in which the historical, familial, and social characteristics are related to WT outcomes (Bettmann et al., 2011; Bettmann et al., 2014).

2.3.4 Pine River Institute

While numerous kinds of WT exist internationally (Norton et al., 2015), only a few programs exist in Canada. Most of the WT literature portrays models of practice and outcome studies of treatment programs in the United States, referred to synonymously as Outdoor Behavioral Healthcare (Harper, 2017). One limitation of this is that the existing literature is largely limited in its generalizability outside of the American context.

The present study aims to share findings from the WT component of Pine River Institute (PRI), one RTC in Canada. Located in rural Ontario, PRI is a non-profit, 40-bed intervention program for adolescents aged 13-19 struggling with substance use problems, mental health, and challenging behaviour with four stages of treatment: (1) wilderness therapy, (2) residential treatment, (3) transition, and (4) aftercare. PRI uses an intensive milieu model; adolescents attend individual, group, and family therapy in the context of a highly structured and supportive environment (Mills et al., 2013).

In Phase 1 of PRI's program, adolescents engage in a WT program component called the Outdoor Leadership Experience (OLE), typically 6-8 weeks in duration. The WT component includes activities such as "canoeing, hiking, snowshoeing, participating in group initiatives, group and individual therapy, and journaling" (http://pineriverinstitute.com/our-program/, n.d.) to develop physical and social skills, and recognize the need for change (Mills & Kelly, 2019). There are two paramount therapeutic goals during this phase: developing emotional intelligence and increasing readiness for change (L. Mills, personal communication, June 15, 2019).

Phase 2 begins after adolescents graduate from WT and move into residence, which is located on a 200 acre campus in central Ontario. Adolescents typically spend eight months in residence and take part in academics, recreational activities, and ongoing individual, group, and family therapy, with the goal of developing maturity and leadership skills. Phase 3, Transition, occurs over four months, when participants are closely supported during home visits that gradually increase in frequency. Finally, in Phase 4, Aftercare, participants return to living at home full-time while engaging with an

aftercare provider for up to one year. The focus of Phase 4 is to support and sustain gains, integrate back into the community, and engage with school and/or work.

Parental engagement with therapy is also a central component of PRI's approach (Mills & Kelly, 2019; Uliaszek et al., 2019). Parents attend family and group therapy sessions, learning workshops, and multi-day retreats throughout the course of their child's treatment.

PRI admits a blend of private pay adolescents and adolescents funded by the Ministry of Health. In 2018, PRI admitted 32 adolescents; 16 were private pay clients and 16 were funded by the Ministry of Health. Clients who were funded by the Ministry of Health had a longer wait than those who paid privately (an average wait time of 559 days compared to 109 days). Over 90% of inquiries during 2018 were made by parents, while the rest were made by other family members, professionals, or the adolescents themselves. The average age of adolescents admitted during 2018 was 17.3 years.

Previous outcome studies at PRI indicate that adolescents have experienced significant improvements from pre-treatment to 1-2 years post-treatment across substance use, relationships, school success, and mental, physical, and behavioural health (Creighton & Mills, 2016; Mills et al., 2013; http://pineriverinstitute.com/our-program/, n.d.). One recent study comparing PRI participants to matched controls showed that receiving treatment from PRI resulted in a significant improvement in quality of life, abstinence from substance use, and a reduction in aggressive behaviour and rule-breaking (Hamdullahpur et al., 2018).

2.4 Emotional Intelligence

Three decades ago, emotional intelligence (EI) was defined by Salovey and Mayer (1990) as a set of skills that support processing emotional information and using emotional information to guide thinking and actions. Over the last three decades there have been a number of varying theoretical approaches that have attempted to further explain EI and operationalize the construct (e.g., Akerjordet et al., 2007; Mayer et al., 2002). Two dominant models of EI have emerged from this literature: ability models and trait models. Ability models conceptualize EI as a distinct cluster of abilities related to emotional information processing (Mayer & Salovey, 1997); trait models define EI as a lower-order personality construct that involves emotion-related dispositions and self-perceptions (Petrides et al., 2007).

The conceptual differences between Ability Emotional Intelligence (AEI) and Trait Emotional Intelligence (TEI) are highlighted through the different instruments used to measure each. Tests of AEI, such as the Mayer-Salovey-Cruso Emotional Intelligence Test (Mayer et al., 2002), seek to measure maximum performance by requiring the individual to solve emotional tasks. Measures of AEI evaluate constructs like emotional management and emotional perception and are akin to cognitive testing because of their use of external appraisals (Davis & Humphrey, 2012). Alternatively, tests of TEI use self-reporting instruments (e.g., Furnham & Petrides' (2003) Trait Emotional Intelligence Questionnaire) that ask people to report their EI skills based on typical performance. Measures of TEI evaluate constructs such as empathy and stress management and are similar to traditional personality tests in their use of internal appraisal (Davis & Humphrey, 2012; Zeidner & Olnick-Shemesh, 2010).

There are advantages and disadvantages associated with the different forms of EI and related measures. O'Connor et al. (2019) highlight that the theoretical basis of TEI has been called into question. For example, Davies et al. (1998) suggest that self-report measures of EI measure constructs that are fundamentally similar to the Big Five (i.e. Extraversion, Agreeableness, Neuroticism, Openness, and Conscientiousness). Others have suggested that self-reported measures of TEI are limited because people are not always able to make accurate assessments of their emotion-related tendencies and abilities (Boyatzis, 2018; Sheldon et al., 2014). O'Connor et al. (2019) have also argued that one advantage of ability-based measures is that they cannot be faked, and that AEI measures may be more engaging. However, AEI measures also face a number of fundamental problems (O'Connor et al., 2019). It has been suggested that AEI is nothing more than intelligence, an argument that is supported by the high correlation between AEI and IQ (O'Connor et al., 2019). Common measures of AEI also have poor reliability and validity (O'Connor et al., 2019) and tend not to be strong predictors of outcomes that they theoretically should predict (O'Boyle et al., 2011; Miao et al., 2017).

Nonetheless, EI has been linked to psychological maladjustment and mental illness in adolescents. For example, Resureccion et al. (2014) found that EI is negatively associated with internalizing problems, depression, and anxiety through a systematic review that included 32 studies on the topic. In this study, associations were found for both ability and TEI. Martins et al. (2010) similarly showed that EI is reliably associated with better mental health. Other studies have established evidence to suggest that TEI promotes resistance to psychological maladjustment and mental illness by reducing psychological and physiological reactivity (Laborde et al., 2011; Mikolajczak & Luminet,

2008). AEI appears to have a less firmly established association in the existing literature; AEI has been shown to predict increased negative emotionality when faced with lab-based stressors (Matthews et al., 2006). Conversely, AEI has been found to protect against deleterious psychological outcomes following a specific chronic form of stress (childhood sexual abuse) with a small, clinically referred sample (Cha & Nock, 2009). More recently, Davis and Humphrey (2012) found that while, in a sample of 405 adolescents, high levels of TEI reduced the impact of stressors such as negative life events, family disfunction, and socio-economic adversity, high levels of AEI amplified these associations.

EI has also been linked to substance use and substance use disorders in adolescents. One recent systematic review on the topic concluded that adolescent EI is associated with less substance abuse and better coping strategies related to substance use (Resureccion et al., 2014). In their systematic review of the research that explored the association between EI and addictions, Kun and Demetrovics (2010) concluded that lower levels of EI are associated with alcohol use, illicit drug use, and smoking. González-Yubero et al. (2019) found that EI predicted alcohol consumption among adolescents; while both AEI and TEI were found to predict alcohol consumption among adolescents, TEI was the most predictive. Finally, in their recent literature review, Martins et al. (2019) concluded that, overall, addictions are associated with EI deficits compared to controls.

EI has not been extensively considered in WT research. Some evidence exists suggesting that WT may have long term positive impacts on concepts associated with EI, such as emotional control and empathy (e.g., Caulkins et al., 2006; Gabrielsen et al.,

2019). Despite this, no WT studies appear to have explicitly considered the impact of WT on EI. As WT programs have been suggested by some to be designed in part to enhance emotional growth, and because WT clients often have challenges associated with emotional functioning, it is surprising that EI has not been more thoroughly considered in WT research (Bettmann et al., 2015; Russell & Phillips-Myers, 2002).

2.5 Readiness to Change

Therapy is commonly a voluntary process where clients access service from a mental health professional (Snyder & Anderson, 2009). It has consequently been suggested that many assume that a client's desire to change is a necessary condition to doing so (Bettmann et al., 2013; Cingolani, 1984; Snyder & Anderson, 2009). Prochaska and DiClemente's (1983) Transtheoretical model of change outlines one model.

The Transtheoretical model, sometimes called the Stages of Change model, has been suggested to pose a problem for WT programs because treatment is often involuntary from the client's perspective (Becker, 2010). This is highlighted by the fact that several studies outside of WT suggest that motivation to change is a core antecedent to behavioural change among adolescents (Clair et al., 2011; Callaghan et al., 2005; Gusella et al., 2003; Martinez et al., 2007; Slesnick et al., 2009; Slavet et al., 2006; Wei et al., 2011).

According to Bettmann et al. (2013), coercion in WT can take many forms, from a judge who may suggest an adolescent should participate in a treatment program to receive a relatively light sentence, to clients being escorted to treatment by a third party; WT studies in the United States have reported that such hired transportation services, which have been interpreted as involuntary entrance into treatment, are used in 50-60%

of treatment programs (Russell, 2007b; Tucker et al., 2015). Considering Prochaska and DiClemente's (1983) Transtheoretical model, Bettmann et al., (2013) suggest that WT's relationship with involuntary entrance highlights a consequently important question: Can adolescents change if they do not want to?

It has been argued that intrinsic motivation to change has largely been challenged by treatment success in various fields of mandated treatment (Snyder & Anderson, 2009). WT research also suggests that adolescents experience change without necessarily wanting to (Harper 2009; Harper & Russell 2008; Russell, 2007a). However, only three studies have considered the role of motivation to change in WT clients (Bettman et al., 2013; Russell, 2007a; Tucker et al., 2015).

Russell (2007a) administered the University of Rhode Island Change Assessment (URICA), an instrument developed by McConnaughy et al. (1989), to a sample of WT clients and found that the proportion of clients in the action phase rose from 27% to 90% from pre-WT treatment to post-WT treatment. The author suggested that these findings suggest that WT improves motivation to change and interest in participating in therapy. Bettman et al. (2013) sought to better understand why these changes occurred. This study included 189 adolescent participants who were enrolled in a private-pay WT program. One key finding from this study was a lack of relationship between URICA scores and improvements in adolescent functioning or relapse coping skills. These findings suggest that adolescents who lacked motivation to change and adolescents who were more motivated to change were equally likely to benefit from WT treatment (Bettman et al., 2013). Finally, Tucker et al. (2015) found that both transported and non-transported adolescent WT clients experienced increased URICA scores from pre- to post-treatment.

Chapter 3: Methods

3.1 Overview

This chapter outlines the research design, participant recruitment, instrumentation used, data collection, and data analyses conducted for this wilderness therapy (WT) study.

3.2 Research Design

A longitudinal case study research design (Creswell, 2003) was used to explore differences between pre-WT and post-WT changes in participants' Readiness to Change (RC) and Trait Emotional Intelligence (TEI), and how client profiles (sex, funding source, substance abuse severity, and digital interference in everyday life) predict these changes.

3.3 Ethics

Ethics approval for this study was obtained through the University of Victoria's Human Research Ethics Board (ethics protocol number #20-0196) (Appendix A) and permission from PRI was also approved after submission of a data-sharing agreement (Appendix B).

3.4 Recruitment and Sampling

Participants were recruited for this study as a function of their application for treatment at PRI. At the time of their application, participants and their parents had the option to decline participation in this research. At the times of data collection,

participants were asked to read and acknowledge understanding of consent forms and had the option to decline participation in this research.

Data were collected through PRI's initial online application form, and pen and paper surveys at various points throughout the adolescent's time at PRI. The surveys were co-created by the clinical and research teams at PRI for ongoing program evaluation and clinical purposes (Mills et al., 2013) and include a combination of standardized and non-standardized in-house measures. The current study analyzes an archived subset of data collected from these surveys.

Ninety adolescents were admitted to PRI between October 2016 and August 2019. Only adolescents who completed the Trait Emotional Intelligence Questionnaire Short Form (See Appendix D) and the University of Rhode Island Change Assessment (See Appendix E) at Admission and at Stage 2, immediately after completion of WT, were included in this study's sample. In total, 48 of the 90 adolescents were included in this study's sample based on this inclusion criteria.

3.5 Instruments

3.5.1 Client Demographic Information

Parents/guardians provided clients' demographic information (sex and age) as part of their online pre-treatment application to PRI.

3.5.2 Substance Abuse Severity

Substance abuse severity was coded using data from the Drug History Questionnaire (DHQ: Sobell et al., 1995; See Appendix C). Adolescents completed the DHQ during their initial admission intake. The DHQ is a multi-page form that takes

about five to ten minutes to complete and collects data across nine different classes of drugs: alcohol, cannabis, hallucinogens, depressants, inhalants, narcotics, stimulants, tranquilizers, and other drugs (Sobell & Sobell, 2007). For each drug class, information is collected about if the drug has ever been used, and if so: a) number of years used; b) if the drug was ever prescribed; c) year last used; and d) frequency of past use during a typical month. The DHQ has been shown to have good test-retest reliability among drug users in residential treatment (Sobell et al., 1995).

Substance abuse severity scores were based on adolescent reports of frequency of marijuana use, preferred drug of choice, and the total number of reported drugs ever used (Mills et al., 2013). *Consistent and problematic* (4) was indicated if marijuana was used daily, or if the participant's drug of choice was something other than marijuana or alcohol (e.g., cocaine). *Periodic slips* (3) was indicated if marijuana use was multiple times per week or participants reported having ever used seven or more drugs. *Social/occasional* (2) was indicated if marijuana use was less than twice per week or if participants reported having ever used more than four to five drugs. *Low/no use* (1) was indicated if there was no use of marijuana, or participants reported lifetime use of less than four different drugs.

3.5.3 Digital Interference

Digital interference was coded using data from the Drug History Questionnaire (DHQ: Sobell et al., 1995). Participants were asked to indicate how recently they had experienced the following:

1. Engaged in virtual relationships so much that it interfered with daily life
2. Used video games so much that it interfered with daily life
3. Were online so much that it interfered with daily life

Response options included: (i) past month, (ii) 2-3 months ago, (iii) 4-12 months ago, (iv) 1+ year ago and, (v) never.

3.5.4 Trait Emotional Intelligence

Clients' TEI was evaluated using the Trait Emotional Questionnaire Short Form (TEIQue-SF: Petrides & Furnham, 2006). The TEIQue-SF is a 30-item, self-report scale that yields a valid and reliable global measure of TEI (Petrides & Furnham, 2006). This measure was derived from the Trait Emotional Questionnaire Long Form (Petrides & Furnham, 2003) by including two questions from each of that measure's 15 subscales. Each of the 15 subscales is identified as one element within the construct of TEQ. The TEIQue-SF has demonstrated moderate to strong correlations with other EI inventories and the measure's global TEI score has demonstrated an internal consistency of .88 (Petrides & Furnham, 2006; Neubauer et al., 2008). To review the TEIQue-SF, see Appendix D.

The TEIQue-SF includes 30 questions that use a 7-point Likert scale that ranges from 1 (completely disagree) to 7 (completely agree) to determine a global trait EI score. In addition, the TEIQue-SF can be used to provide scores for the four underlying factors of TEI - Emotionality, Self-Control, Sociability, and Well-Being – at a lower internal consistency (Petrides & Furnham, 2006). This study only seeks to measure global EI using the TEIQue-SF.

As a measure of TEI, the TEIQue-SF has been described as a "very good, comprehensive measure of trait EI" (O'Connor et al., 2019, n.p.). There is also evidence in support of the TEIQue-SF's reliability and validity (Andrei et al., 2016). For example,

Abdolrezapour and Tavakoli (2012) reported the reliability to be 0.82, and Zampetaskis (2011) reported the reliability to be 0.88.

3.5.5 Readiness to Change

Clients' Readiness to Change was evaluated using the University of Rhode Island Change Assessment (URICA: McConnaughy et al., 1989). The URICA is based on the Transtheoretical model of change set forth by Prochaska and DiClemente (1983) designed to assess readiness to implement major lifestyle changes. The URICA includes 32 questions that use a 5-point Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree) to assess the way individuals feel when starting to address challenges in their lives.

The URICA has been shown to be a reliable and valid measure of the states of change and readiness to change for adolescents (Greenstein et al., 1999). Despite these promising psychometric properties, studies exploring the predictive validity of the URICA have been mixed, as have findings from studies that support the Transtheoretical model of Change (Pantalon et al., 2002).

3.6 Procedures

Data analyzed in this study is a subset of a larger data corpus collected from parents or guardians and adolescent clients at PRI. Collection of data at PRI spans from a screener and application questionnaire before admission to treatment to 3+ years post-treatment, with multiple data collection points in-between. The data analyzed for this study was collected at three stages: (1) during the initial online application, (2) at

adolescents' admission intakes before starting WT, and (3) when adolescents transitioned from Phase 1 (WT) to Phase 2 (Residence) (Table 1).

Table 1

Overview of data collection

Factor	Tool	Application	Admission	Transition to Phase 2
Demographics	n/a	Parent		
Substance abuse severity	DHQ		Adolescent	
Digital interference	DHQ		Adolescent	
Emotional Intelligence	TEIQue-SF		Adolescent	Adolescent
Readiness to Change	URICA		Adolescent	Adolescent

3.7 Data Analysis

All data were anonymized by PRI's research team before being accessed by the researcher. Data were analyzed using R Studio version 3.6.1 and Microsoft Excel 2016. Statistical significance was set a priori at an alpha of $\alpha = 0.05$.

3.7.1 Missing Data

Eight participants had at least one value of missing DHQ data; three of these eight participants had missing data for frequency of marijuana use and five of these eight participants had missing data for all three digital interference questions. Missing data represented 2.6% of the total dataset. A research associate at Pine River Institute confirmed that the missing data was a result of incomplete DHQs. A *K nearest neighbours* (kNN) algorithm was used to impute this missing data. kNN has been widely used as a method of imputing missing data and has comparatively high accuracy (Zhang,

2008). kNN finds the k nearest neighbour for a missing value in a dataset, and imputes the missing value based on the mode or mean (Troyanskaya et al., 2001).

3.7.2 Does participation in PRI's WT component increase trait emotional intelligence? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference?

In order to address the first research question, descriptive statistics (frequencies, means, standard deviations, and measures of normality) were calculated for all variables. This was done to check if the dataset met assumptions for parametric statistics and to describe the sample.

A paired sample t-test was conducted to see if pre/post WT TEIQue-SF scores were significantly different. Comparisons were made with a Bonferroni correction establishing alpha at 0.025 to protect against Type 1 error. Associations between pre-treatment client-level variables and changes in trait emotional intelligence were investigated using Pearson correlations. Dichotomous variables were coded as 0-1 to allow for the use of Pearson correlations. This is equivalent to calculating a point-biserial correlation coefficient, used to investigate the association between a continuous and dichotomous variable (Korbrot, 2005). If pre/post WT TEIQue-SF scores were found to be significantly different a multivariable linear regression was then used to investigate if the variance in TEI was accounted for by any of the client-level pre-treatment variables.

3.7.3 Does participation in PRI's WT component increase readiness to change? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference?

The same approach used to address the first research question was used to address this second research question. First, a paired sample t-test was conducted to see if pre/post WT URICA scores were significantly different. Comparisons were made with a Bonferroni correction establishing alpha at 0.025 to protect against Type 1 error. Associations between pre-treatment client-level variables and changes in readiness to change were investigated using Pearson correlations. Dichotomous variables were coded as 0-1 to allow for the use of Pearson correlations. This is equivalent to calculating a point-biserial correlation coefficient, used to investigate the association between a continuous and dichotomous variable (Korbrot, 2005). If pre/post WT readiness to change scores were found to be significantly different, multivariable linear regression was then used to investigate if the variance in RC was accounted for by any of the client-level pre-treatment variables.

Chapter 4: Findings

4.1 Overview

This chapter provides the results of the study starting with a description of the sample including descriptive statistics for all variables, followed by parametric statistics that address each research question.

4.2 Sample

A total of 48 adolescents participated (mean age at admission = 17.06 yrs; SD = 1.33) with a small majority being male (56%). 34 (71%) study participants were receiving full funding from the Ontario Ministry of Health (MOH) to attend Pine River Institute (PRI). The remaining participants were either funded by both the Ontario MOH and private pay (17%) or private pay only (12%). Racial and ethnic data were not available for participants in this sample.

The average length of stay in wilderness therapy was 49.56 days (range 20 – 102 days). At the time of writing this, 8 participants were still in residential treatment, 16 had not completed residential treatment, and 24 had completed residential treatment. Among the 34 participants in this sample who had data available, the average length of stay at PRI was 459 days.

4.3 Descriptive Statistics

Descriptive statistics (frequencies, means, and standard deviations) were calculated for all client-level predictor variables (Table 2) and outcome variables (Table 3). Normality of each continuous variable was tested using the Shapiro-Wilk test ($p > 0.05$). Results (Table 4) indicate that four of the seven continuous variables met the

assumption of normality. The three variables that did not meet the assumption of normality were age at admission, substance abuse severity, and post-WT URICA scores. Density plots for these three variables (Appendix F) were visually inspected for notable breaks between high and low values. Based on this visual inspection and the robust nature of the parametric statistics I used in the subsequent steps of this analysis, I decided to proceed with the analysis plan outlined in Chapter 3.

Table 2

Descriptive statistics for predictor variables (n = 48)

Variable	n (%)	Mean (SD)
Sex		
Male	27 (56%)	
Female	21 (44%)	
Age		17.06 (1.33)
Funding		
Private pay	6 (12%)	
Private pay & MOH	34 (71%)	
MOH	8 (17%)	
Substance abuse severity		3.15 (1.11)
Digital interference		
Video Games		
Yes	22 (46%)	
No	26 (54%)	
Online		
Yes	20 (42%)	
No	28 (58%)	
Virtual Relationships		
Yes	4 (8%)	
No	44 (92%)	

Table 3

Descriptive statistics for outcome variables

Variable	n	Mean(SD)
Trait Emotional Intelligence		
TEIQue-SF Pre-WT	48	4.28 (0.67)
TEIQue-SF Post-WT	48	4.38 (0.60)
Readiness to Change		
URICA Pre-WT	48	8.49 (1.97)
URICA Post-WT	48	9.43 (2.03)

Table 4

Shapiro-Wilk tests (n = 48)

Variable	Statistic	df	Sig.
Age	0.94	48	0.01**
Substance abuse severity	0.74	48	6.5e-08**
TEIQue-SF pre-WT	0.98	48	0.54
TEIQue-SF post-WT	0.97	48	0.31
URICA pre-WT	0.98	48	0.54
URICA post-WT	0.88	48	3.2e-03**

Note. * refers to significant p < .05. ** refers to significant p < .01.

Correlations between the seven client-level predictor variables are presented in Table 5. Pearson correlations show significant negative correlations between funding and age (r = -0.32, $p < 0.05$) and between age and online interference in everyday life (r = *-0.30*, p = 0.04), and significant positive correlations between online interference in everyday life and video game interference in everyday life (r = 0.41, $p < 0.01$) and between online interference in everyday life and virtual relationship interference in everyday life (r = 0.36, $p < 0.01$). Pearson correlations between all other predictor variables show non-significant correlations, suggesting that most of the client-level variables are independent of each other in this sample.

Table 5

Correlations between predictor variables

Variables	1.	2.	3.	4.	5.	6.	7.
1. Sex	1.00						
2. Age	0.09	1.00					
3. Funding	0.01	-0.32*	1.00				
4. Sub. abuse sev.	0.07	0.05	0.11	1.00			
5. Video games	-0.22	-0.01	-0.01	0.11	1.00		
6. Online activity	0.02	-0.30*	0.04	-0.04	0.41**	1.00	
7. Virtual relat.	0.04	-0.07	0.04	-0.18	0.18	0.36**	1.00

Note. * refers to significant $p < .05$. ** refers to significant $p < .01$.

4.4 Does participation in PRI's WT component increase trait emotional intelligence? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference?

Welch's paired-sample t-test with Bonfferoni correction was conducted to explore if there was a significant difference between pre and post-WT TEIQue-SF means. Results indicate that pre-WT TEIQue-SF scores ($M = 4.28$, $SD = 0.67$) did not differ significantly from post-WT TEIQue-SF ($M = 4.33$, $SD = 0.60$), $t(47) = 0.37$, $p = 0.71$. Given this nonsignificant result, a multivariable linear regression was not calculated.

Correlations between pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference – and TEIQue-SF scores are presented in Table 6. Pearson correlations show two significant negative correlations between sex (male = 0, female = 1) and pre-WT TEIQue-SF scores ($r = -0.33$, $p < 0.05$) and between sex and post-WT TEIQue-SF scores ($r = -0.43$, $p < 0.01$). These results show that pre-WT TEIQue-SF scores and post-WT TEIQue-SF scores were, on average, significantly larger for male participants than female participants.

The person correlations also show two significant positive correlations between video game interreference in everyday life (no = 0, yes = 1) and TEIQue-SF change scores ($r = 0.28$, $p < 0.05$) and between online interference in everyday life (no = 0, yes = 1) and TEIQue-SF change scores ($r = 0.38$, $p < 0.01$). These results indicate that TEIQue-SF change scores were, on average, larger for adolescents who had experienced video game interference in everyday life compared to adolescents who had not, and that TEIQue-SF change scores were, on average, larger for adolescents who had experienced interference in everyday life because of their online activity compared to adolescents who had not. Pearson correlations between all other predictor variables and TEIQue-SF scores show non-significant correlations.

Table 6

Correlations between predictor variables and TEIQue-SF scores

Variables	Pre-WT TEIQue-SF	Post-WT TEIQue-SF	Δ TEIQue-SF
1. Sex	-0.33*	-0.43**	-0.07
2. Age	-0.08	0.01	0.12
3. Funding	0.09	-0.02	-0.03
4. Sub. abuse sev.	0.02	0.00	-0.02
5. Video games	-0.24	-0.03	0.28*
6. Online activity	-0.36*	-0.08	0.38**
7. Virtual relat.	-0.14	-0.11	0.05

Note. * refers to significant p < .05. ** refers to significant p < .01.

4.5 Does participation in PRI's WT component increase readiness to change? Did this differ by pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference?

Welch's paired-sample t-test with Bonferroni correction was conducted to explore if there was a significant difference between pre and post-WT URICA means. Results

indicate that pre-WT URICA scores (M = 8.49, SD = 1.97) differed, on average, significantly from post-WT URICA (M = 9.43, SD = 2.03), $t(47) = 2.30$, $p < 0.05$.

Correlations between pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference – and URICA scores are presented in Table 7. Pearson correlations show two significant positive correlations between sex (male = 0, female = 1) and pre-WT URICA scores ($r = 0.29$, $p < 0.05$) and between virtual relationship interference in everyday life (no = 0, yes = 1) and URICA change scores ($r = 0.30$, $p < 0.05$). These results indicate that pre-WT URICA scores were, on average, larger for females, and that URICA change scores were, on average, larger for adolescents who indicated that they had experienced interference in their everyday life because of a virtual relationship. Pearson correlations between all other predictor variables and URICA scores show non-significant correlations.

Table 7

Correlations between predictor variables and URICA scores

Variables	Pre-WT URICA	Post-WT URICA	Δ URICA
1. Sex	0.29*	0.16	-0.15
2. Age	0.23	0.18	-0.06
3. Funding	-0.01	-0.05	-0.04
4. Sub. abuse sev.	0.07	0.01	-0.07
5. Video games	0.15	0.14	-0.01
6. Online activity	0.16	0.24	0.11
7. Virtual relat.	0.06	0.28	0.30*

Note. * refers to significant p < .05. ** refers to significant p < .01.

The multivariable linear regression model for client-level variables and change in URICA scores is presented in Table 8. This model accounted for 2.09% of the variance in URICA change scores ($F(7,40) = 0.86$, $p = .54$, $R^2_{Adjusted} = -0.02$).

Table 8

Multivariable linear regression model client-level variables and Δ URICA

Independent variables	Estimate	Std. Error
1. Sex	-0.58	0.47
2. Age	-0.04	0.19
3. Funding	-0.15	0.33
4. Sub. abuse sev.	0.03	0.21
5. Video games	-0.38	0.52
6. Online activity	0.14	0.88
7. Virtual relat.	1.71	0.88

Chapter 5: Discussion and Conclusion

5.1 Overview

The evidence base for wilderness therapy (WT) continues to grow, illustrating some promising outcomes (e.g., Bettmann et al., 2016; Bowen & Neill, 2013; Gillis et al., 2016). Despite gaining support as an engaging approach for adolescent populations, a firmly established and theoretically supported evidence base has yet to be established (Dobud & Harper, 2018). WT outcome research has been relatively limited in scope, and the question of 'for whom?' (the question of client fit), has largely gone unconsidered in the existing literature (Fernee et al., 2017).

The overall aim of this study was twofold: (1) to examine if PRI's WT component increases TEI and/or RC and (2) to examine if pre-treatment client-level variables – sex, age, funding, substance abuse severity, and digital interference – predict changes in TEI and/or RC. To the researcher's knowledge, this study builds on a handful of existing studies to explore RC in the context of WT (e.g., Bettmann et al., 2013; Russell, 2007; Tucker et al., 2015), but is the first WT study to explore TEI as an outcome of WT. This also appears to be the first time the pre-treatment client-level variables substance abuse severity and digital interference have been explored as predictors of WT outcomes.

This chapter starts with a discussion of the WT outcomes (TEI and RC) and pre-treatment client-level predictor variables (sex, age, funding, substance abuse severity, and digital interference) that were studied in this research. In both cases, findings are discussed in the context of the existing literature. Implications and future research directions are then discussed before concluding this chapter by noting the present study's strengths and limitations.

5.2 Outcomes: Emotional Intelligence and Readiness to Change

A growing body of evidence connects participation in WT with a host of treatment outcomes (e.g., Brown & Neill, 2013; Russell et al., 2017). For example, recent meta-analyses of WT treatment outcomes support WT as a promising alternative treatment modality (Bettmann et al., 2016; Bowen & Neill, 2013; Gillis et al., 2016). However, a firmly established and theoretically supported evidence base has yet to be established (Becker & Russell, 2016; Dobud & Harper, 2017). This study builds on previous WT outcomes research by exploring if two outcome variables (TEI and RC) changed over the course of WT participation at PRI.

Emotional intelligence (EI) has largely gone unstudied as a WT treatment outcome in the existing literature. The one apparent exception was a study conducted by Caulkins et al. (2006) on the role of physical exercise in WT for troubled adolescent women. The authors found that participants developed an enhanced awareness of: (1) the natural surroundings, (2) the self, and (3) the other group members. It was this third component of participants' enhanced awareness that the authors described as "suggesting a major advancement in emotional intelligence" (p. 33).

The present study appears to be the first to consider TEI as an outcome of WT. Findings show that adolescents' composite TEIQue-SF scores after participation in WT did not differ significantly from their TEIQue-SF scores before WT. These findings do not appear to align with some existing evidence that suggests WT may have long-term positive impacts on concepts associated with EI, such as emotional control and empathy. These findings also break from suggestions that have been made by some that WT programs are designed, in part, to enhance emotional growth (Bettmann et al., 2015;

Russell & Phillips-Myers, 2002). However, given that trait models of EI conceptualize EI as a lower-order personality construct related to dealing with emotion (Petrides et. al., 2007), it may be unlikely that a relatively short wilderness intervention, such as the one that was the focus of this study, would significantly change participants' TEIQue-SF scores.

As is the case in the WT literature, EI appears to be similarly unconsidered as a treatment in other outdoor adventure fields, such as outdoor education. One notable exception suggests that EI may be positively impacted through outdoor adventure experiences in some contexts. Opper et al. (2014) found that participation in outdoor education during adolescence led to a sustainable increase in participants' overall EI scores. If one goal of some WT programs is to support participants in developing their self-awareness, self-regulation, empathy, and interpersonal skills, future WT research about EI as a treatment outcome may be beneficial.

Compared to EI, RC has been studied more extensively in the context of WT, albeit infrequently compared to other treatment outcomes. Past research has shown that participation in WT is likely to improve client's RC. For example, Russell (2007) administered the URICA to a sample of WT clients. At pre-treatment, only 27% of the sample included in the study were in the action stage of Prochaska and DiClemente's (1983) model. At discharge, 90% of participants were in the action and/or maintenance stage. Russell (2007) concluded that participation in the WT program improved participants' motivation to change and interest in therapy, but noted that it was unknown why the changes occurred.

Two subsequent studies (Bettmann et al., 2013; Tucker et al., 2015) similarly showed that RC, measured using the URICA, increased significantly after participation in WT. These two studies extended Russell's (2007) findings by showing that pre-treatment RC and RC change scores did not predict mean positive treatment outcomes as measured by Youth Outcome Questionnaire change scores. Both groups of authors suggested that their findings indicate that resistance to treatment at admission does not reduce the effectiveness of WT and, by extension, is not a necessary condition for beneficial therapeutic outcomes in WT.

The present study explored RC as one treatment outcome of WT. This decision was made after consultation with PRI's Director of Research, who explained that one expected outcome of PRI's WT component is to increase participants' motivation to change such that participants enter residence (the subsequent phase at PRI) with increased motivation (L. Mills, personal communication, April 20, 2019). Results show that participation in PRI's WT component did, on average, significantly increase participants' motivation to change, as measured by their composite URICA scores.

Taken together, these findings provide evidence that participation in WT at PRI has a positive impact on participants' RC but not TEI. Previous research conducted at PRI has indicated that participants have varied experiences during WT and, for some, it takes months or years after the program to acknowledge the value of their WT experience (Harper et al., 2019). While URICA scores significantly increased following WT and TEIQue-SF scores did not, the prolonged process of reflecting on the WT experience may suggest WT has latent effects on outcomes such as URICA and TEI. While beyond the

scope of the present study, exploring such effects in future research might provide a more detailed account of the impacts that WT has on these two treatment outcomes.

5.3 Client Fit

There are growing calls in the WT literature to extend our empirical understanding of WT beyond outcomes by also focusing on what works for whom. For example, Harper et al., (2019) state that the question of what works for whom is an important consideration from a client-centered and ethical practice perspective. These authors also raise the point that currently there appears to be no empirically informed assessment that can pre-determine the fit of a prospective client for WT. One approach to better understanding which clients are likely to benefit from WT, and to what extent, is to study how individual client-level variables predict WT outcomes (Fernee et al., 2017).

The present study sought to understand how five client-level pre-treatment variables (sex, age, funding, substance abuse severity, and digital interference) predicted changes in TEI and RC. To the author's understanding, this was the first study that sought to explore how substance abuse severity and digital interference before treatment may have predicted outcomes of WT. In doing so, this study extends the examination of client-level pre-treatment variables beyond the 'traditional', or commonly considered, participant characteristics or predictors at the individual level such as age and sex (Russell & Sibthorp, 2004).

Findings indicate that TEIQue-SF change scores were, on average, larger for participants who had experienced interference in everyday life because of video games compared to participants who had not, and for participants who had experienced interference in everyday life because of online activity compared to participants who had

not. As pre-post changes in mean TEIQue-SF scores were found to be not significant, a linear model was not calculated for client-level pre-treatment variables and changes in TEIQue-SF. Nonetheless, the statistically significant correlational findings between digital interference and changes in TEIQue-SF suggest that digital interference may be one relevant client-level variable related to changes in Trait Emotional Intelligence during WT.

Similarly, findings from this study also show that URICA change scores were, on average, larger for participants who had experienced interference in everyday life because of a virtual relationship compared to participants who had not. As pre-post changes in mean URICA scores were significantly different, relationships between client-level pre-treatment variables and changes in URICA scores were further examined using a linear model. Findings show that none of the client-level pre-treatment variables significantly predicted the mean change in URICA. The predictive relationship of the association between virtual relationship interference in everyday life and URICA change scores was such that experiencing interference in everyday life because of a virtual relationship in the past year predicted larger improvements in URICA from pre- to post-WT. While this relationship was not found to be statistically significant, further study is warranted given the fact that only four adolescents responded yes to this question. The non-significant associations found between the other client-level pre-treatment variables are similarly interesting, as they suggest that for this sample, sex, age, funding, substance abuse severity, and digital interference (from online activity and video games) do not predict a significant amount of change in participants' readiness to change.

The finding that the pre-treatment client-level variables considered in the present study did not significantly predict changes in RC should not, however, be interpreted as suggesting that pre-treatment client-level variables are not relevant, or that WT will impact all participants similarly. In another PRI study, Harper et al. (2019) showed that participants in PRI's WT had varied experiences of salient components of WT. For example, these authors showed that challenging aspects of wilderness, such as those related to outdoor travel and living practices, were described as positively contributing to some participants' change processes while others openly stated that they found these aspects to be the least helpful part of WT. This suggests that further research considering the relationship between pre-treatment client-level variables is needed, and may benefit from including process factors as well.

5.4 Implications and Future Research

As mentioned above, there have been considerable calls in the literature to not just focus on outcomes of WT, but to consider what works for whom. Future research on client fit may also benefit from consideration of process factors, such as programmatic circumstances, service models, and clients' experiences during WT. Doing so is likely to help gain an understanding of what works for whom and why, and may allow for WT to be used more prescriptively for specific populations of adolescents (Fernee et al., 2017). Further, as WT programs are considerably heterogenous in populations served and programming goals, salient pre-treatment and client-level variables, process factors, and outcome variables are likely to vary across programs and contexts. Site-specific approaches to WT with rich descriptions of the site's therapeutic milieu and population served will help address notable gaps in existing WT research (Fernee et al., 2017).

Similarly, future research may benefit from larger sample sizes to increase statistical power and consideration of additional client-level pre-treatment variables. The current study was limited to client-level pre-treatment variables that were available in the existing dataset and thus represented a selection that was convenient. Finally, further study is needed to understand the relationship between digital interference in everyday life and WT outcomes. The present study indicates that, on average, adolescents who had experienced interference in their everyday life due to video games or online activity experienced larger TEIQue-SF changes, and adolescents who experienced interference in their everyday life due to a virtual relationship experienced, on average, larger URICA changes.

5.5 Strengths of the Study

There are several strengths that this study has that may support its contribution to the literature. First, by examining client-level pre-treatment variables (sex, age, funding, substance abuse severity and digital interference) it provides some insight into client-fit for WT at PRI. This study also appears to be the first to consider an empirical measurement of TEI as an outcome of WT.

5.6 Limitations of the Study

This study was limited in a number of ways. First, data were included from clients who participated in WT between November 2016 and October 2019. Over the course of this time program changes and changes in populations served may have occurred. These changes were not considered in the present study and their potential impacts on the data analyzed is unknown.

This study was limited to specific client-level pre-treatment variables and two outcomes. Process factors, such as adolescents' experiences of specific elements of WT (e.g., social dynamics, challenge in nature), have been shown to impact participants at PRI differentially (Harper et al., 2019). Further, WT has been criticized for its lack of empirical understanding of how change occurs (Dobud & Harper, 2018). As process factors were not considered in the current study, possible mediating or moderating relationships between them, client-level variables, and outcome variables were not considered. Further, an explanation of why readiness to change increased, on average, for participants exceeds the scope of the current study.

Another limitation of the present study is that only five client-level pre-treatment variables were considered. Other client-level pre-treatment variables are likely to impact WT outcomes at PRI. For example, family involvement in WT at PRI has been shown to be one important process factor (Creighton & Mills, 2016). By extension, clients' relationships with their families or caregivers before WT might be one significant client-level pre-treatment variable that predicts outcomes. Similarly, this research was limited to anonymized data and did not directly access participants or staff for additional sources of data.

Three of the six continuous variables included in this study did not meet the assumption of normality inherent to the parametric statistics used. The researcher decided to proceed after density plots were visually examined, given the robust nature of the statistical tests used. This nonetheless represents a limitation of this study. Finally, given the relatively small sample size used for this study, statistical power to identify

significant results was limited. Given this, the findings cannot be generalised beyond this specific study sample at PRI; cautious interpretation of the findings is recommended.

Bibliography

Abdolrezapour, P., & Tavakoli, M. (2012). The relationship between emotional intelligence and EFL learners' achievement in reading comprehension. *Innovation in Language Learning and Teaching*, *6*(1), 1-13.

Akerjordet, K., & Severinsson, E. (2007). Emotional intelligence: A review of the literature with specific focus on empirical and epistemological perspectives. *Journal of Clinical Nursing*, *16*(8), 1405-1416.

Andrei, F., Siegling, A. B., Aloe, A. M., Baldaro, B., & Petrides, K. V. (2016). The incremental validity of the trait emotional intelligence questionnaire (TEIQue): A systematic review and meta-analysis. *Journal of Personality Assessment*. *98*(3), 261–276.

Anglin, J. P., & Knorth, E. J. (Eds.). (2004). *International perspectives on rethinking residential care*. Kluwer Academic/Human Sciences Press.

Baker, A. J., & Calderon, P. (2004). The role of group homes in the child welfare continuum of care. *Residential Treatment for Children & Youth*, *21*(4), 39-58.

Bates, B. C., English, D. J., & Kouidou-Giles, S. (1997, February). Residential treatment and its alternatives: A review of the literature. *Child and Youth Care Forum*, *26*(1), 7-51.

Becker, S. P. (2010). Wilderness therapy: Ethical considerations for mental health professionals. *Child & Youth Care Forum*, *39*, 47–61.

Becker, S. P., & Russell, K. C. (2016). Wilderness therapy. In R. J. R. Levesque (Ed.), *Encyclopedia of Adolescence* (2nd ed.). (pp. 1–10). Springer.

Bettmann, J. E., Freeman, P. C., & Parry, K. J. (2015). Differences between adopted and nonadopted adolescents in wilderness and residential treatment. *Journal of Experiential Education*, *38*(3), 245-261.

Bettmann, J. E., Gillis, H. L., Speelman, E. A., Parry, K. J. & Case, J. M. (2016). A meta-analysis of wilderness therapy outcomes for private pay clients. *Journal of Child and Family Studies, 25,* 2659-2673.

Bettmann, J. E., Lundahl, B. W., Wright, R., Jasperson, R. A., & McRoberts, C. H. (2011). Who are they? A descriptive study of adolescents in wilderness and residential programs. *Residential Treatment for Children & Youth*, *28*(3), 192-210.

Bettmann, J. E., Russell, K. C., & Parry, K. J. (2013). How substance abuse recovery skills, readiness to change and symptom reduction impact change processes in wilderness therapy participants. *Journal of Child and Family Studies, 22*(8), 1039-1050.

Bettmann, J. E., Tucker, A. R., Tracy, J., & Parry, K. J. (2014). An exploration of gender, client history, and functioning in wilderness therapy participants. *Residential Treatment for Children & Youth*, *31*(3), 155-170.

Beringer, A. (2004). Toward an ecological paradigm in adventure programming. *Journal of Experiential Education*, *27*(1), 51-66.

Boyatzis, R. E. (2018). The behavioral level of emotional intelligence and its measurement. *Frontiers in Psychology*, *9,* 1-12. doi.org/10.3389/fpsyg.2018.01438

Boyer, S. N., Hallion, L. S., Hammell, C. L., & Button, S. (2009). Trauma as a predictive indicator of clinical outcome in residential treatment. *Residential Treatment for Children & Youth*, *26*(2), 92-104.

Bowen, D. J., & Neill, J. T. (2013). A meta-analysis of adventure therapy outcomes and moderators. *The Open Psychology Journal, 6*, 28-53.

Burlingame, G., Wells, A., Lambert, M., & Cox, J. (2004). *Youth Outcome Questionnaire: Updated psychometric properties*. In M. Maruish (Ed.), The use of psychological testing for treatment planning and outcome assessment (3rd ed., Vol. 2, p. 235–274). Lawrence Erlbaum Associates.

Butler, L. S., & McPherson, P. M. (2007). Is residential treatment misunderstood? *Journal of Child & Family Studies*, *16*, 465−472.

Callaghan, R. C., Hathaway, A., Cunningham, J. A., Vettese, I. C., Wyatt, S., & Taylor, L. (2005). Does stage-of-change predict dropout in a culturally diverse sample of adolescents admitted to inpatient substance-abuse treatment? A test of the transtheoretical model. *Addictive Behaviors, 30*, 1834–1947.

Caulkins, M. C., White, D. D., & Russell, K. C. (2006). The role of physical exercise in wilderness therapy for troubled adolescent women. *Journal of Experiential Education*, *29*(1), 18-37.

Cha, C. B., & Nock, M. K. (2009). Emotional intelligence is a protective factor for suicidal behavior. *Journal of the American Academy of Child & Adolescent Psychiatry, 48*(4), 422-430.

Cingolani, J. (1984). Social conflict perspective on work with involuntary clients. *Social Work, 29*, 442–446.

Clair, M., Stein, L. A. R., Martin, R., Barnett, N. P., Colby, S. M., Monti, P. M., Golembeske, C. Jr., Lebeau, R. (2011). Motivation to change alcohol use and treatment engagement in incarcerated youth. *Addictive Behaviors, 36,* 647–680.

Creighton, V., & Mills, L. (2016). Family matters: Engaging parents in youth treatment. *Journal of Therapeutic Schools and Programs*, *8*(1), 51-58.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Sage.

Crisp, S. J. R., Noblet, L., & Hinch, C. (2004). Guidelines for the practice of wilderness adventure therapy: Findings from the systemic wilderness adventure therapy research and development (SWATRAD) project. Melbourne, Australia: Youth Psych Consulting.

Danermark, B., Ekström, M., Jakobsen, L., & Karlsson, J. C. (2002). *Explaining society: Critical Realism in the Social Sciences*. Routledge.

Davies, M., Stankov, L., & Roberts, R. D. (1998). Emotional intelligence: In search of an elusive construct. *Journal of Personality and Social Psychology*. *75*(4), 989. doi.org/10.1037/0022-3514.75.4.989

Davis, S. K., & Humphrey, N. (2012). The influence of emotional intelligence (EI) on coping and mental health in adolescence: Divergent roles for trait and ability EI. *Journal of Adolescence*, *35*(5), 1369-1379.

Dobud, W., & Harper, N. J. (2018). Of Dodo birds and the common factors: A scoping review of adventure therapy direct comparison trials. *Complementary Therapies in Clinical Practice, 31,* 16-24.

Fernee, C. R., Gabrielsen, L. E., Andersen, A. J., & Mesel, T. (2017). Unpacking the black box of wilderness therapy: A realist synthesis. *Qualitative Health Research*, *27*(1), 114-129.

Fernee, C. R., Mesel, T., Andersen, A. J., & Gabrielsen, L. E. (2019). Therapy the natural way: A realist exploration of the wilderness therapy treatment process in adolescent mental health care in Norway. *Qualitative Health Research*, *29*(9), 1358-1377.

Freudenthaler, H. H., Neubauer, A. C., Gabler, P., Scherl, W. G., & Rindermann, H. (2008). Testing and validating the trait emotional intelligence questionnaire (TEIQue) in a German-speaking sample. *Personality and Individual Differences*, *45*(7), 673-678.

Furnham, A., & Petrides, K. V. (2003). Trait emotional intelligence and happiness. *Social Behavior and Personality: An International Journal*, *31*(8), 815-823.

Gabrielsen, L. E., Eskedal, L. T., Mesel, T., Aasen, G. O., Hirte, M., Kerlefsen, R. E., ... & Fernee, C. R. (2019). The effectiveness of wilderness therapy as mental health treatment for adolescents in Norway: A mixed methods evaluation. *International Journal of Adolescence and Youth*, *24*(3), 282-296.

Gabrielsen, L. E., & Harper, N. J. (2017). The role of wilderness therapy for adolescents in the face of global trends of urbanization and technification. *International Journal of Adolescence and Youth*, *23*(4), 409-421.

Gallagher, B., & Green, A. (2012). In, out and after care: Young adults' views on their lives, as children, in a therapeutic residential establishment. *Children and Youth Services Review*, *34*(2), 437-450.

Gass, M. A., Gillis, H. L., & Russell, K. C. (2012). *Adventure therapy: Theory, practice, & research*. Routledge Press.

Gillis, H., Speelman, E., Linville, N., Bailey, E., Kalle, A., Oglesbee, N., … Jensen, J., (2016). Meta-analysis of treatment outcomes measured by the Y-OQ and Y-OQ-SR comparing wilderness and non-wilderness treatment programs. *Child and Youth Care Forum, 45*(6), 851-863.

González-Yubero, S., Palomera, R., & Lázaro-Visa, S. (2019). Trait and ability emotional intelligence as predictors of alcohol consumption in adolescents. *Psicothema*, *31*(3), 292-297.

Greenstein, D., Franklin, M., & McGuffin, P. (1999). Measuring motivation to change: An examination of the University of Rhode Island change assessment questionnaire (URICA) in an adolescent sample. *Psychotherapy: Theory, Research, Practice, Training*, *36*(2), 47–55.

Grietens, H., Knorth, E., Barth, R., Cummings, M., Stein, M., Courtney, M., ... & McNamara, P. (2014). *Therapeutic residential care for children and youth: Developing evidence-based international practice*. Jessica Kingsley Publishers.

Gusella, J., Butler, G., Nichols, L., & Bird, D. (2003). A brief questionnaire to assess readiness to change in adolescents with eating disorders: Its applications to group therapy. *European Eating Disorders Review*, 11, 58–71.

Hair, H. J., (2005). Outcomes for children and adolescents after residential treatment: A review of research from 1993 to 2003. *Journal of Child and Family Studies, 4,* 551-575.

Hammond, D., Ahmed, R., Yang, W. S., Brukhalter, R., & Leatherdale, S. T. (2011). Illicit substance use among Canadian youth: Trends between 2002 and 2008. *Canadian Journal of Public Health, 102*, 7–12.

Harper, N. J. (2017). Wilderness therapy, therapeutic camping and adventure education in child and youth care literature: A scoping review. *Children and Youth Services Review, 83*, 68-79.

Harper, N. J., Gabrielsen, L. E., & Carpenter, C. (2018). A cross-cultural exploration of 'wild' in wilderness therapy: Canada, Norway and Australia. *Journal of Adventure Education and Outdoor Learning*, *18*(2), 148-164.

Harper, N. J., Mott, A. J., and P. Obee. (2019). Client perspectives on wilderness therapy as a component of adolescent residential treatment for problematic substance use and mental health issues. *Children and Youth Services Review, 105*, 1-9.

Harper, N. J., Peeters, L., & Carpenter, C. (2015). Adventure therapy. In R. Black & K. S. Bricker (Eds.). *Adventure programming and travel for the 21st century* (pp. 221–236). Venture.

Harper, N. J., & Russell, K. C. (2008). Family involvement and outcome in adolescent wilderness treatment: A mixed-methods evaluation. *International Journal of Child & Family Welfare, 1*, 19-36.

Harper, N., Russell, K., Cooley, R., & Cupples, J. (2007). Catherine freer wilderness therapy expeditions: An exploratory case study of adolescent wilderness therapy, family functioning, and the maintenance of change. *Child & Youth Care Forum, 36*, 111–129.

Jordan, J., Joyce, P. R., Carter, F. A., McIntosh, V. V., McKenzie, J. M., & Bulik, C. M. (2009). The Yale–Brown–Cornell Eating Disorder Scale in women with anorexia nervosa: What is it measuring? *International Journal of Eating Disorders*, *42*(3), 267–274.

Kingston, L., Poot, A., & Thomas, N. E. (1997). The brief intervention program under the microscope: A five-year review of an adolescent day program. Melbourne, Australia: Child & Adolescent Mental Health Service, Austin & Repatriation Medical Center.

Kirby, M. J. L., & Keon, W. J. (2006). The standing senate committee on social affairs, science and technology. *Out of the shadows at last: Highlights and recommendations.* Senate of Canada. Retrieved from: www.parl.gc.ca/39/1/parlbus/commbus/ senate/com-e/soci-e/rep-e/pdf/rep 02 may06part1-e.pdf. Retrieved December 18, 2018.

Knorth, E. J., Harder, A. T., Zandberg, T., & Kendrick, A. J. (2008). Under one roof: A review and selective meta-analysis on the outcomes of residential child and youth care. *Children and Youth Services Review*, *30*, 123–140.

Kornbrot, D. (2005). Correlation. In *Encyclopedia of statistics in behavioral science*. Retrieved from: https://onlinelibrary.wiley.com/doi/abs/10.1002/0470013192.bsa136

Kun, B., & Demetrovics, Z. (2010). Emotional intelligence and addictions: A systematic review. *Substance Use & Misuse*, *45*(7-8), 1131-1160.

Kutcher, S. (2011). Facing the challenge of care for child and youth mental health in Canada: A critical commentary, five suggestions for change and a call to action. *Healthcare Quarterly*, *14*, 14-21.

Laborde, S., Brüll, A., Weber, J., & Anders, L. S. (2011). Trait emotional intelligence in sports: A protective role against stress through heart rate variability? *Personality and Individual Differences*, *51*(1), 23-27.

Leatherdale, S. T., & Ahmed, R. (2010). Alcohol, marijuana, and tobacco use among Canadian youth: do we need more multi-substance prevention programming? *The Journal of Primary Prevention, 31*(3), 99-108.

Leatherdale, S. T., & Burkhalter, R. (2012). The substance use profile of Canadian youth: Exploring the prevalence of alcohol, drug and tobacco use by gender and grade. *Addictive Behaviors*, *37*(3), 318-322.

Lee, B. R. (2008). Defining residential treatment. *Journal of Child and Family Studies*, *17*(5), 689−692.

Lewis, S. F. (2013). Examining changes in substance use and conduct problems among treatment-seeking adolescents. *Child and Adolescent Mental Health, 18*, 33-38.

Lyons, J. S., Woltman, H., Martinovich, Z., & Hancock, B. (2009). An outcomes perspective of the role of residential treatment in the system of care. *Residential Treatment for Children & Youth*, *26*(2), 71-91.

Magle-Haberek, N. A., Tucker, A. R., & Gass, M. A. (2012). Effects of program differences with wilderness therapy and residential treatment center (RTC) programs. *Residential Treatment for Children & Youth*, *29*(3), 202-218.

Malla, A., Shah, J., Iyer, S., Boksa, P., Joober, R., Anderson, A., Lal, S., Fuhrer, R. (2018). Youth mental health should be a top priority for health care in Canada. *Canadian Journal of Psychiatry*, *63*(4), 216-222.

Martins, A., Ramalho, N., & Morin, E. (2010). A comprehensive meta-analysis of the relationship between emotional intelligence and health. *Personality and Individual Differences*, *49*(6), 554-564.

Martins, F. D. M. P., Leite, K. P., Trevizol, A. P., Noto, J. R. D. S., & Brietzke, E. (2019). Emotional intelligence and schizophrenia spectrum disorders: A critical review. *Trends in Psychiatry and Psychotherapy*, *41*(1), 94-102.

Matthews, G., Emo, A. K., Funke, G., Zeidner, M., Roberts, R. D., Costa Jr, P. T., & Schulze, R. (2006). Emotional intelligence, personality, and task-induced stress. *Journal of Experimental Psychology: Applied*, *12*(2), 96.

Martinez, E., Castro, J., Bigora, A., Morer, A., Calvo, R., Vila, M., et al. (2007). Assessing motivation to change in bulimia nervosa: The bulimia nervosa stages of change questionnaire. *European Eating Disorders Review*, *15*, 13–23.

Maxwell, J. A. (2012). *A realist approach for qualitative research*. Sage.

Mayer, J. D., Caruso, D. R., & Salovey, P. (2000). *Selecting a measure of emotional intelligence: The case for ability testing*. In R. Bar-On & J. D. A. Parker (Eds.), Handbook of emotional intelligence (pp. 320– 342). Jossey-Bass.

Mayer, J. D., & Salovey, P. *What is emotional intelligence?* In P. Salovey & D. Sluyter, Emotional development and emotional intelligence: Educational implications. Basic Books.

Mayer, J. D., Salovey, P., & Caruso, D. R. (2002). *Mayer– Salovey–Caruso Emotional Intelligence Test (MSCEIT) item booklet*. MHS Publishers.

McConnaughy, E. A., DiClemente, C. C., Prochaska, J. O., & Velicer, W. F. (1989). Stages of change in psychotherapy: A follow-up report. *Psychotherapy: Theory, Research, Practice, Training*, *26*(4), 494.

McCurdy, B. L., & McIntyre, E. K. (2004). 'And what about residential…?' Re-conceptualizing residential treatment as a stop-gap service for youth with emotional and behavioral disorders. *Behavioral Interventions: Theory & Practice in Residential & Community-Based Clinical Programs*, *19*(3), 137-158.

McEwan, K., Waddell, C. & Barker, J. 2007. "Bringing children's mental health 'Out of the shadows' ". *Canadian Medical Association Journal, 176*(4), 471–72.

McIntosh, A., Lyons, J. S., Weiner, D. A., & Jordan, N. (2010). Development of a model for predicting running away from residential treatment among children and adolescents. *Residential Treatment for Children & Youth*, *27*(4), 264-276.

McQuaid, R. J., & Di Gioacchino, L. A. (2017). *Addiction treatment in Canada: The national treatment indicators report: 2014-2015 data*. Canadian Centre on Substance Use and Addiction.

Mental Health Commission of Canada. (2013). Making the case for investing in mental health in Canada. Retrieved from Mental Health Commission of Canada website: https://www.mentalhealthcommission.ca/sites/default/files/2016-06/Investing_in_Mental_Health_FINAL_Version_ENG.pdf

Mikolajczak, M., & Luminet, O. (2008). Trait emotional intelligence and the cognitive appraisal of stressful events: An exploratory study. *Personality and Individual Differences*, *44*(7), 1445-1453.

Miao, C., Humphrey, R. H., & Qian, S. (2017). A meta-analysis of emotional intelligence and work attitudes. *Journal of Occupational and Organizational Psychology, 90*(2), 177–202. doi.org/10.1111/joop.12167

Mills, L., & Kelly, E. (2019). Pine River Institute Annual Evaluation. Retrieved from: http://pineriverinstitute.com/pri-2018-annual-report

Mills, L., Pepler, D., & Cribbie, R. A. (2013). Effectiveness of residential treatment for substance abusing youth: Benefits of the Pine River Institute program. *Residential Treatment for Children & Youth*, *30*(3), 202-226. doi.org/10.1080/0886571X.2013.819273

Norton, C. L., Carpenter, C., & Pryor, A. (2015). *Adventure therapy around the globe: International perspectives and diverse approaches*. Common Ground Publishers

O'Boyle, E. H. Jr., Humphrey, R. H., Pollack, J. M., Hawver, T. H., & Story, P. A. (2011). The relation between emotional intelligence and job performance: A meta-analysis. *Journal of Organizational. Behaviour*, *32*(5), 788–818.

O'Connor, P. J., Hill, A., Kaya, M., & Martin, B. (2019). The measurement of emotional intelligence: A critical review of the literature and recommendations for researchers and practitioners. *Frontiers in Psychology, 10,* 1-19.

Opper, B., Maree, J. G., Fletcher, L., & Sommerville, J. (2014) Efficacy of outdoor adventure education in developing emotional intelligence during adolescence. *Journal of Psychology in Africa, 24*(2), 193-196.

Ozechowski, T. J., & Waldron, H. B. (2010). Assertive outreach strategies for narrowing the adolescent substance abuse treatment gap: Implications for research, practice, and policy. *The Journal of Behavioral Health Services & Research*, *37*(1), 40-63.

Pantalon, M. V., Nich, C., Franckforter, T., & Carroll, K. M. (2002). The URICA as a measure of motivation to change among treatment-seeking individuals with concurrent alcohol and cocaine problems. *Psychology of Addictive Behaviors*, *16*(4), 299-307.

Paquette, J., & Vitaro, F. (2014). Wilderness therapy, interpersonal skills and accomplishment motivation: Impact analysis on antisocial behavior and socio-professional status. *Residential Treatment for Children & Youth*, *31*(3), 230-252.

Pearson, C., Janz, T., & Ali, J. (2013). *Mental and substance use disorders in Canada*. Retrieved from Statistics Canada website: http://www.statcan.gc.ca/pub/82–624-x/2013001/article/

Petrides, K. V., Pita, R., & Kokkinaki, F. (2007). The location of trait emotional intelligence in personality factor space. *British Journal of Psychology*, *98*(2), 273-289.

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51, 390–395.

Pumariega, A. J. (2007). Residential treatment for children and youth: Time for reconsideration and reform. *American Journal of Orthopsychiatry*, *77*(3), 343-345.

Resurrección, D. M., Salguero, J. M., & Ruiz-Aranda, D. (2014). Emotional intelligence and psychological maladjustment in adolescence: A systematic review. *Journal of Adolescence, 37*(4), 461-472.

Rocha, T. B. M., Graeff-Martins, A. S., Kieling, C., & Rohde, L. A. (2015). Provision of mental healthcare for children and adolescents: A worldwide view. *Current Opinion in Psychiatry, 28*(4), 330-335.

Russell, K. C. (2001). What is wilderness therapy? *Journal of Experiential Education, 24*(2), 70-79.

Russell, K. C. (2002). *Longitudinal assessment of treatment outcomes in outdoor behavioral healthcare*. Idaho Forest, Wildlife, and Range Experiment Station. University of Idaho.

Russell, K. C, & Phillips-Miller, D. (2002). Perspectives on the wideness therapy process and its relation to outcome. *Child and Youth Care Forum, 31*(6), 415-437.

Russell, K. C. (2007a). Adolescent substance-use treatment: Service delivery, research on effectiveness, and emerging treatment alternatives. *Journal of Groups in Addiction & Recovery, 2*(2-4), 68-96.

Russell, K. C. (2007b). *Summary of research from 1999–2006 and update to 2000 survey of outdoor behavioral healthcare programs in North America*. University of Minnesota.

Russell, K., Gillis, H. L., & Lewis, T. G. (2008). A five-year follow-up of a survey of North American outdoor behavioral healthcare programs. *Journal of Experiential Education, 31*(1), 55-77.

Rutko, E. A., & Gillespie, J. (2013). Where's the wilderness in wilderness therapy? *Journal of Experiential Education*, *36*(3), 218-232.

Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality*, *9*(3), 185-211.

Sheldon, O. J., Dunning, D., and Ames, D. R. (2014). Emotionally unskilled, unaware, and uninterested in learning more: Reactions to feedback about deficits in emotional intelligence. *Journal of Applied Psychology*, *99*(1), 125–137.

Shiendling, S. (2000). Developing effective supervisors in residential treatment programs: A model for responding to unsatisfactory staff performance. *Residential Treatment for Children & Youth*, *17*(2), 19-31.

Slavet, J. D., Stein, L. A. R., Colby, S. M., Barnett, N. P., Monti, P. M., Golembeske, C., Jr. (2006). The marijuana ladder: Measuring motivation to change marijuana use in incarcerated adolescents. *Drug and Alcohol Dependence*, *83*, 42–48.

Slesnick, N., Bartle-Haring, S., Erdem, G., Budde, H., Letcher, A., Bantchevska, D. (2009). Troubled parents, motivated adolescents: Predicting motivation to change substance abuse among runaways. *Addictive Behaviors*, *34*, 675–684.

Snyder, C. M. J., & Anderson, S. A. (2009). An examination of mandated versus voluntary referral as a determinant of clinical outcome. *Journal of Marital & Family Therapy*, *35*, 278–292.

Sobell, L. C., Kwan, E., & Sobell, M. B. (1995). Reliability of a drug history questionnaire (DHQ). *Addictive Behaviors*, *20*(2), 233-241.

Tahhan, J., Pierre, J. S., Stewart, S. L., Leschied, A. W., & Cook, S. (2010). Families of children with serious emotional disorder: Maternal reports on the decision and

impact of their child's placement in residential treatment. *Residential Treatment for Children & Youth*, *27*(3), 191-213.

Thompson, K., Merrin, G. J., Ames, M. E., & Leadbeater, B. (2018). Marijuana trajectories in Canadian youth: Associations with substance use and mental health. *Canadian Journal of Behavioural Science*, *50*(1), 17.

Troyanskaya, O., Cantor, M., Sherlock, G., Brown, P., Hastie, T., Tibshirani, R., Botstein, D., Altman, R. B. (2001) Missing value estimation methods for DNA microarrays. *Bioinformatics*, *17*(6), 520–525.

Tucker, A. R., Bettmann, J. E., Norton, C. L., & Comart, C. (2015). The role of transport use in adolescent wilderness treatment: Its relationship to readiness to change and outcomes. *Child and Youth Care Forum*, 44(5), 671-686.

Uliaszek, A. A., Hamdullahpur, K., & Mills, L. (2019). Examining the effectiveness of residential treatment among adolescents with problem substance use. *Journal of Child & Adolescent Substance Abuse, 28*(4), 1-8.

United Nations Office on Drugs and Crime (UNODC). (2018). Drugs and Age: Drugs and associated issues among young people and older people. Retrieved from United Nations website: https://www.unodc.org/wdr2018/prelaunch/WDR18_Booklet_4_YOUTH.pdf

Waddell, C., McEwan, K., Shepherd, C. A., Offord, D. R., & Hua, J. M. (2005). A public health strategy to improve the mental health of Canadian children. *The Canadian Journal of Psychiatry, 50*(4), 226-233.

Wei, C. C., Heckman, B. D., Gay, J., & Weeks, J. (2011). Correlates of motivation to change in adolescents completing residential substance use treatment. *Journal of Substance Abuse Treatment, 40*, 272–280.

Whittaker, J. K., del Valle, J. F., & Holmes, L. (Eds.) (2014). The current landscape of therapeutic residential care. *Therapeutic residential care for children and youth. Exploring evidence-informed international practice (pp. 23-34).* Jessica Kingsley Publishers.

Whittaker, J. K., Holmes, L., del Valle, J. F., Ainsworth, F., Andreassen, T., Anglin, J., ... & Courtney, M. (2016). Therapeutic residential care for children and youth: A consensus statement of the international work group on therapeutic residential care. *Residential Treatment for Children & Youth*, *33*(2), 89-106.

Whitehead, K., Keshet, M., Lombrowski, B., Domenico, A., & Green, D. (2007). Definition and accountability: A youth perspective. *American Journal of Orthopsychiatry*, *77*(3), 348.

Wilder, J. (2020). How Much does wilderness thearpy cost? https://www.allkindsoftherapy.com/blog/how-much-does-wilderness-therapy-cost

Williams, B. (2000). The treatment of adolescent populations: An institutional vs. a wilderness setting. *Journal of Child and Adolescent Group Therapy, 10* (1), 47–56.

Wilson, S. J., & Lipsey, M. W. (2000). Wilderness challenge programs for delinquent youth: A meta-analysis of outcome evaluations. *Evaluation and Program Planning*, *23*(1), 1-12.

Winters, K. C., & Henly, G. A. (1989). *Personal Experience Inventory test and manual*. Western Psychological Services.

Young, M. M., Saewyc, E., Boak, A., Jahrig, J., Anderson, B., DoironBrun, Y., & Clark, H. (2011). *Cross-Canada Report on Student Alcohol and Drug Use: Technical Report*. Canadian Centre on Substance Abuse.

Zampetaskis, L.A. (2011). The measurement of trait emotional intelligence with TEIQue-SF: An analysis based on unfolding item response theory models. In N. M. Ashkanasy, J. Zerbe and C. E. J. Härtel (Eds.), *Research on Emotion in Organizations* (pp. 289-315). Emerald Group Publishing Limited.

Zeidner, M., & Olnick-Shemesh, D. (2010). Emotional intelligence and subjective well-being revisited. *Personality and Individual Differences*, *48*(4), 431-435.

Zhang, S. (2008). Parimputation : from imputation and nullimputation to partially imputation. *IEEE Intelligent Informatics Bulletin, 9*(1), 32–38.

Appendix A – University of Victoria Human Research Ethics

University of Victoria

Office of Research Services | Human Research Ethics Board
Michael Williams Building Rm B202 PO Box 1700 STN CSC Victoria BC V8W 2Y2 Canada
T 250-472-4545 | F 250-721-8960 | uvic.ca/research | ethics@uvic.ca

Certificate of Approval

PRINCIPAL INVESTIGATOR	**Nevin Harper** (Supervisor)	**ETHICS PROTOCOL NUMBER**	**20-0196**
PRINCIPAL APPLICANT	**Addison Mott** **Master's student**	ORIGINAL APPROVAL DATE	09-Apr-2020
		APPROVED ON	09-Apr-2020
UVIC DEPARTMENT	**Child & Youth Care**	APPROVAL EXPIRY DATE	08-Apr-2021

PROJECT TITLE **Emotional intelligence, readiness to change, and client fit in wilderness therapy**

RESEARCH TEAM MEMBERS **None**

DECLARED PROJECT FUNDING
Social Sciences and Humanities Research Council (SSHRC), University of Victoria

DOCUMENTS INCLUDED IN THIS APPROVAL
Mott_Addison Data Sharing Agreement.pdf - 07-Apr-2020
Addison Mott data collection fields .xlsx - 07-Apr-2020

CONDITIONS OF APPROVAL

This Certificate of Approval is valid for the above term provided there is no change in the protocol.

Modifications
To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.

Renewals
Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.

Project Closures
When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.

Certification

This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropiate standards of ethcis as outlines by the University of Victoria Research Regulations Involving Human Participants.

Dr. Rachael Scarth
Associate VP Research Operations

Certificate Issued On: 09-Apr-2020

Appendix B – Data Sharing Agreement

PINE RIVER INSTITUTE

Data Sharing Agreement for Pine River Institute Research and Evaluation

Scope: The purpose of this agreement is to set forth expectations and requirements regarding the use of physical and electronic information collected or housed by Pine River Institute (PRI). This policy is intended for any persons employed as a full-time, part-time or contract staff at Pine River Institute ("internal researcher") or for persons formally collaborating with an internal researcher. This policy does not cover the release or use of information for clinical or other purposes required or permitted by law.

Statement of Principle: As a clinical service provider, PRI is committed to improving the lives of adolescents and their families through the delivery of evidence-informed practices. To this end, we are committed to ongoing program evaluation to inform program practice and improve outcomes. We are also committed to advance the field of treatment for adolescent addictions and related health and behavioural issues through internal research programs and knowledge exchange. Further, we are committed to addressing system-level needs through collaborative research projects with collegial programs or institutional partners.

These policies and procedures should be used in conjunction with PRI Research and Evaluation Policies and Procedures and relevant provincial and federal legislation to ensure that risks to all research participants are minimized.

As a custodian of personal and clinical information, PRI has the responsibility to uphold all ethical guidelines when engaged in research and program evaluation including protecting the confidentiality of all program participants and staff members. All internal researchers and collaborators must comply with any conditions and restrictions PRI might impose relating to the use, transportation, storage, security, disclosure, dissemination, return, or disposal of the information. As such, any person who receives PRI data has no rights to use the data beyond what is granted by PRI's Director of Research & Evaluation. Persons wishing to utilize PRI data may only do so as per this document. Specifically, any use of the data must comply with the following guidelines:

1. All persons who wish to utilize PRI data must have completed training in research ethics (e.g. Tri-Council Ethics tutorial) prior to engaging in research activities at the PRI.

2. All research activities involving human participants must be reviewed by a research ethics board prior to commencing data collection.

3. Data may not be used if consent was denied on any consent form from each participant or representative (e.g., parent) prior to his/her data being used for the purposes of research and evaluation. If the participant is under the age of 16 years old, a parent or guardian consent must also be obtained before the participant's information can be used for research purposes.

4. No penalty shall be imposed upon any participant who withdraws withdraw from research at any time with or without reason. In the case of non-consent, participants will be notified that an unwillingness to consent or a decision to withdraw from research and evaluation activities will not in any way impact their relationship with, or access to services, at the PRI.

5. When in direct communication with participants, all individuals will be explicitly notified that participation in research and evaluation is voluntary and that their identity will be confidential.

6. All data, whether it is in physical or electronic form, remains the property of PRI. This means that collaborators may only use data for purposes outlined and within timelines specified in this agreement. Upon termination employment or expiry of contract or completion of project, all data and any outputs resulting from that data (e.g., recoded variables) must be returned to PRI.

7. Physical data (e.g., raw measures or output from measures) may only be removed from PRI premises with permission of the PRI and under condition that files will remain protected in locked storage unless actively in use.

8. Electronic datasets may only used or taken off-site (e.g., via email or through fixed data storage) with permission of the Director of Research & Evaluation. Any electronic data that are used off-site must not contain any information that could potentially identify clients/study participants (i.e., through primary or residual disclosure).

9. If the nature or the scope of any project should change, the onus is on the researcher to inform PRI's Director of Research & Evaluation immediately.

10. The Director of Research & Evaluation of PRI will explicitly delineate how data will be used and how results will be disseminated. Authorship, timelines for publication and/or presentation of data shall be determined using the following as a general guideline:

To be named as an author or co-author, an individual is generally expected to be able to defend the work publicly, and thus is required to have a thorough knowledge and understanding of the literature review, research question, the methods used, the data sources used, and the results and the interpretation of those results. The determination of authorship and co-authorship will be a negotiated process between the individuals involved in a research study, but is ultimately the responsibility and decision of the Principal Investigator, and PRI's Director of Research & Evaluation. Individuals who do

not meet the above criteria for authorship should, if appropriate, be acknowledged as contributors.

PRI staff will often make significant contributions to research projects by administering surveys, contributing PRI data, or utilizing PRI data or evaluation outcomes. Thus, contributions by PRI staff shall be appropriately acknowledged.

11. PRI shall retain the copyright to all non-published or internal materials resulting from the use, analysis and interpretation of PRI data. In cases where research results are published, copyright rules and regulations of the publishing agent will be upheld, provided item #13 is in compliance.

12. It is expected that knowledge dissemination activities (e.g., written publications, presentations or other activities) will be attached to each project. At the outset of the project, and in an ongoing manner, the researcher will disclose all planned public dissemination activities for the project, and keep the Director of Research & Evaluation of PRI informed of any new developments or opportunities for dissemination. The following must happen with respect to dissemination activities:

    a. ***Presentations/Posters*** – any presentations given to audiences external to PRI must first be given internally to PRI staff, or at a minimum, be subject to review by either the Director of Research & Evaluation or, in the case where the Director is the presenter, review by the Chief Executive Officer (CEO) .

    b. ***Publications*** – written copies of all reports, papers, theses, etc., must be submitted to PRI's Director of Research & Evaluation, for review, with ample notice prior to final submission. in the case where the Director is the author, review by the CEO is required prior to submission.

The purpose of this process is to keep non-research staff informed about the findings of the research, to maximize the extent that findings are communicated in a fashion that is consistent with PRI Mission and Values, to ensure that PRI and its activities are represented accurately in the broader community, and ultimately to contribute knowledge to the field of adolescent mental health and addictions in the most ethically sound manner possible.

13. You must agree not to publish or otherwise disclose the data in a form that could reasonably enable someone to ascertain the identity of an individual to whom the information relates. This is upheld in all cases except when disclosure is required by law (e.g., in the case of potential of harm or disclosure of abuse).

14. Anyone using PRI data shall agree to notify PRI's Director of Research and Evaluation immediately should they become aware of any breach in ethical conduct of research and evaluation activities at or related to PRI.

15. The penalty for violating any terms of the ethical guidelines will depend on the nature of the violation. These could range from the termination of the research project to public disassociation with the investigator to loss of employment or

affiliation status. Any breach of the ethical guidelines can be addressed legally, including appropriate penalties as determined by the courts.

Please check all that apply:

✓ I am affiliated with Pine River Institute (PRI) as an internal researcher, staff, or collaborator and I agree to abide by the terms of data use set out PRI as the data producer and owner.

I understand that:

✓ The data provided to me are for the exclusive purposes of research or evaluation as stated in the 'Description of Research Activities' (below) while I am associated with PRI. PRI data may not be used for any other purposes without the explicit prior written approval of the owner of the data, as per PRI's Director of Research and Evaluation.

✓ I am prohibited from using these data in the pursuit of any commercial or income-generating venture either privately, with government, or under the auspices of PRI.

✓ The data are released to me as a working copy for my use only. The distribution, sale, donation, transfer, sharing or exchange of any portion of these data in any way is expressly prohibited.

✓The data are accepted "as is", and the owner makes no representations or warranties, either expressed or implied, as to the appropriateness and fitness for a particular purpose.

✓All publications, paper printouts, or manuscripts containing the data or the results of its analysis must acknowledge explicitly the owner of the data, PRI.

✓All digital data must be returned to PRI or destroyed upon the completion of my research project.

✓Use of the data may be subject to audit by PRI, so that in the event of audits, my use of these data may be disclosed.

Data covered by this agreement:

✓ De-Identified survey responses from PRI clients or staff
De-Identified clinical case files information
De-Identified clinical notes
De-Identified case files log entries

I understand these conditions and agree to abide by them:

Addison Mott _____ _____
Applicant (print) email

_____ March 5, 2020
Applicant (signature) Date

Appendix C – Drug History Questionnaire

For any substances that you have never used, answer 'no' in the first column and leave the rest of that row blank.	**Ever Used?**	**Age First Used**	**Total Years Used**	**Most Typical Route of Administration**	**Last year used (e.g. 1998)**	**Frequency of use in Past 90 Days**	**Ever prescribed**
ALCOHOL	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
MARIJUANA	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
POWDER COCAINE	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
ROCK COCAINE (crack, freebase)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
METH/AMPHETAMINES	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	

For any substances that you have never used, answer 'no' in the first column and leave the rest of that row blank.	**Ever Used?**	**Age First Used**	**Total Years Used**	**Most Typical Route of Administration**	**Last year used (e.g. 1998)**	**Frequency of use in Past 90 Days**	**Ever prescribed**
Ecstacy/MDMA	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
TRANQUILIZERS NOT following a doctor's instructions: (benzodiazepines, quaaludes, valium, prozac)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	☐ No ☐ Yes
KETAMINE ("K")	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	☐ No ☐ Yes
OPIATES (heroin, morphine)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
METHADONE	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
HALLUCINOGENS: (Mushrooms, Datura, LSD, peyote)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week	☐ No ☐ Yes

For any substances that you have never used, answer 'no' in the first column and leave the rest of that row blank.	**Ever Used?**	**Age First Used**	**Total Years Used**	**Most Typical Route of Administration**	**Last year used (e.g. 1998)**	**Frequency of use in Past 90 Days**	**Ever prescribed**
				☐ inhaled ☐ other		☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
INHALANTS (glue, gasoline, whiteout)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
PCP (angel dust)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	☐ No ☐ Yes
PRESCRIPTION DRUG(S) NOT prescribed (e.g. OxyContin, Ritalin)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	☐ No ☐ Yes
NICOTINE	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	
OTHER PSYCHOACTIVE DRUGS (please specify here)	☐ No ☐ Yes			☐ oral ☐ sniffed ☐ injected ☐ smoked ☐ inhaled ☐ other		☐ None ☐ less than 1 x /month ☐ 1 x /month ☐ 1 x /week ☐ 2 to 3x/ week ☐ 4 to 6x /week ☐ 1 x /day ☐ more than 1 x /day	☐ No ☐ Yes

First Drug of Choice: _____

Second Drug of Choice: _____

1. When was the last time, if ever, you…	Past Month	2-3 Months ago	4-12 Months ago	1+ Years ago	Never
a. Used video games so much that it interfered with daily life?	☐	☐	☐	☐	☐
b. Were online so much that it interfered with daily life?	☐	☐	☐	☐	☐
c. Engaged in virtual relationships so much that it interfered with daily life?	☐	☐	☐	☐	☐

Appendix D – Trait Emotional Intelligence Questionnaire-Short Form

Circle the number that best reflects your degree of agreement or disagreement with that statement. Do not think too long about the exact meaning of the statements. Work quickly and answer as accurately as possible. **There are no right or wrong answers.**

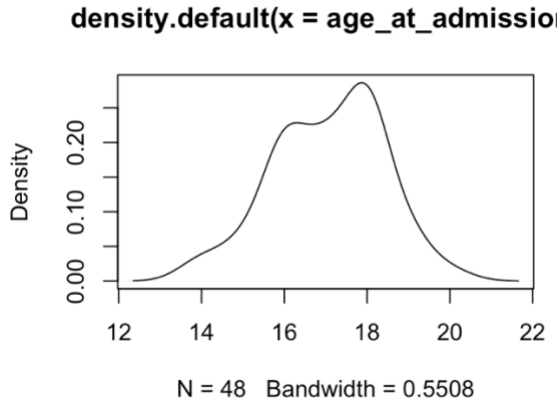
	Completely Disagree						Completely Agree
1. Expressing my emotions with words is not a problem for me.	1	2	3	4	5	6	7
2. I often find it difficult to see things from another person's viewpoint.	1	2	3	4	5	6	7
3. On the whole, I'm a highly motivated person.	1	2	3	4	5	6	7
4. I usually find it difficult to regulate my emotions.	1	2	3	4	5	6	7
5. I generally don't find life enjoyable.	1	2	3	4	5	6	7
6. I can deal effectively with people.	1	2	3	4	5	6	7
7. I tend to change my mind frequently.	1	2	3	4	5	6	7
8. Many times, I can't figure out what emotion I'm feeling.	1	2	3	4	5	6	7
9. I feel that I have a number of good qualities.	1	2	3	4	5	6	7
10. I often find it difficult to stand up for my rights.	1	2	3	4	5	6	7
11. I'm usually able to influence the way other people feel.	1	2	3	4	5	6	7
12. On the whole, I have a gloomy perspective on most things.	1	2	3	4	5	6	7
13. Those close to me often complain that I don't treat them right.	1	2	3	4	5	6	7
14. I often find it difficult to adjust my life according to the circumstances.	1	2	3	4	5	6	7
15. On the whole, I'm able to deal with stress.	1	2	3	4	5	6	7
16. I often find it difficult to show my affection to those close to me.	1	2	3	4	5	6	7
17. I'm normally able to "get into someone's shoes" and experience their emotions.	1	2	3	4	5	6	7
18. I normally find it difficult to keep myself motivated.	1	2	3	4	5	6	7
19. I'm usually able to find ways to control my emotions when I want to.	1	2	3	4	5	6	7
20. On the whole, I'm pleased with my life.	1	2	3	4	5	6	7
21. I would describe myself as a good negotiator.	1	2	3	4	5	6	7
22. I tend to get involved in things I later wish I could get out of.	1	2	3	4	5	6	7
23. I often pause and think about my feelings.	1	2	3	4	5	6	7
24. I believe I'm full of personal strengths	1	2	3	4	5	6	7
25. I tend to "back down" even if I know I'm right.	1	2	3	4	5	6	7
26. I don't seem to have any power at all over other people's feelings.	1	2	3	4	5	6	7
27. I generally believe that things will work out fine in my life.	1	2	3	4	5	6	7
28. I find it difficult to bond well even with those close to me.	1	2	3	4	5	6	7
29. Generally, I'm able to adapt to new environments.	1	2	3	4	5	6	7
30. Others admire me for being relaxed.	1	2	3	4	5	6	7

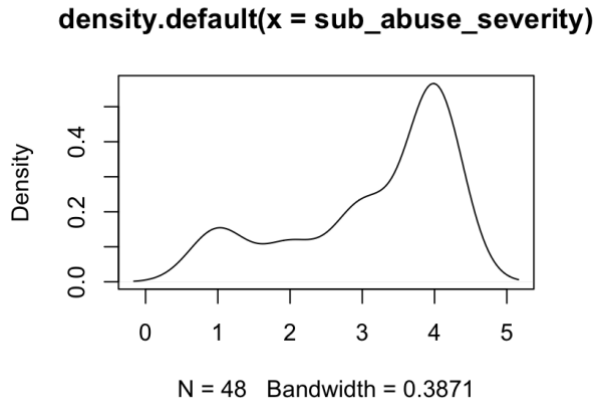
Appendix E – University of Rhode Island Change Assessment

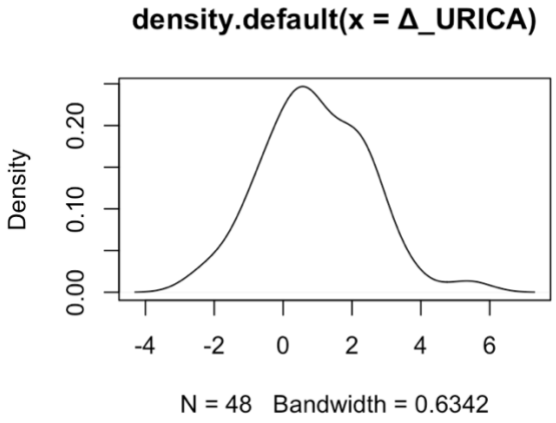
Please indicate the extent to which you agree with each statement. The words 'here' and 'this place' refer to Pine River Institute.

1. As far as I am concerned, I don't have any problems that need changing.
2. I think I might be ready for some self-improvement.
3. I am doing something about the problems that had been bothering me.
4. It might be worthwhile to work on my problem.
5. I am not the problem one. It doesn't make much sense for me to consider changing.
6. It worries me that I might slip back on a problem I have already changed, so I am here to seek help.
7. I am finally doing some work on my problem.
8. I have been thinking that I might want to change something about myself.
9. I have been successful in working on my problem, but I'm not sure I can keep up the effort on my own.
10. At times my problem is difficult, but I am working on it.
11. Trying to change is pretty much a waste of time for me because the problem doesn't have to do with me.
12. I'm hoping that I will be able to understand myself better.
13. I guess I have faults but there is nothing that I really need to change.
14. I am really working hard to change.
15. I have a problem, and I really think I should work on it.
16. I'm not following through with what I had already changed as well as I had hoped, and I want to prevent a relapse of the problem.
17. Even though I'm not always successful in changing, I am at least working on my problem.
18. I thought once I had resolved the problem I would be free of it, but sometimes I still find myself struggling with it.
19. I wish I had more ideas on how to solve my problems.
20. I have started working on my problem, but I would like help.
21. Maybe someone or something will be able to help me.
22. I may need a boost right now to help me maintain the changes I've already made.
23. I may be part of the problem, but I don't really think I am.
24. I hope that someone will have some good advice for me.
25. Anyone can talk about changing; I'm actually doing something about it.
26. All this talk about psychology is boring. Why can't people just forget about their problems.
27. I'm here to prevent myself from having a relapse of my problem.
28. It is frustrating, but I feel I might be having a recurrence of a problem I thought I had resolved.
29. I have worries, but so does the next guy.
30. I am actively working on my problem.
31. I would rather cope with my faults than try to change them.
32. After all I had done to try and change my problem every now and again it comes back to haunt me.

Appendix F – Density Plots







Appendix G – Data Analysis Code

```
# impute missing data

setwd("~/Desktop/Working copy/1. Data_Impute")
library(readxl)
thesis_data_no_impute_101020 <- read_excel("Desktop/Working copy/1.
Data_Impute/thesis_data_no_impute_101020.xlsx")
View(thesis_data_no_impute_101020)

data_no_impute <- thesis_data_no_impute_101020

install.packages('recipes')
library('recipes')
library('dplyr')

impute <- recipe(marijuana_freq + video_game_interfere + online_interfere +
virtual_relationship_interfere, data = data_no_impute) %>%
  step_knnimpute(all_predictors())

imputed_1 <- prep(impute) %>%
  juice()

view(imputed_1)

data <- imputed_1

# descriptive stats

summary(data)

sd(data$age_admit)
sd(data$substance_abuse_severity)
sd(data$urica_4_readiness_for_change)
sd(data$urica_7_readiness_for_change)
sd(data$urica_Δ_readiness_for_change)
sd(data$teiq_4_score)
sd(data$teiq_7_score)
sd(data$teiq_Δ_score)

table(data$sex)
table(data$fund)
table(data$video)
table(data$online)
table(data$virtual)
```

```
#test normality

shapiro.test(data$age_admit)
shapiro.test(data$substance_abuse_severity)
shapiro.test(data$teiq_4_score)
shapiro.test(data$teiq_7_score)
shapiro.test(data$urica_4_readiness_for_change)
shapiro.test(data$urica_7_readiness_for_change)

#t-tests

var.test(data$teiq_4_score, data$teiq_7_score)
t.test(data$teiq_4_score, data$teiq_7_score, var.equal = TRUE, paird=TRUE)

var.test(data$urica_4_readiness_for_change, data$urica_7_readiness_for_change)
t.test(data$urica_4_readiness_for_change, data$urica_7_readiness_for_change, var.equal
= TRUE, paird=TRUE)

#correlation matrix

library("Hmisc")

rcorr(as.matrix(data))

#lm based on significant t-test

summary(lm(urica_Δ_readiness_for_change ~ age_admit + fund +
substance_abuse_severity + video + online + virtual + sex, data = data))
```