HEALING THROUGH ADVENTURE

Dissertation presented to the Faculty of the

California School of Professional Psychology

Alliant International University

San Francisco

In partial fulfillment of the requirements for the degree of

Doctor of Philosophy

by

Samuel C. Kane, M.A., LMHC

2021

Approved by:

Davis Y. Ja, Ph.D., Chairperson

Quyen Q. Tiet, Ph.D.

Simon N. Ferber, Psy.D.

Acknowledgements

To Dr. Davis Ja, my advisor and dissertation chair, thank you for encouraging me and for your guidance through my doctoral program. To my committee, Dr. Quyen Tiet and Dr. Simon Ferber, thank you for all your support. To the California School of Professional Psychology and all of those who have worked with me during my training to become a clinical psychologist, thank you. To my partner, Molly C. Reid, and our dog Bear and cat Toby, thank you for your love and support during these years of my becoming. To my father, Michael J. Kane, who taught me that there is no challenge so great it cannot be overcome, my family, and all my friends along the way. Thank you for your continued love and support. Thank you to all the people at First Descents who made this research possible: The Participants, Mackenzie McGrath, Brad Ludden, Paul Kelly, and all the staff and volunteers working tirelessly to help people "Out Live It". Thank you to all of the beautiful people I have had the privilege of sharing time with at First Descents who have taught me humility and gratitude to always appreciate every day I am alive, as each one is a special gift, and the next is not always guaranteed.

Abstract

Multiple sclerosis is a chronic degenerative disease affecting nearly one million Americans with incidence increasing each year. In addition to numerous and complex physical sequelae, multiple sclerosis is also associated with significant mental health burdens such as social isolation, depression, and anxiety. Despite the rising burden of multiple sclerosis, the disease is poorly understood, there are no known cures, and treatment options are limited. In 2019, First Descents, a non-profit organization, began offering week-long outdoor adventure programs to young adults with a multiple sclerosis diagnosis. This pilot study (N = 21) used archival data from the 2019 First Descents program to conduct multiple within-subjects analyses of variance examining changes in six different outcome measures: self-efficacy, anxiety, depression, quality of life, social support, and mindfulness-based self-efficacy. Outcomes were measured before attendance, immediately following the program, and at a one-month follow-up. Participants demonstrated improved self-efficacy, reductions in anxiety, and increases in mindfulness-based self-efficacy following their one-week adventure program. There were no statistically significant changes in depression, quality of life, and social support scores. To our knowledge, this is the first research to demonstrate that an outdoor adventure program can improve self-efficacy, reduce anxiety, and increase mindfulness-based self-efficacy in people living with multiple sclerosis. Results of this pilot study should serve as a model for future expanded RCT research on this population.

Table of Contents

List of Tables

CHAPTER I

Introduction

The aim of this study is to evaluate the effects of an adventure program for people with multiple sclerosis by using archival data collected in 2019. Multiple sclerosis is a chronic degenerative disease affecting nearly one million Americans, with incidence increasing each year (Leray et al., 2016). Despite the rising burden of multiple sclerosis, the disease is poorly understood, there are no known cures, and treatment options are limited (Lublin et al., 2014). Evidence shows that several key measures of mental health and coping factors including depression, anxiety, social support, self-efficacy, quality of life, and mindfulness-based self-efficacy of people living with multiple sclerosis can be improved by engaging in physical activity and group activities (Pedersen & Saltin, 2015). Adventure programs incorporate physical activities and group dynamics and may be a promising resource for the multiple sclerosis population.

In other populations living with chronic disease and disability, substantial improvements in mental and physiological health have been achieved through adventure-based activity programs (Buckley & Brough, 2017). Adventure programming refers to challenging immersive sports done in groups with self-reflection, typically in outdoor settings. Adventure programing can include activities like hiking, camping, sailing, kayaking, rafting, skiing, ropes courses, and mountaineering. Adventure programming lacks the standardization and consistency of many traditional psychological therapeutic interventions, but its core components involve physical and psychological challenges, as well as an element of self-reflection and group discourse. Adventure programs have been demonstrated to improve many of the same key measures of mental health and coping that are associated with multiple sclerosis: depression, anxiety, social support, self-

efficacy, quality of life, and mindfulness-based self-efficacy. Adventure programs have not yet been studied in a population of people with multiple sclerosis.

First Descents is a non-profit organization that began offering week-long adventure programs to young adults with cancer in 2000. Participants choose from an array of activities and locations, but most involve whitewater kayaking or rafting in US wilderness areas. These programs are conducted in a small group of participants with two group leaders, a chef, and a health care practitioner or nurse provided by First Descents. Participants stay in a large cabin or lodge, from which they travel as a group to each day's activities. The group eats meals together and participates in nightly group meetings termed "campfire" to encourage discussion and processing of the day's events. A study of the psychological impacts of First Descents among people with a cancer diagnosis observed that self-compassion, body image, and depression all improved after attending the program (Rosenberg et al., 2014). A subsequent evaluation of the wellness impacts of First Descents cancer programming demonstrated significant reductions in psychological distress, as well as improvements in self-efficacy and social support immediately after attending a program and at a one-month follow-up (Zebrack et al., 2017). First Descents expanded to provide programming to people living with multiple sclerosis in 2018 with a pilot program, followed by an expansion for more of these programs in 2019.

This research examined an archival data collected in 2019 that evaluated the impacts of attending a First Descents program on depression, anxiety, self-efficacy, social support, quality of life, and mindfulness-based self-efficacy of young adults with multiple sclerosis using a longitudinal pre-test post-test design. Measures were administered via an online questionnaire before a participant began a program, after completion of the program, and one month after program completion. Data will be evaluated using a repeated-measures within-subjects ANOVA.

First Descents is the first known outdoor adventure program to bring this type of potentially transformative intervention to the multiple sclerosis population, and this study will mark the first known translational research of adventure programming for multiple sclerosis.

CHAPTER II

Review of Literature

This section will cover two main topics: the issues surrounding treatment of multiple sclerosis, as well as the history and uses of adventure programming. Multiple sclerosis epidemiology and disease etiology are described. This is followed by a review of treatment options for the physical and mental health conditions associated with multiple sclerosis, with particular focus on social support and a critical examination of the literature describing physical activity interventions for multiple sclerosis. Adventure programming is introduced as a potential supplement to these treatment options. A description of the theoretical and mechanistic pathways through which adventure programs are thought to improve participant well-being follows, then a review of the literature for evidence that adventure programs improve health outcomes in people with physical limitations and chronic illnesses is presented. The proposed adventure program is then introduced, and the First Descents program components are described. Two previous studies of the mental health impacts of First Descents are then discussed in detail. Last is a summary of why people with multiple sclerosis stand to benefit from adventure programming, and a description of how the proposed research will address this gap.

Multiple Sclerosis

Multiple sclerosis is a chronic health disease that affects between 851,749 and 913,925 total people in the United States (Wallin et al., 2019) and about 2.5 million people worldwide, with almost double the prevalence for females compared to males (Moore et al., 2014). Multiple sclerosis effects the central nervous system including the brain and spinal cord (Mayo Clinic, 2019). In multiple sclerosis, damage occurs to the myelin sheath covering the nerve fibers. This damage is called “sclerosis.” The damaged nerve fibers cause slowed and incorrect

communication throughout the central nervous system. People with multiple sclerosis can live with substantial limitations on their ability to perform the activities of daily living, and on average live a shorter lifespan than the general population by about seven years (Marrie et al., 2015). The disease can be disabling depending on the extent to which the individual's nerves have been damaged, and no cure has yet been established.

There are four types of multiple sclerosis a person can be diagnosed with. Each type is distinguished by the manner by which symptoms progress. While the types of diagnosis have four distinct categories, each individual is unique in how their symptoms manifest regarding duration and intensity. *Relapsing-remitting* is the most commonly diagnosed type. Eighty-five percent of new diagnoses are initially categorized as relapsing-remitting, which is distinguished by temporary exacerbations of symptoms, termed "relapses". *Secondary-progressive* type is characterized by symptoms worsening over time without relapses. This type usually transitions to the third type, *primary-progressive*, which is uncommon at about ten percent prevalence, characterized by slowly worsening symptoms from disease onset. Lastly, *progressive-relapsing* is the rarest form, at about five percent prevalence, and is unique in that there are acute relapses without an occurrence of remission (Hooper, 2011; National Multiple Sclerosis Society, 2011).

Symptoms of multiple sclerosis can vary widely and cover a broad swathe of physical and neurological functions. As demyelination progresses, people living with multiple sclerosis can experience spasms, numbness and weakness which typically occur on one side of the body, sensations of electric shock, challenges ambulating, lack of coordination or tremors, visual impairments, bladder and bowel functional failure, and sexual dysfunction. A major concern for people living with multiple sclerosis is pain, which can result from the periodic muscle spasms that are common in the disease or from discomfort associated with mobility impairments. As the

disease progresses, it can become difficult to maintain careers, social roles, and to manage the activities of daily living.

People with multiple sclerosis can experience a challenging set of mental health states resulting from their illness both directly and indirectly. The mechanisms by which multiple sclerosis *directly* interacts patient mental health through degenerative neurological effects and pharmacodynamics are complex. It is hypothesized that the progressive demyelination and damage to nerve fibers characteristic of multiple sclerosis can directly impact patient neurological functioning and mental health by changing emotional regulation and cognitive capacity as the neurons lose myelin, and the communication along the central nervous becomes slow and disordered (Chwastiak & Ehde, 2007).

In addition, multiple sclerosis often requires treatment with medications such as corticosteroids, beta interferon (IFNβ), glatiramer acetate, and immunosuppressants that have neuropsychiatric side effects such as anxiety, poor sleep, depressive symptoms, mood lability, and euphoria (Chwastiak & Ehde, 2007). As both nerve damage and the need for medication increase throughout the lives of people living with multiple sclerosis, these mental health impacts of the disease progressively worsen as well.

These psychological concerns for people living with multiple sclerosis are but a layer of their mental health experience; the disease has several documented *indirect* effects on mental well-being as well. People with multiple sclerosis report higher prevalence of major depressive disorder, anxiety disorders, alcohol abuse, suicidal thoughts, and substance use compared to the general population (Chwastiak & Ehde, 2007). Again, the pathways by which multiple sclerosis indirectly impacts the mental health of patients are diverse and complex. One element mentioned frequently in the literature is social isolation. Due to the physical limitations often experienced

with multiple sclerosis, people living with the disease are sometimes unable to hold jobs or attend social functions, which can result in diminished social support and connection (Walsh & Walsh, 1989). This isolation is linked to poor self-esteem, depression, anxiety, and suicidal ideation. Social support was shown to be a predictor of mental health-related quality of life in people with multiple sclerosis in the United Kingdom (Schwartz & Frohner, 2005). Lack of social support in people living with multiple sclerosis is linked with increased physical pain (Alphonsus & D'Arcy, 2021). People with multiple sclerosis who identified strongly with a peer group with the same condition were more likely to report satisfaction with life and less likely to report symptoms of anxiety and depression (Wakefield et al., 2013). In addition to the social and community concerns of living with multiple sclerosis, the National Multiple Sclerosis Society emphasizes the importance of acknowledging the emotional burden of living with a chronic degenerative disease ("Emotional Changes," n.d.). They encourage care providers to look beyond the physical and academic understanding of multiple sclerosis and know that grief, stress, and fear can all be normal experiences for people diagnosed with the disease.

While mental health in the multiple sclerosis population has many components, the best-studied and perhaps most salient are the mental health disorders of depression and anxiety, mental health functioning measures of self-efficacy and quality of life, and the coping factors of social support and mindfulness-based self-efficacy. Given the prevalence of these mental health issues among people with a multiple sclerosis diagnosis, reliable measures of mental health status are necessary. For depression, the Patient Health Questionnaire - 9 (Spitzer et al., 1999) has been evaluated in the multiple sclerosis population and is shown to be a reliable measure. Anxiety is measured via the Generalized Anxiety Disorder - 7 (Spitzer et al., 1999) in people with multiple sclerosis.

Self-efficacy is measured via the Multiple Sclerosis Self-Efficacy scale (Schwartz et al., 1996), a tool designed to understand perceived agency of the respondent with a multiple sclerosis diagnosis. There are multiple scales to assess quality of life in people with multiple sclerosis, but the Quality of Life Scale (Burckhardt et al., 1989) is most commonly used and has been validated in multiple sclerosis populations similar to the proposed study population.

Social support, as discussed, is a key coping factor in the mental well-being of people with multiple sclerosis and can be measured in this population using the Duke-UNC Functional Social Support Questionnaire (Broadhead et al., 1988). Mindfulness, as a newer concept, is less readily defined but can be operationalized as the ability to direct one's attention on the present moment while remaining open, curious, and accepting of whatever it might bring (Bishop et al., 2004). Mindfulness-based self-efficacy has been measured using the Mindfulness-Based Self Efficacy Scale - Revised (Cayoun, 2011) in the multiple sclerosis population. Reliability and validity of each metric, as well as definitions of constructs measured are described further in the Methods section.

Treatment for People with Multiple Sclerosis

There are a number of therapeutic options to improve the overall well-being of people living with multiple sclerosis. In this section, an overview is presented of the pharmacological and psychotherapeutic means to treat both physiological and mental health issues in people with multiple sclerosis, as well as the limitations of these treatments. Then, focus will turn to evidence of the effectiveness of social support and physical activity interventions to treat the physiological and mental health disorders of people with multiple sclerosis, as these are components of adventure programming and may illuminate how the First Descents program will work in the multiple sclerosis population.

Treatment options for people with multiple sclerosis - pharmacological. There is no medication that altogether stops the progression of multiple sclerosis, but symptoms can be managed with an array of pharmaceuticals. For acute attacks of multiple sclerosis symptoms, high dose steroid therapy is recommended (Murray, 2006). Efficacy of these medications varies widely from patient to patient. To prevent frequency and severity of relapses, interferons, glatiramer acetate, and mitoxantrone have been used, though these become less effective over time and can cause significant side effects such as nausea and fatigue (Murray, 2006). Urinary symptoms, spasms, and emotional lability can also sometimes be managed with oxybutynin, baclofen, and tricyclic antidepressants, respectively (Murray, 2006). There is some early evidence that cannabinoids can reduce pain and sleep dysfunction in people with multiple sclerosis (Nielsen et al., 2018: Zajicek et al., 2003). Most difficult to manage with pharmacological interventions are the pain, sexual dysfunction, weakness, dysesthesia and other sensory symptoms, tremors, ataxia, and cognitive changes associated with multiple sclerosis.

For the mental health issues that often accompany a multiple sclerosis diagnosis, pharmacotherapy has been shown to effectively reduce symptoms of major depressive disorder and anxiety disorders in people with multiple sclerosis with similar efficacy as in the general population (Mohr & Goodkin, 1999). However, drug side effects can be particularly problematic for people living with multiple sclerosis, and high rates of non-adherence and attrition at levels similar to the general population have been observed (Klauer & Zettl, 2008; Mohr et al., 2001). For example, selective serotonin reuptake inhibitors to treat depression and anxiety in the general population can cause sexual dysfunction, which in the multiple sclerosis population may be less tolerable due to the high rates of sexual dysfunction resulting from the disease itself (Ghaffar & Feinstein, 2007). In addition, there is no effective pharmacotherapy for the treatment of the

alcohol and substance use disorders for which people with multiple sclerosis experience higher risk.

Treatment options for people with multiple sclerosis - psychotherapeutic. Physiological health can improve as an indirect result of psychotherapy (Eells, 2000). For mental health issues, psychotherapy for people with multiple sclerosis is known to be highly effective, particularly cognitive-behavioral therapy and supportive-expressive group therapy (Mohr et al., 2000, 2001). Several comprehensive reviews exist describing the application of psychotherapy in people with multiple sclerosis, with particular focus on depression, fatigue, and overall quality of life (Hart et al., 2005; Hind et al., 2014; Kesselring & Beer, 2005; & van den Akker et al., 2016). Interpersonal therapy, behavioral activation, and other forms of therapy have not been studied in people with multiple sclerosis and it is unknown how effective these may be (Chwastiak & Ehde, 2007). Tailoring psychotherapy to the multiple sclerosis population is recommended, as some strategies are more effective than others. For example, targeting coping skills is more effective at reducing depression than psychotherapies that focus on increasing insight in people with multiple sclerosis, though both are comparable in the general population (Mohr & Goodkin, 1999).

Supplemental treatment for people with multiple sclerosis - social support. Social support is a key component of the experienced quality of life in people with multiple sclerosis (Bambara, Turner, Williams, & Haselkorn, 2011; Costa, Sá, & Calheiros, 2012; de Groot et al., 2008). While social support is demonstrably important to people living with multiple sclerosis, the existing literature has not identified an intervention to address this need. Interventions to improve physiological and psychological well-being in people with multiple sclerosis by targeting social support are scarce and have found conflicting results. One study of a telephone support network demonstrated improved self-efficacy but produced no change in twenty other

measures of mental and physical well-being such as depression, anxiety, and self-acceptance (Schwartz, 1999). A second study showed that people more recently diagnosed with multiple sclerosis were less likely to benefit from in-person disease support groups than people further along in their disease progression (Uccelli et al., 2004). The National Multiple Sclerosis Society provides multiple resources to help connect people with multiple sclerosis, including peer mentoring, support groups, and social events, though these have not been empirically evaluated for efficacy ("Find Support," n.d.). The dearth of data on social support interventions calls for innovative new approaches, further research, and an improved understanding of the link between social support and psychological well-being in people with multiple sclerosis.

A comprehensive review of social support interventions for mental health in people with other chronic diseases such as cancer, obesity, and substance use found evidence for social support improving patient well-being, which was measured in myriad ways including quality of life scales, distress, and social network size (Hogan et al., 2002). While no studies were included in this review that looked at people with multiple sclerosis, there were numerous social support intervention studies in patients with conditions with similar symptoms or overlap with multiple sclerosis such as depression, medium-to-high functioning stroke survivors, cancer, or heart conditions. The author of this manuscript reviewed over 100 studies and identified different forms of social support that were most consistently beneficial to participants: support involving a family member or friends, and support groups supplemented training in social skills.

Supplemental treatment for people with multiple sclerosis - physical activity. Physical activity interventions are an emerging treatment option for people with multiple sclerosis. Originally thought to worsen multiple sclerosis symptoms, exercise was discouraged until reevaluation in the late twentieth century (Giesser, 2015). Now, the physiological benefits

of physical activity interventions in people with multiple sclerosis are well-supported: a meta-analysis of 54 studies identified improvements in muscular strength, aerobic capacity, mobility, fatigue, and health-related quality of life as a result of physical activity interventions in people with multiple sclerosis (Latimer-Cheung et al., 2013). Subsequent randomized controlled trials of physical activity in the multiple sclerosis population have expanded these findings, showing that physical activity improves physical capacity (Magnani et al., 2016), walking ability, and cognitive functioning as measured at completion of a physical activity intervention (Sandroff et al., 2014). In addition to the ample evidence to support that physical activity can have immediate effects on multiple sclerosis symptom management and patient mental health, there is also emerging evidence for a disease-modifying effect of exercise on multiple sclerosis disease progression (reviewed in Dalgas and Stenager, 2012). Three studies of clinical disease measures of multiple sclerosis progression (Golzari et al., 2010; Romberg et al., 2004, 2005), two studies of brain structure or MRI-based measures (Prakash et al., 2007, 2010), nine studies of self-reported measures (Motl et al., 2006, 2007, 2011; Motl et al., 2008; Motl et al., 2008; Motl & McAuley, 2009, 2011; Motl & Gosney, 2008; Stuifbergen et al., 2006), and three studies of animal-model based measures (Le Page et al., 1994, 1996; Rossi et al., 2009) found evidence to support that physical exercise can slow disease progression in people living with multiple sclerosis.

Of key interest to the present study, these positive physiological changes from exercise are often paired with improved psychological well-being as well. Indeed, improved physical fitness is strongly correlated with cognitive functioning in people with multiple sclerosis (Beier et al., 2014). A literature search of peer-reviewed studies of the effect of physical activity on the key mental health measures in people with multiple sclerosis returned 28 relevant studies, the

details of which are outlined in Table 1. Physical improvements are included as a measure of study outcomes in this table, but not discussed in detail as they have been reviewed extensively in meta-analyses and are tangential to the purpose of the proposed research.

Depression. 11 studies addressed the impact of physical activity on depression: ten randomized controlled trials, and one randomized crossover design. Four of these studies provided an aerobic exercise-based intervention such as biking or treadmill, and six used a resistance training-based exercise intervention, and one used a 6 month long physical activity intervention. Seven of these studies were able to detect lower depression scores following the intervention in participants relative to controls, and four found no change in depression scores.

Anxiety. Anxiety was less well-studied, with just four studies including it as an outcome measure for their physical activity interventions, all which used an aerobic exercise intervention in their participants. Three studies were randomized controlled trials and one used a pre-test-post-test design. Three of these studies reported decreased measures of anxiety and one did not observe changes in anxiety.

Self-efficacy. Similarly, self-efficacy was less studied, with four studies including it as an outcome in their physical activity interventions. These had very different study approaches: one study used a t'ai chi intervention and a pre-test-post-test design, another a resistance training exercise intervention and pre-test-post-test design, another used an aerobic training intervention and a randomized crossover design, and one used therapeutic yoga and a pre-test post-test design. All four studies found that physical activity was associated with increased measures of perceived self-efficacy.

Social support. Five studies examine physical activity and social support in participants with multiple sclerosis, again with varied approaches. Three used a randomized controlled trial

design, one used a pre-test-post-test design, and one used a cross-sectional cohort design. The interventions studied included aerobic exercise training, t'ai chi, resistance training, and general physical activity. Four of the five studies detected higher measures of social support.

Quality of life. Studies reporting changes in quality-of-life score were common, with 26 studies examining quality of life outcomes. A majority of these studies used a randomized controlled trial design, and both aerobic exercise and resistance training were the most common interventions studied with quality-of-life outcomes. 22 of these studies detected higher quality of life measures associated with physical activity.

Mindfulness. Mindfulness was used as an outcome in just two studies, one randomized controlled trial and one pre-test-post-test design. One study examined the effects of aerobic exercise, and another looked at sports climbing and yoga. Both observed higher scores in mindfulness associated with their physical activity interventions.

Overall, these 28 studies support physical activity as a tool for improving mental health measures in people living with multiple sclerosis. The studies were primarily conducted in the United States and Europe, with two studies from Iran, two from Turkey, and one from Australia. Quality of life and depression were the most commonly studied mental health measures, and more research is needed for social support, mindfulness, and anxiety.

Table 1

The Effect of Physical Activity Interventions on People with a Multiple Sclerosis Diagnosis

Paper	Study Set-up				Outcomes by Measure						
	Study Design	Sample Size	Intervention	Location	Depression	Anxiety	Self-efficacy	Social Support	Quality of Life	Mindfulness	Physical
Amhadi et al., 2013	RCT	treadmill n = 10, yoga n = 10, control n = 10	8 weeks of treadmill or yoga training	Iran	yes	yes			yes		
Bjarnadottir et al., 2007	RCT	n = 6, control n = 10	5 weeks of aerobic and resistance training	Iceland					yes		yes
Cakt et al., 2010	RCT	biking n = 15, home-training n = 15, control n = 15	8 weeks of biking or home training	Turkey	yes				yes		yes
Collet et al., 2010	RCT	low intensity n= 20, moderate intensity n = 18, high intensity n = 17	12 weeks of low, moderate or intense bike training	UK					no change		yes
Dalgas et al., 2010	RCT	n = 16, control n = 15	12 weeks resistance training	Denmark	yes				yes		yes
Dettmers et al., 2009	RCT	n = 15, control n = 15	3 weeks of either endurance training or stretching	Germany	no change				no change		yes
Dodd 2010	RCT	n = 36, control n = 35	10 weeks of progressice resistance exercise	Australia					yes		yes
Garrett et al., 2013	RCT	PT-led exercise n = 80, yoga n = 77, instructor-led exercise n = 86, control n = 71	10 weeks of physical therapist-led exercise, yoga, or fitness instructor-led exercise	Ireland	yes	yes		yes			yes
Hassanpour-Dehkordi & Jivad, 2014	RCT	aerobic n = 20, yoga n = 20, control n = 21	12 weeks of aerobic exercise or yoga	Iran					yes		
Husted et al., 1999	pre-test post-test	n = 19	8 weeks of t'ai chi	US			yes	yes	yes		yes
McCullagh et al., 2005	RCT	n = 12, control n = 12	12 weeks of home workouts	Ireland					yes		yes
Mostert & Kesselring, 2002	RCT	n = 13, MS control n = 13, non-MS control n = 26	4 weeks of aerobic exercise training on bikes	Switzerland				yes	yes	yes	yes
Oken et al., 2004	RCT	aerobic n = 21, yoga n = 26, control n = 22	yoga or aerobic training with biking	US	no change	no change			yes		yes
Petajan et al., 1996	RCT	n = 21, control n = 25	exercise or nonexercise	US	yes				yes		yes
Petruzzello et al., 2009	pre-test post-test	n = 25	5, 20, or 60 minutes of cycling	US		yes					
Pilutti et al., 2011	pre-test post-test	n = 6	12 weeks of treadmill training	Canada					yes		yes
Rafeeyan 2010	pre-test post-test	n = 22	4 weeks of swimming	Iran					yes		yes
Rampello et al., 2007	randomized crossover	n = 19	8 weeksof aerobic training	Italy					yes		yes
Romberg et al., 2005	RCT	n = 47, control n = 48	6 months of resistance training	Finland	no change				no change		yes
Sabapathy et al., 2011	randomized crossover	n = 16	8 weeks of endurance and 8 weeks of resistance training	Australia	no change				no change		no change
Shulz et al., 2004	RCT	n = 23, control n = 16	8 weeks of biking	Germany					yes		yes
Sutherland et al., 2001	RCT	n = 11, control n = 11	10 weeks of water aerobics	Australia	yes			no change	yes		yes
Tarakci et al., 2013	RCT	n = 51, control n = 48	12 weeks of group exercise	Turkey					yes		yes
Taylor et al., 2006	pre-test post-test	n = 9	10 weeks of progressice resistance exercise	Australia			yes				yes
Turner et al., 2009	cross-sectional cohort	n = 2374	NA- observational	US				yes			yes
Velikonja et al., 2010	2 group pre-post	n=10, ctrl n=10	sports climbing or yoga	Slovenia						yes	yes
Wier, 2011	randomized crossover	n = 13	6 weeks of treadmill training	US			yes		yes		yes
Zaenker et al., 2018	pre-test post-test	n = 26	12 week HIIT and resistance training	France					yes		yes

RCT = randomized controlled trial, PT = physical therapy, MS = multiple sclerosis

There is some evidence that self-efficacy and social support are effect-modifiers for physical activity interventions improving mental health in the multiple sclerosis population. In one study, participants with multiple sclerosis were randomized either to a 12-week exercise program or to the same program with added lectures and information regarding self-efficacy (McAuley, 2007). The self-efficacy enhanced program produced substantially better improvements in exercise frequency, duration, enjoyment, and positive affect in participants compared to the exercise-only group. Elements of the self-efficacy training offered in this intervention were similar to components of the proposed research, using the First Descents program and other adventure programming theory, namely the establishment of realistic but challenging goals and the importance of social support. Indeed, of the reviewed studies that used group exercise, all observed significant improvements in physical and quality of life measures (Tarakci et al., 2013; Husted et al., 1999; Turner et al., 2009). Highly social self-efficacy-focused interventions may be of particular importance for the multiple sclerosis population, and these factors warrant further investigation.

To review: a handful pharmacological, therapeutic, and physical activity treatments are documented as improving the physical and mental well-being of people with multiple sclerosis. These treatments are often limited in their scope or are associated with substantial side-effects. Physical activity is a promising avenue for treating multiple sclerosis, but the effect-modifying benefits of supplemental self-efficacy training and social support are underexplored. People living with multiple sclerosis need more options for activities that can improve their overall well-being. The National Multiple Sclerosis Society has issued a call for improved access to activities that provide physical engagement and that allow participants to see themselves as more than a patient, even to have fun (*Exercise*, 2020). Adventure programming, unstudied in the multiple

sclerosis population, but well-established among physically well people and individuals with chronic disease alike, may address this need.

Adventure Programming

Adventure programming is defined as activities in group settings that take place outdoors in natural areas. In adventure programming there is an element of physical and mental challenge or risk-taking, and often involves activities like watersports, backpacking, snow activities, and ropes courses. Adventure programming is distinct from but often a component of "adventure therapy" or "wilderness therapy" because adventure programming does not include direct involvement of psychological health professionals (Itin, 1997; Newes & Bandoroff, 2004). First Descents, the partner organization for this research, is structured as an adventure program rather than adventure therapy, in that a mental health professional is not integrated during the program.

Theoretical Origins

Adventure programming has grown out of a long-standing tradition of healing through time spent outdoors. It has roots in naturalism dating back to the late 1700s when reconnection with nature underwent a philosophical and intellectual revival, later popularized by the work of Henry David Thoreau and contemporaries (Miles & Priest, 1999). "Tent therapy" and therapeutic camping were thought to improve health by increasing contact with nature (Davis-Berman & Berman, 1994). Beginning in the 1940s, outdoor adventure programs began to take the form currently seen in First Descents and other modern adventure programs. The first such program, Outward Bound, was able to demonstrate reduced recidivism in troubled youth who participated in their outdoor adventure program (Kelly & Baer, 1969). Outward Bound is still running to this day.

Adventure programming has a strong theoretical basis in "experiential education" (Kraft & Sakofs, 1985), and eco-psychology (Roszak et al., 1995). Applied to adventure programs, experiential education, or "learning by doing", is enhanced by the multi-sensory nature of cognitive and physical activity in the outdoor setting (Crisp, 1998). Adventure programming employs the five key elements of experiential learning philosophy (Newes & Bandoroff, 2004). First, the participant is an actor rather than a spectator in the program. Second, the activities require internal motivation in the form of energy exertion, involvement, and personal responsibility from each participant. Third, the activities are real and meaningful with natural consequences for the participant. Fourth, reflection is a critical component of the experience. And fifth, the learning experience must have relevance and meaning in the life of the participant outside of the program. These theoretical foundations lay the groundwork for adventure programming to be used for improving mental health in a range of populations.

In addition to its foundations in experiential educational philosophy, adventure programming developed from early research on the importance of nature and its role in mental health. Eco-psychology is the theoretical focus on human-environmental connection as the path to mental and ecological health (Roszak et al., 1995). Eco-psychology informed a number of subsequent forms of therapeutic practice such as walking meditation, outdoor therapy, and nature retreats for a wide array of mental health states, including those associated with a cancer diagnosis, trauma, and depression (reviewed in Burns, 1998). Adventure programming is one way to reconnect individuals with the natural world and access the psychological benefits of this link (Holewski, 2016). First Descents programming occurs throughout the United States and in four locations internationally, primarily on public lands and natural areas. Interaction with nature is an essential component of each program the organization runs.

Mechanisms of Adventure Programming Improving Participant Well-Being

Adventure programming in some form has been in use for over one hundred years, yet its mechanisms of effect have been studied only recently. While this research is still ongoing, it is believed that social interaction, adaptive dissonance, spirituality, and challenge-by-choice are significant mechanisms (each of these will be discussed below) behind the success of adventure programs in improving the well-being of participants.

Social interaction. Social interactions are a key mechanism for success in the overall goals of adventure programs (Sibthorp, 2003). Perhaps the best-studied mechanism, the social component of adventure programs has been studied as a combination of different "helping factors" (Yalom & Crouch, 1990). These eleven factors have been identified as key components of the social group that create the observed benefits to mental and overall well-being, though this remains an active field of study. The helping factors are described below and are summarized in Table 2.

The group formed as part of adventure programming typically has a common factor, such as a health condition or school association, that unites them. This allows for improved feelings of *universality*, where participants see that they are not alone in their challenges (Sibthorp & Jostad, 2014). Universality helps participants see themselves as part of something bigger than themselves and helps to foster a group identity or belonging. The *existential* factors of the environment itself also contribute to a sense of something bigger, because it places participants in the larger ecosystem which often contrasts with their home environments and routines. This universality and existentialism from the group setting improves feelings of *hope* and optimism for the future among participants (Gelkopf et al., 2013).

The shared experiences that bring group member together in a program also help to provide participants with new advice and *information* they may use to cope once the program is completed (Martin & Leberman, 2005). Group members often meet for the first time in an adventure program, and this allows each participant to experiment with new behaviors and identities with each other, via *imitative behavior* and improved *socialization* (Johnson et al., 2011). The skills acquired in group settings, especially as they are tailored to a shared condition or experience, build strengths that can benefit participants long after a program is ended.

Indeed, these new social dynamics may foster an alternative family structure, whereby participants can correct for the limitations of their own primary family and upbringing by *corrective recapitulation* (Gargano & Turcotte, 2019). Group members can develop long-lasting *interpersonal relationships* during the course of a program (Sibthorp & Jostad, 2014). The group works together to accomplish tasks during the program, which develops a close social *cohesion*, improving communication and helping to form social bonds (Breunig et al., 2010). These relationships and structures can expand the social universe of participants, which in the case of chronic disease can be quite limited.

In the process of this teamwork, members are able to help one another and feel the value and importance that come from *altruistic* acts (Gargano & Turcotte, 2019). Altruism as a social phenomenon thought to benefit both the actor and recipient reciprocally and is an important part of group and pair bonding. In either planned or impromptu interactions, participants can disclose their feelings and experiences in the group, allowing for *emotional catharsis* (Tubbs, 2012). These emotional releases, especially when acknowledged and respected in a group setting, allow participants an opportunity to examine feelings they might otherwise avoid, and can be an important step in acceptance.

Table 2

Helping Factors of Group Programs

Helping factor	Description
Universality	Group members see that they are not alone in their struggles
Existential factors	Participants feel part of something greater than themselves
Hope	Group members feel a sense of optimism and future promise
Information/education	Participants gain new knowledge about mental health, outdoor skills, and life in general
Imitative behavior	Group members adopt the coping skills and behaviors of other members
Socialization	Participants learn improved social skills
Corrective recapitulation	The group forms a familial structure that may supplement participant families of origin
Relationship building	Participants form close interpersonal relationships
Group cohesion	Members feel a sense of belonging and identity with the group
Altruism	Helping others allows a participant to feel valued and significant
Catharsis	Opportunities to express emotions and disclose create cathartic experiences

Adapted from (Yalom & Crouch, 1990)

Adaptive dissonance in the physical environment. The physical environment for adventure programs plays a role in developing positive health outcomes, primarily through existential factors and novelty. In natural settings, participants feel like a part of something greater, and have identified this perspective as a factor leading to long-term positive changes (Sibthorp et al., 2007). This shift in perspective that comes from the contrast between the program and home environments is a form of adaptive dissonance (Yalom & Crouch, 1990). The built environment of adventure programs, typically in camp settings, tents, treehouses, and cabins, can contrast from the day-to-day lives of participants. In one adventure program, the close quarters of a sailing boat paired with the vast openness of the sea induced a sense of novelty and encouraged positive social outcomes and personal development (Capurso & Borsci, 2013; Sibthorp, 2003). The natural environment also contributes to adaptive dissonance: in a meta-analysis examining ten studies with a total of 1252 participants, the presence of water in adventure programs increased effect sizes for improvements in self-esteem and mood (Barton &

Jules, 2010). In one study, when weather conditions limited the group activities to the indoors, group outcomes were worse (McKenzie, 2003). These physical environments and their contrast with the lived environment of participants work together with many of the social dynamics discussed above, especially in the creation of a social interdependence.

Challenge by choice. Perhaps most unique to adventure programming is the mechanism of "challenge by choice": the process of facing an unfamiliar and challenging situation and overcoming it independently. Studies have shown that adventure programs are most effective when they create an experience of psychological disequilibrium at the beginning of the challenge, which pushes participants just out of their comfort zone but not into acute distress or panic (Brown, 2008; Luckner & Nadler, 1997; Panicucci, 2007). This challenge and mastery emphasize the participant's own self-efficacy and can feed into the process of self-actualization by showing them that they are capable. Participants may first doubt their physical ability to do the challenge but are given adaptive training and support from program staff and peers. They learn that they are safe and can use their own skills to accomplish the adventure. In people with chronic conditions and physical limitations, this can help restore the locus of control from others (medical care providers, family members, and the external world) to themselves. Participants do not experience adventure programs as passive patients, but rather as active individuals.

Spirituality. In connecting participants with the natural world, adventure programming can encourage spiritual development in participants. While spiritual experiences are not regularly the purview of scientific literature, scholars of adventure programming contend that being part of something "greater than oneself" promotes reflection, perspective, and improved well-being (Sibthorp et al., 2007). Many individuals experience a spiritual connection to nature, and this complex relationship can form another mechanism by which nature affects health outcomes

(Heintzman, 2009). As proposed in the study of eco-psychology, the human brain structure is adapted to and shaped by the environment in which it evolved, and thus people have an innate instinct to connect emotionally and spiritually with nature (Kellert & Wilson, 1995; Roszak et al., 1995). For people with physical limitations and who experience chronic illness, the opportunity to access natural spaces can be vanishingly rare. Spiritual experiences facilitated by the presence of nature may play a role in the improvements seen in adventure program participants.

Literature review of adventure programs improving wellness in chronic disease.

While no studies of adventure programming in the multiple sclerosis population have been published to date, multiple sclerosis is a chronic degenerative disease that shares characteristics and limitations with many chronic health conditions. A literature search produced a total of 17 peer-reviewed studies of adventure programming in people with chronic disease. The majority of these studies were exploratory and of a pilot intervention, consisting of smaller sample sizes. Three studies were larger and of more established adventure programs (Bekesi et al., 2011; Rosenberg et al., 2014; Zebrack et al., 2017). While some interventions are considered individual sports (e.g. kayaking), all of the program activities were conducted in a group setting. Considered as a whole, these studies established that adventure programming can have a substantial and broad positive impact on the well-being and coping of people with chronic health conditions, in particular those measures which most concern the multiple sclerosis population (depression, anxiety, self-efficacy, social support, quality of life, and mindfulness-based self-efficacy).

Depression. Six studies were identified that looked at the effects of adventure programming on depression in participants with chronic health conditions, three of which

utilized pre-test post-test design (Buettner and Fitzsimmons, 2002; Rosenberg et al., 2014; Zebrack et al., 2017), one used mixed methods (Vörösvári, 2016) and two used a randomized controlled trial (Gelkopf et al., 2013; Han et al., 2016). Two studies involved participants with dementia (Buettner and Fitzsimmons, 2002) or brain injury (Vörösvári, 2016), two had subjects with a cancer diagnosis (Rosenberg et al., 2014; Zebrack et al., 2017), one looked at those with chronic pain conditions (Han et al., 2016), and one studied people with post-traumatic stress disorder (Gelkopf et al., 2013). Two studies looked at interventions based on kayaking (Rosenberg et al., 2014; Zebrack et al., 2017), one studied group biking (Buettner and Fitzsimmons, 2002), one group sailing (Gelkopf et al., 2013), one forest therapy program (Han et al., 2016), and one outdoor adventure camp (Vörösvári, 2016). The majority of the studies that looked at depression were conducted in the United States, but one took place in Israel (Gelkopf et al., 2013), and one in South Korea (Han et al., 2016). Each of these studies found that adventure programming significantly improved measures of depression. Of particular interest to the current study is the water-based activities of kayaking (Rosenberg et al., 2014 & Zebrack et al., 2017) as it relates to the proposed research with the multiple sclerosis population, whitewater rafting.

The first randomized controlled trial (Gelkopf et al., 2013) identified adventure programming as a supplementary intervention to increasing the efficacy of PTSD treatment. In this study, 22 veterans (waitlist control $N = 20$) spent one year undergoing the adventure program intervention in the form of sailing group trips. The study found significant improvements in posttraumatic symptoms, depression, functional impairments, quality of life, perceived control over illness, hope, and functioning. Of note, this was the first study to demonstrate that adventure programming can help people with chronic posttraumatic stress disorder. The second randomized

controlled trial (Han et al., 2016) investigated the effect of an adventure program that took place in a forested metropolitan park over a two-day period in people with chronic widespread pain (experimental group $N = 33$; control group $N = 28$). Results from the intervention demonstrated that participating in the forest program improved physiological outcomes (heart rate variability; increase in immune competence), as well as decreased pain and depression, and increased quality of life regarding health as compared with controls who did not attend the adventure program. This study concludes that forest therapy can treat people with chronic widespread pain.

Anxiety. Two studies were identified that looked at the effects of adventure programming on anxiety in participants, both of which used a pre-test post-test design (Shepanski et al., 2005; Zebrack et al., 2017). One study involved participants with inflammatory bowel disease and took place at an outdoor adventure camp (Shepanski et al., 2005), and the other looked at people with a cancer diagnosis who participated in a kayaking program (Zebrack et al., 2017), both in the United States. No change in anxiety was found with the inflammatory bowel disease study as measured by a component of the IMPACT-II questionnaire (Shepanski et al., 2005). It is possible that since the study measured anxiety by looking at a component of an overall questionnaire rather than a specific tool for anxiety, the methods used were not sensitive enough to detect change. Zebrack and coauthors (2017), however, did observe significant reductions in anxiety as measured by the PHQ-4 in people with cancer who participated in the kayaking program, specifically, a statistically significant decrease from a pre-trip mean score of 2.76 to a post-trip mean score of 1.87 in participants.

Self-Efficacy. 10 studies were identified that examined the effects of adventure programming on self-efficacy in participants. The majority of these studies used qualitative interviews (Bidell, 2009; Pasek & Schkade, 1996; Slavin, 2015; Stevens et al., 2004; Sugerman,

2005; Taylor & McGruder, 1996). A pre-test post-test design was utilized in two studies (Bekesi et al., 2011; Zebrack et al., 2017), a randomized control trial by one study (Gelkopf et al., 2013), and one study used mixed methods (Vörösvári, 2016). A majority of these studies took place in North America and among people with a cancer diagnosis, and the interventions employed were varied. See Table 3 for complete details about study location, population, and intervention. While the majority of these studies were qualitative, improvements in self-efficacy were found throughout the reviewed studies.

Social Support. 10 studies were identified that reviewed the effects of adventure programming on social support in participants. The majority of these studies used qualitative interviews (Bidell, 2009; Slavin, 2015; Stevens et al., 2004; Sugerman, 2005; Taylor & McGruder, 1996), three used pre-test post-test design (Andersonn et al., 1997; Shepanski et al., 2005; Zebrack et al., 2017), one used a randomized controlled trial (Wassif, 2014), and one used mixed methods with pre-test post-test and qualitative interviews (Vörösvári, 2016). The Wassif, 2014 randomized controlled trial used an outdoor adventure camp program (Outward Bound) to help veteran participants (treatment group $N = 50$; waitlist control group $N = 45$) reintegrate and re-socialize after returning home from serving with the military. The intervention participants completed the Outward Bound adventure program designed for veterans. The study demonstrated that participation in this program led to significantly improved posttraumatic growth compared to waitlist controls. Interestingly, in examining the component subscales of the posttraumatic growth measure, they found that "relation to others" was the only statistically significant contributor to the observed effects. This result suggests that meaningful social interaction may play a key role in recovery and growth.

A majority of these studies took place in North America and among people with a cancer diagnosis, and the interventions employed were varied. See Table 3 for complete details about study location, population, and intervention. Increases in social support were found across these studies.

Quality of Life. Eight studies were identified that reviewed the effects of adventure programming on quality of life in participants. The majority of these studies used pre-test post-test designs (Andersonn et al., 1997; Bekesi et al., 2011; Buettner and Fitzsimmons, 2002; Mirandola et al., 2020; Shepanski et al., 2005), two used randomized controlled trials (Gelkopf et al., 2013; Han et al., 2016), and one study used qualitative interviews (Bidell, 2009). A majority of these studies took place in North America. See Table 3 for complete details about study location, population, and intervention. All eight studies observed some positive change in quality of life following the adventure program interventions.

Mindfulness-Based Self-Efficacy. Two studies were identified that looked at the effects of adventure programming on mindfulness in participants, and both utilized a qualitative design with cancer patients (Slavin, 2015; Stevens et al., 2004). One study used a climbing program which took place in the United Kingdom (Slavin, 2015), and the other used a mountaineering program which took place in the United States (Stevens et al., 2004). Both described modest improvements in mindfulness in their participants, and interviewees in both programs emphasized the role of the natural setting in fostering their mindfulness. Research on mindfulness and adventure programming is scant in the literature, but this study aims to contribute to this field of research.

Table 3

The Effect of Adventure Programming Interventions on People with Chronic Health Conditions

Paper	Study Set-up					Outcomes by Measure						
	Study Design	Sample Size	Intervention	Chronic condition	Location	Depression	Anxiety	Self-efficacy	Social Support	Quality of Life	Mindfulness	Physical
Andersonn et al., 1997	Pre-test post-test	n = 12	Wilderness canoe adventure program	Mental and physical disabilities	US				yes	yes		
Bekesi et al., 2011	Pre-test post-test	n = 115	Camping trip	Cancer, diabetes, juvenile arthritis	Hungary			yes		yes		
Bidell, 2009	Qualitative interviews	n = 8	Camping, rafting, and ropes course program	HIV/AIDS	US			yes	yes	yes		yes
Buettner & Fitzsimmons, 2002	Pre-test post-test	n = 41	Group biking	Dementia	US	yes				yes		
Gelkopf et al., 2013	RCT	n = 22, control n = 20	Group sailing	PTSD	Israel	yes		yes		yes		
Han et al., 2016	RCT	n = 33, control n = 28	Forest therapy program	Chronic pain	South Korea	yes				yes		yes
Hitzig et al., 2012	Pre-test post-test	n = 14	Outdoor experiential therapy intervention	Spinal cord injury	Canada			yes				
Pasek & Schkade, 1996	Qualitative interviews	n = 14	Snow skiing trip	Limb deficiency	US			yes				
Rosenberg et al., 2014	Pre-test post-test	n = 199	Kayaking program	Cancer	US	yes						
Shepanski et al., 2005	Pre-test post-test	n = 61	Outdoor adventure camp	Inflammatory bowel disease	US		no change		yes	yes		yes
Slavin, 2015	Qualitative interviews	n = 6	Climbing program	Cancer	UK			yes	yes		yes	
Stevens et al., 2004	Qualitative interviews	n = 16	Mountaineering program	Cancer	Canada			yes	yes		yes	
Sugerman, 2005	Qualitative interviews	n = 4	Ropes course program	Cancer	US			yes	yes			
Taylor & McGruder, 1996	Qualitative interviews	n = 3	Sea kayaking	Spinal cord injury	US			yes	yes			
Vörösvári, 2016	Mixed methods	n = 9	Outdoor adventure camp	Brain injury	US	yes		yes	yes			yes
Wassif, 2014	RCT	n = 50, control n = 45	Outward bound program	PTSD	US				yes			
Zebrack et al., 2017	Pre-test post-test	n = 304	Kayaking program	Cancer	US	yes	yes	yes	yes			

RCT = randomized controlled trial, PTSD = post-traumatic stress disorder, HIV/AIDS = human immunodeficiency virus/ autoimmune deficiency syndrome

First Descents Adventure Programming

First Descents is an organization that employs adventure programs to enrich the lives of young adults with chronic health diseases. First Descents collaborates with mental health practitioners in the development of their programs to ensure safety and inclusivity, but providers are not present during the actual execution of the programs. Programs are run by Lead Staff and highly trained professional instructors to teach participants how to do the adventure sport chosen as the theme for each individual program.

First Descents has been providing adventure programming for almost 20 years. While the number of participants and availability of programs all over the world have expanded greatly over the years, the premise of the program has remained the same. Programs range from weekend trips to week-long adventures, and include activities such as rock-climbing, white-water rafting, and kayaking. A central theme is the opportunity to hear the stories of other participants in a structured manner. Each participant comes in with a different story and unique diagnosis. The Lead Staff, employed by First Descents, provides a structure for these conversations to take place, called “campfire”, which consists of the group of participants all circling up and taking time to speak individually in response to prompts from Lead Staff. Discussion topics include each individual’s journey with their disease, experiences with medical and social support systems, challenges they had to overcome to be alive and sitting in the circle that day, and other topics chosen to allow for a group process to occur in an emotionally supportive and structured arena. These “campfires” are a time where people are prompted to share personal information with the group about their experiences with a chronic health disease, and participation is voluntary with Lead Staff emphasizing that speaking to the whole group is encouraged but not a requirement.

Lead Staff are trained on a yearly basis during a program retreat where all of the employees of First Descents gather to go over the mission statement, new protocols for running programs, and goals for helping new populations of people (such as those with multiple sclerosis). Each Lead Staff member undergoes vigorous interpersonal and objective interviewing and training to ensure that they are able uphold the mission of First Descents, to "provide life-changing, outdoor adventures for young adults impacted by cancer and other serious health conditions." Lead Staff are in charge of making sure the program week goes as planned, as well as oversee volunteer medical staff, photographers, camp chefs, and general needs helpers named "camp moms". While the overall plan for each program has structure, there is also some flexibility for Lead Staff to allow participants to create their own experiences and moments for healing. The main components, namely the nightly campfires, daily activities, and daily ceremonies are consistent in every program, but participants are encouraged to explore and expand on the group processes that crop up organically in a social setting.

The campaign "Prescribe Adventure" was launched by First Descents in 2018 in an effort to include people who had very recently been diagnosed with a chronic health disease. In the past, people would be asked to wait until sometime after treatment to attend a program due to concerns about restricted physical ability and the impact that travel and extra stress might have on overall health. In 2018, First Descents lifted that limitation in order to allow medical professionals the freedom to recommend patients who have been cleared medically to participate in a program right away to start building resiliency by accessing the resources available from First Descents. In an effort to make medical providers aware of the resources that First Descents offers, a campaign was launched to partner with numerous healthcare professionals and hospitals to integrate adventure programs into the initial planning for patient's long-term care.

The importance of integrating adventure programs into treatment planning from the start is highlighted in a statement from Jennifer Jackson, MD, a previous participant with First Descents and medical doctor: “As a doctor and as a patient, I’ve experienced the value of First Descents. I know that adventure and community are essential to the healing process. I would love to see the medical system go beyond treating my sickness and start healing my soul. My hope is for a future where every young adult cancer patient gets a written prescription for First Descents, because nothing is more healing than Out Living It!” (Jennifer Jackson MD quoted in “Prescribe Adventure,” 2018). “Out Living It” is the motto used by First Descents.

Another unique component of First Descents is that participants are asked to assign themselves a nickname. Participant’s real names are not used at all during the programs in an effort to allow for psychological distance from the name of the person who was a patient undergoing the potentially traumatic and painful treatments for their chronic health disease. Participant’s report feeling as if they can finally be themselves again, or even someone new with their nickname, and separate from always being the patient who had to overcome great feats of physical pain and psychological distress to be able to make it through their chronic disease.

Since First Descents began, two studies have undertaken to evaluate the health impacts of participation in the program (Rosenberg et al., 2014; Zebrack et al., 2017). In 2014, the first empirical research project on First Descents was conducted by Rosenberg and coauthors in an effort to better understand the effects that adventure programming has on participants. This study used people between the ages of 18 to 39 with a cancer diagnosis. The experimental and control groups each had a sample size of $N = 198$. The study utilized a waitlist comparison design. Self-report measures were administered before the program and immediately following completion, and assessed body image, self-compassion, and general mental health. Participants in First

Descents showed significant improvements in measures of body image (mean change in score over time: $\beta = 3.9$, F test comparing β between intervention and control arms: $p < .001$), self-compassion ($\beta = 2.7$, $p < .001$), discomfort ($\beta = -1.3$, $p < .01$), depression ($\beta = 2.4$, $p < .001$), depressive feelings ($\beta = -2.2$, $p < .001$), poor self-esteem ($\beta = -1.7$, $p < .01$), alienation ($\beta = -2.3$, $p < .05$), fatigue ($\beta = -1.3$, $p < .01$), concentration problems ($\beta = -1.7$, $p < .001$), and somatic anxiety ($\beta = -1.7$, $p < .05$), as compared with participants in the waitlist control group. There were no observed changes in anger/aggression, anxious feelings, or social outgoingness between the intervention and control groups.

Researchers again found support for the positive impacts of First Descents in a subsequent study conducted in 2017 from the University of Michigan (Zebrack et al., 2017). To participate in the study, First Descents program attendees had to be in the age range of 18 to 40 years old, be attending the program for the first time, and have a cancer diagnosis. Researchers completed a longitudinal study, collecting data at three separate time points: pre-trip, post-trip, and at a one-month follow-up. The sample size for this study was $N = 247$ at the pre-trip timepoint, $N = 196$ at the post-trip timepoint, and $N = 159$ at the follow-up timepoint. In the study by Zebrack and coauthors, results from this initial research were promising. Distress, as measured by the PHQ-4 (higher numbers indicating higher levels of distress) decreased from 2.76 to 2.31 and continued to decrease at follow-up to a mean score of 1.99. Distress was statistically significantly lower than at baseline for both the post-trip and follow-up timepoints (pre- to follow-up $\beta = -0.322$, $p < 0.001$). Self-efficacy, as measured by the Cancer Behavior Inventory - Brief (CBI-B), (a test used to measure behavioral coping responses of people with diagnosed cancer; Merluzzi et al., 2001) significantly improved from pre-trip to post-trip with a mean score of 47.33 to 52.68 at post-test and attenuated slightly to 51.45 at follow-up. Self-

efficacy score for post-trip and follow-up were statistically significantly greater than measured at the pre-trip timepoint (pre- to follow-up $\beta = 2.361$, $p < 0.001$). Social support, as measured by the Duke-UNC Functional Social Support Questionnaire (Broadhead et al., 1988) improved from a mean score of 4.06 to 4.29 at post-test and attenuated to 4.15 at follow-up. Social support was statistically significantly different between pre-trip to post-trip, however, from pre-trip to follow-up the significance was only marginal (pre- to follow-up $\beta = 0.064$, $p = 0.053$).

Following the encouraging results from these studies, First Descents chose to expand their programming in order to benefit more individuals with chronic health conditions, changing their mission statement from "First Descents provides life-changing outdoor adventures for young adults impacted by cancer" to "First Descents provides life-changing outdoor adventures for young adults (ages 18 - 39) impacted by cancer and other serious health conditions." The first population they aimed to expand services to was people with a multiple sclerosis diagnosis. They ran a pilot program consisting of 14 participants with multiple sclerosis in 2018 and have expanded to a set of programs for people with a multiple sclerosis diagnosis in 2019.

Potential Impacts of Adventure Programming for Multiple Sclerosis

In this review, it has been established that adventure programming similar to the proposed First Descents program can improve mental health and overall quality of life in people with physical limitations and chronic illness. Because these populations have conditions that overlap meaningfully with multiple sclerosis, it is possible that adventure programming may produce similar effects in the multiple sclerosis population. Also reviewed were the numerous treatments for improving physiological and mental wellness in people with multiple sclerosis that are available and empirically studied thus far. The pharmacological interventions for multiple sclerosis can have significant side effects and do not treat all of the symptoms that people

experience, and psychotherapy is effective but can require training specific to the multiple sclerosis population. Social support interventions are lacking, but there is potential for growth. And lastly, physical activity interventions have been shown to substantially improve physical and mental well-being of people with multiple sclerosis. The physical activity and social components of adventure programming are likely to benefit people with multiple sclerosis, and adventure programming may fill in the gaps and supplement the range of other treatment options available to providers and their patients. People with multiple sclerosis are therefore a prime population to benefit from adventure programming. Hopefully this is the first of many studies in order to lend further support for the utility of adventure programs and add to the available treatment options for people with multiple sclerosis.

Purpose of the Study

To our knowledge, this is the first study to examine the psychological and physiological health benefits of adventure programming in people with multiple sclerosis. Multiple sclerosis is on the rise (Harirchian et al., 2018) and this population stands to benefit substantially from more care options, particularly those that address both physiological and mental health challenges. A 2017 feature in *Frontiers in Public Health* called for increased research on the use and application of adventure programming to improve the lives of people with chronic illnesses (Buckley & Brough, 2017). It is the intention of the proposed research to examine the mental well-being effects of First Descents adventure programming for people with multiple sclerosis using a pre-test post-test study design and data collected during the 2019 First Descents program year.

Research Questions

1. Does the well-being of individuals with multiple sclerosis improve from pre- to post-intervention among participants of First Descents adventure programs?
2. Are these improvements maintained through one month following the intervention?

Hypotheses

1. Self-Efficacy scores as measured by the MSSES will increase from pre- to post- trip.
    a. Effects will be maintained through the one-month follow-up.
2. Anxiety scores as measured by the GAD-7 will decrease from pre- to post- trip.
    a. Effects will be maintained through the one-month follow-up.
3. Depression scores as measured by the PHQ9D will decrease from pre- to post- trip.
    a. Effects will be maintained through the one-month follow-up.
4. Quality of Life scores as measured by the QOLS will increase from pre- to post- trip.

a. Effects will be maintained through the one-month follow-up.

5. Social Support scores as measured by the FSSQ will increase from pre- to post- trip.

a. Effects will be maintained through the one-month follow-up.

6. Mindfulness-Based Self Efficacy scores as measured by the MSESR will increase from pre- to post- trip.

a. Effects will be maintained through the one-month follow-up.

CHAPTER III

Methods

Data used in this study comes from an archival data set. First Descents collected participant data during the 2019 programs in order to conduct an internal program evaluation after expanding to multiple sclerosis population and have since made the de-identified data available for research purposes.

Participants

The data used in this research was collected during the 2019 First Descents programming year with three groups of participants who all completed the intervention. Participants were recruited from a list of people who actively sought out the programs First Descents offered. First Descents partners with an array of patient advocacy groups who refer people with chronic health conditions to their programs. The participants in this study were recruited as a convenience sample through First Descents. First Descents uses a protocol to determine each individual's readiness to participate in a program.

Procedure

During First Descent's summer programming in 2019, First Descents and this researcher compiled and administered surveys using Qualtrics, an online data collection program. Relevant scales designed to measure physiological and psychological health were combined into one comprehensive survey which was distributed to each participant through email. Utilizing a convenience sample comprised of people registered to participate in a First Descents program, a link was sent to each individual that navigated them to the Qualtrics online survey for completion. The online survey included a demographic section which was prefaced by a written statement embedded in the survey stating: "Your responses are being sent to the researcher only

and identifying information will be secured and your privacy protected. These questions are used for research purposes only. Your personal responses will not be shared with anybody but the researcher who will secure them following institutional best-practices for protecting the identities of research participants. Please take your time and answer the following questions as best as you can. Thank you for participating in this research."

As this study was longitudinal with data gathering taking place before, immediately after, and then one month after, three separate emails were sent to each participant linking them to three different and unique surveys. The six scales gathering quantitative data were included in each survey administration, but questions regarding program satisfaction were added or removed according to each unique administration period.

Each 6-day program began on a Monday during the months of August and September 2019. To ensure each participant had adequate time to complete the pre-trip survey, those were sent out on the Wednesday prior to the beginning of a program. Surveys collecting post-trip data were sent to participants on the Monday following completion of their program. Lastly, surveys collecting longitudinal data post-trip were sent to participants four weeks after the Monday they received the post-trip email. Dates for data collection for all of the participants were the following in 2019: rock climbing in Estes Park, Colorado from August 26th until the 30th ($N = 8$), whitewater rafting on the McKenzie River in Oregon from September 9th until the 13th ($N = 6$), and whitewater rafting on the Rogue River on Oregon from September 23rd until the 27th ($N = 7$).

Instrumentation

Following similar research protocols found effective by the Zebrack, Kwak, & Sundstrom, 2017 study, analogous versions of scales for multiple sclerosis instead of cancer were used. This study intends to measure similar constructs as the previous research conducted

on the cancer program to see if similar improvements are seen across the multiple sclerosis population, as well. As previous research on First Descents adventure programming with cancer patients found reductions in psychological distress, improvements in self-efficacy, and increased social support, measures were obtained that could translate to the multiple sclerosis population for the purpose of this study.

Background Information Questionnaire. Each participant was asked a series of background questions including their age, gender, race, marital/relationship status, if they are working or in school, the type of multiple sclerosis they are diagnosed with, the time that has passed since their initial diagnosis, and the First Descents program they are attending. This information is included in the analysis to test for any association with outcome measures, though this is expected to be minimal.

Multiple Sclerosis Self-Efficacy Scale (MSSES). This self-report scale was developed by Schwartz, Coulthard-Morris, Zeng, & Retzlaff, (1996) to measure levels of self-efficacy in people with multiple sclerosis. The measure consists of 18 items assessing bodily function and control using a ten-point Likert scale ranging from “10 - very uncertain” to “100 - very certain”. The scale provides a continuous measure of self-efficacy, with higher scores indicating greater levels of bodily function and control. Sample items for function include ability to “walk 100 feet on flat ground” and “walk 10 steps downstairs” and for control include “how certain are you that you can control your fatigue?” and “how certain are you that you can regulate your activity so as to be active without aggravating your MS?” Internal reliability of the function part of the scale was good with a Cronbach’s alpha of .86, the control part of the scale was good with a Cronbach’s alpha of .90, and the overall combined scales had a good Cronbach’s alpha of .89 (Schwartz et al., 1996). For this study sample, Cronbach’s alpha was good at .862.

Generalized Anxiety Disorder - 7 (GAD7). This self-report scale was developed by Spitzer, Williams, & Kroenke (1999) as an adapted version of the clinician administered version. The new measures consist of seven items assessing levels of anxiety over the last two weeks using a four-point Likert scale ranging from "0 - not at all" to "4 - nearly every day". Sample items for anxiety include "feeling nervous, anxious or on edge" and "not being able to stop or control worrying." The scales provide a continuous measure of symptom severity, with higher scores indicating greater levels of anxiety. Internal reliability of the GAD-7 was established as good, with a Cronbach's alpha of .89 (Lowe, Decker, Brahler, Schellberg, Herzog, & Herzberg, 2008). For this study sample, Cronbach's alpha was .671. This scale consisted of seven items which allows for an adjustment of criteria according to Pallant, 2020, who posits that if a scale has 10 or fewer items, a Cronbach's alpha greater than .5 is sufficient.

Patient Health Questionnaire - 9 (PHQ9). This self-report scale was developed by Spitzer, Williams, & Kroenke (1999) as an adapted version of the clinician administered version. The measure consists of nine items assessing levels of depression over the last two weeks using a four-point Likert scale ranging from "0 - not at all" to "4 - nearly every day". The scales provide a continuous measure of symptom severity, with higher scores indicating greater levels of depression. Sample items for depression include "little interest or pleasure in doing things" and "feeling down, depressed, or hopeless." Internal reliability of the PHQ-9 was established as good with a Cronbach's alpha of .89 and .86 in studies with two different populations (Kroenke, Spitzer, & Williams, 2001). For this study sample, Cronbach's alpha was .665. This scale consisted of nine items, and at greater than .5 the Cronbach's alpha is considered sufficient.

Quality of Life Scale (QOLS). This self-report scale was developed by Burckhardt, Woods, Schultz, & Ziebarth (1989) to measure how satisfied individuals are with their overall quality of life. The measure consists of 16 items assessing quality of life using a seven-point Likert scale ranging from "1 - terrible" to "7 - delighted". The scale provides a continuous measure with higher scores indicating greater levels of satisfaction with an individual's current quality of life. Sample items include "material comforts home, food, conveniences, financial security" and "health - being physically fit and vigorous". Internal reliability of the scale was good with a Cronbach's alpha of .87 across different populations (Burckhardt et al., 1989). For this study sample, Cronbach's alpha was good at .855.

Duke-UNC Functional Social Support Questionnaire (FSSQ). This self-report scale was developed by Broadhead, Gehlbach, DeGruy, & Kaplan (1988) to measure the amount and type of social support perceived by an individual. The measure consists of 8 items assessing perceived social support using a five-point Likert scale ranging from "1 - much less than I would like" to "5 - as much as I would like". The scale provides a continuous measure with higher scores indicating greater levels of perceived social support. Sample items include "I have people who care what happens to me" and "I get love and affection". Internal reliability of the scale was good with a Cronbach's alpha of .81 to .92 across different populations (Broadhead et al., 1988). For this study sample, Cronbach's alpha was good at .885.

Mindfulness-Based Self Efficacy Scale - Revised (MSESR). This self-report scale was developed by Cayoun (2011) to measure changes in self-efficacy levels following a mindfulness-based therapy program. The measure consists of 22 items assessing emotional regulation, equanimity, social skills, distress tolerance, taking responsibility, and interpersonal effectiveness. The Likert scale ranging from "0 - not at all" to "4 - completely" provides a continuous measure

with higher scores indicating greater levels of self-efficacy. Sample items include “I get easily overwhelmed by my emotions” and “I find it difficult to make new friends”. Internal reliability of the scale was good with a Cronbach’s alpha of .86 (Cayoun, 2011). For this study sample, Cronbach’s alpha was .639. This scale consisted of nine items, and at greater than .5 the Cronbach’s alpha is considered sufficient.

Study Variables

The first research question (Do measures of well-being improve from pre- to post-intervention among participants of First Descents adventure programs for people with multiple sclerosis?) is designed to examine if participant well-being improved after participating in an adventure program with First Descents. This research question employs the independent variable of time. This research question employs the dependent variables of depression, anxiety, self-efficacy, social support, quality of life, and mindfulness-based self-efficacy.

The second research question (Are these improvements maintained through one month following the intervention?) is designed to examine if participant well-being continues to improve one month after completing an adventure program with First Descents. This research question employs the independent variable of time. This research question employs the dependent variables of depression, anxiety, self-efficacy, social support, quality of life, and mindfulness-based self-efficacy.

Design

Two statistical methods are utilized in the current study, a bivariate correlation and the repeated measures ANOVA. The bivariate correlation was conducted to examine the relationships between depression, anxiety, self-efficacy, quality of life, social support, and

mindfulness-based self-efficacy. Normality was run in SPSS on each scale using the Shapiro-Wilk test of normality.

Dependent Variable Intercorrelations

To show if potential bias exists among the dependent variables, a correlational matrix was run with demographic variables including race (1 = African American, 2 = Asian American, 3 = Caucasian, 4 = Preferred not to say), sex (male = 1, female = 2), and age. Collinearity and multicollinearity were examined and interpreted as such if the variables did not appear to be independent from one another (Howell, 2016).

Repeated Measures Analysis of Variance

A repeated measures ANOVA was conducted to determine if there are statistically significant differences in mean scores between timepoints. This statistical test of significance requires the dependent variables be at the continuous level of measurement and the independent variable be categorical (Howell, 2016), criteria met by the data set being evaluated in this study. The independent variable of this study is time consists of 3 levels, with the same measures being administered at time 1 (pre-test), time 2 (post-test), and time 3 (follow-up). For these reasons, the repeated-measures ANOVA, also known as a within-subjects ANOVA or ANOVA for correlated samples, was used to examine if there are any significant differences in mean scores on each health and coping outcome measure.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) program was used to analyze data for this study. The data utilized for this study is from an archival data set which was compiled by this researcher using Qualtrics during the 2019 First Descents program season. A repeated-measures ANOVA, also known as a within-subjects ANOVA or ANOVA for correlated samples,

was used to examine if there are significant mean differences in scores on each health and coping outcome measure. Statistically significant differences obtained between related means were interpreted and utilized to inform the results of this study.

Multiple ANOVAs were run using the same data set in this study. The likelihood of obtaining a statistically significant result increases each time an ANOVA is run. To reduce the likelihood of a Type I error as defined by the conclusion that a significant result exists when there is in fact is not one, the Bonferroni Correction was used in the analysis to reduce the chance that this error will occur.

Parametric Assumptions

There are five parametric assumptions to consider when using a repeated measures ANOVA to perform a statistical test of significance explained by Howell, 2006. First, the dependent variable being measured needs to be at the continuous level of measurement, an assumption met as all of the measures being utilized in this study are interval or ratio variables. Second, the independent variable needs to have related-groups, an assumption met as the pre, post, and follow-up measures in this analysis match participants across three measurements time periods. Third, outliers need to be accounted for, a process conducted in SPSS. Fourth, the distribution of the dependent variable needs to meet the assumptions of normality. The fifth assumption is sphericity as variances of the differences need to be equal throughout all of the combinations of the related groups.

Assumptions of Normality

The repeated measures ANOVA is known to be “robust” to normality violations regarding the distribution of the dependent variable (Howell, 2016). Normality violations of the

dependent variable can exist while still providing results that are valid and interpretable. Normality was tested using the Shapiro-Wilk test of normality.

Power Analysis

The repeated measures ANOVA requires a power analysis to determine the number needed to show statistical significance. The repeated measures ANOVA was chosen for this study because the test has more power than other statistical tests of significance such as an independent ANOVA because the F-Statistic denominator is minimized as the between subject's variability is treated independently from the groups error (Howell, 2016).

An a priori power analysis (Cohen, 1988) was conducted using G*Power 3 (Erdfelder, Faul, & Buchner, 1996), a software application developed to allow researchers to calculate the sample size needed to have a meaningful statistical data analysis. To establish power level in G*Power (1 - ß), a ß of 0.20 was selected, a level consistent with previous research (Cohen, 1988). Next, the prespecified significance level is imputed to the G*Power program, in this case, a nondirectional alpha significance level of .05, nondirectional to enable to researcher to interpret results of the data analysis if scores increase (as predicted) or decrease (in the case where people get worse after the intervention). An effect size of .25 was used to capture changes in measures similar to those observed during the 2014 and 2017 First Descent evaluations in the cancer population (Rosenberg at al., 2014; Zebrack at al., 2017). Results from the G*Power calculation determined that a sample size of 20 will be sufficient to detect effect sizes of .25 or greater with a power level of 0.8. The statistical analysis for this study utilized a data set with all 3 groups combined together for a total sample size of $N = 21$.

An estimated magnitude of effect is utilized in a repeated measures ANOVA to explain how strongly the variables are related, with this effect size revealing how large the differences

are between groups (Levine & Hullett, 2002). Eta-squared, the ratio of the between-groups sum of squares to the total (between- and within-groups) sum of squares, resembles the formulation described by Cohen (1973) to explain effect size. Partial eta-squared is calculated as the magnitude of effect relatively independent of sample size, and for this reason, is used to estimate the magnitude of effect in the repeated measures ANOVA (Levine & Hullett, 2002).

Potential Confounders in the Demographical Data

Confounders, factors which might explain changes in groups beyond those predicted by this researcher, were examined in a bivariate correlational matrix and interpreted as such. As this study is looking at changes within subjects and not changes between subjects, confounding by age, sex, race, and other demographic factors are minimal.

Time is a potentially confounding variable in this study design. Multiple sclerosis is a progressive disease in which symptoms worsen over time. The effect of time represents a potential limiting factor, but due to the short-term nature of this study, disease progression is unlikely to be significant. If this confounding factor were to impact the findings of the study, the observed effect would be attenuated.

Limitations

Due to the nature of convenience sampling, it is not likely that our sample is representative of all people with multiple sclerosis. These participants are likely earlier in their disease progression and show motivation to participate in physical activity and shared experiences with other young adults in their cohort. During the data cleaning process, participants were matched across timepoints using self-report data entered by the respondent at the time of survey completion. Participants were asked to provide their age, birthdate, and select from three options which specific program they attended. Due to the nature of self-report data

collection, linking participants across timepoints proved to have some challenges. Participants who responded consistently were matched across timepoints based on their self-reported birthdate and age. The remaining respondents (4) who did not provide consistent birthdate and age were then matched based on other demographic characteristics which were unique to each individual response.

CHAPTER IV

Results

Preliminary Analysis

Descriptive statistics. A total of 21 participants completed this study. Of these 21 participants, two identified as male and 19 identified as female. One participant identified as African American, one as Asian American, 17 as Caucasian, and two declined to state their ethnicity. Participant age ranged from 19 to 43, with a mean of 35. 20 of the participants reported having a diagnosis of relapsing-remitting multiple sclerosis, and one reported having a diagnosis of secondary-progressive multiple sclerosis.

Table 4

Demographic Characteristics (N=21)

Variables	Frequency	Percentage
Program Type		
Rock climbing, Colorado	8	38%
Whitewater rafting on the McKenzie, Oregon	7	33%
Whitewater rafting on the Rogue, Oregon	6	29%
Gender		
Male	2	10%
Female	19	90%
Race		
African American	1	5%
Asian American	1	5%
Caucasian	17	81%
Preferred not to say	2	10%
Age		
Mean	35	
Median	35	
Range	25	
Type of MS		
Relapsing-Remitting	20	95%
Secondary-progressive	1	5%

Assumptions of normality. The assumptions of normality for the parametric tests were considered in this analysis. The assumptions of normality for the repeated measures ANOVA include normality, independence of observations within groups, and sphericity. Normality was evaluated for all the dependent variables. The repeated measures ANOVA is known to be "robust" to normality violations regarding the distribution of the dependent variable (Howell, 2016). As such, normality violations of the dependent variable can exist while still providing results that are valid and interpretable. The independence of observations within groups assumptions was met by design, as this researcher thought carefully about this assumption while collecting data and took the necessary steps to ensure that no participant data are linked to one another.

Each measure was administered to each participant before the intervention, after the intervention, and at a one-month follow-up. The measures include the Multiple Sclerosis Self-Efficacy Scale (MSSES), the Generalized Anxiety Disorder -7 (GAD7), the Patient Health Questionnaire - 9 Depression (PHQ9D), the Quality-of-Life Scale (QOLS), the Duke-UNC Functional Social Support Questionnaire (FSSQ), and the Mindfulness-Based Self Efficacy Scale -Revised (MSESR).

Normality was examined using the Shapiro-Wilk test. The significance value of $p = 0.05$ was used to evaluate if the dependent variable is normally distributed. The assumption of normality was violated ($p < .05$) for the pre-test MMSES scale, follow-up QOLS scale, and the post and follow-up FSSQ scales, with the remaining scales being non-significant ($p > .05$). These normality violations did not inform the results of the overall ANOVAs, as this statistical test of significance is "robust" to violations of normality (Howell, 2016).

Dependent Variable Intercorrelations

Pearson correlation. The Pearson correlations were derived from the total sample (see Table 5). Results of the bivariate correlation indicated that a significant, small negative association between race and FSSQ existed (r = -.0.484, n = 21 p < .05). A significant, small positive association existed between GAD7 and PHQ9D (r = .0.485, n = 21 p < .05). A significant, moderate positive association existed between PHQ9D and FSSQ (r = .674., n = 21 p < .01). A significant, moderate positive association existed between QOLS and FSSQ (r = .674, n = 21 p < .01). A significant, moderate negative association existed between PHQ9D and MSESR (r = -.600, n = 21 p < .01). A significant, moderate negative association existed between FSSQ and MSESR (r = -.574, n = 21 p < .01).

Table 5

Pearson Correlation

Item	1	2	3	4	5	6	7	8	9
1. male	-	**0.492***	-0.034	0.127	0.136	-0.099	0.024	0.072	-0.321
2. age		-	-0.123	0.103	-0.138	0.06	-0.012	-0.045	-0.01
3. race			-	-0.074	-0.008	-0.028	-0.314	**-0.484***	0.113
4. MSSES				-	-0.38	-0.417	-0.132	-0.139	0.289
5. GAD7					-	**0.485***	0.37	**.674****	**-.600****
6. PHQ9D						-	0.238	0.343	-0.226
7. QOLS							-	**.674****	-0.418
8. FSSQ								-	**-.574****
9. MSESR									-

Note: Bolded p-values indicate significance.
*p<.05, two-tailed
**p<.01, two-tailed

MSSES = Multiple Sclerosis Self Efficacy Scale
GAD7 = Generalized Anxiety Disorder - 7
PHQ9D = Patient Health Questionnaire Depression
QOLS = Quality of Life Scale
FSSQ = Functional Social Support Scale
MSESR = Mindfulness-Based Self Efficacy Scale - Revised

Repeated Measures Analysis of Variance

Preliminary analyses. A total of six repeated measures ANOVAs were conducted in SPSS to test the six hypotheses that scores on a measure changed from pre intervention, post intervention, and at a one-month follow-up.

Testing Hypothesis 1. I hypothesized that Self-Efficacy scores as measured by the MSSES would increase from pre- to post- trip. From pre to post intervention, mean MSSES scores increased by 8.478 ($df = 1$, $p < .05$). There were no significant differences in mean MSSES scores between pre to follow-up and post to follow-up. See Table 6.

Results of the overall repeated measures ANOVA are significant ($F = 6.15$, $df = 2, 21$, $p < .05$). The Sphericity assumption was not met thus the F from the Greenhouse-Geisser row was interpreted. We can reject the null hypothesis and conclude that there is some inequality between the groups (i.e., time) means in the population. Partial Eta-squared = 0.235 which tells us that 23.5% of the variance in the dependent variable (MSSES scores) is accounted for by or associated with the independent variable (time) in this sample. I also hypothesized that effects would be maintained through the one-month follow-up. The Bonferroni correction was used in running these tests in order to determine between which time groups significant difference (s) exist. Examination of the post-hoc test results and mean tables allow us to conclude that in the population (a) the means for pre and post differ from one-another; (b) the means for pre to follow-up do not differ from one-another; and (c) the means for post are greater than the means for pre and follow-up. Therefore, results indicate that self-efficacy increases as a result of direct effects, but this effect is not maintained four weeks after the completion of the intervention.

Table 6

Pairwise Comparisons for MSSES

Time	Mean Difference	Std. Error	p-value	95% Confidence Interval	
pre to post	**-8.476***	3.073	0.036	-16.506	-0.447
pre to follow-up	-6.952	2.85	0.072	-14.398	0.493
post to follow-up	1.524	1.533	0.996	-2.482	5.529

Note: Bolded values indicate significance.
*p<.05
**p<.01

Testing Hypothesis 2. I hypothesized that Anxiety scores as measured by the GAD7 would decrease from pre- to post- trip. From pre to post intervention, mean GAD7 scores decreased by 3.19 (df = 1, p <.001) and from pre to follow-up intervention, mean GAD7 scores decreased by 2.429 (df = 1, p <.05). There were no significant differences in mean GAD7 scores between post to follow-up. See Table 7.

Results of the overall repeated measures ANOVA are significant (F = 8.66, df = 2, 21, p < .001). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can reject the null hypothesis and conclude that there is some inequality between the groups (i.e., time) means in the population. Partial Eta-squared = 0.302 which tells us that 30.2% of the variance in the dependent variable (GAD7 scores) is accounted for by or associated with the independent variable (time) in this sample. I also hypothesized that effects would be maintained through the one-month follow-up. The Bonferroni correction was used in running these tests in order to determine between which time groups significant difference (s) exist. Examination of the post-hoc test results and mean tables allow us to conclude that in the population (a) the means for pre and post differ from one-another; (b) the means for pre to follow-up differ from one-another; and (c) the means for post are less than the means for pre and follow-up. Therefore, results indicate that anxiety decreases as a result of direct effects, and this effect is maintained over four weeks.

Table 7

Pairwise Comparisons for GAD7

Time	Mean Difference	Std. Error	p-value	95% Confidence Interval	
pre to post	**3.190****	0.739	0.001	1.26	5.121
pre to follow-up	**2.429***	0.695	0.007	0.612	4.246
post to follow-up	-0.762	0.946	1	-3.233	1.709

Note: Bolded values indicate significance.
*p<.05
**p<.01

Testing Hypothesis 3. I hypothesized that Depression scores as measured by the PHQ9D would decrease from pre- to post- trip. There were no significant changes in PHQ9 scores from pre to post intervention, pre to follow-up intervention, or post to follow-up intervention. See Table 8.

Results of the overall repeated measures ANOVA are non-significant (F = 2.262, df = 2, 21, p > .05). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can accept the null hypothesis and conclude that there is not inequality between the groups (i.e., time) means in the population.

Table 8

Pairwise Comparisons forPHQ9D

Time	Mean Difference	Std. Error	p-value	95% Confidence Interval	
pre to post	1.952	0.893	0.123	-0.381	4.286
pre to follow-up	0.905	0.73	0.689	-1.002	2.812
post to follow-up	-1.048	1.096	1	-3.912	1.817

Note: Bolded values indicate significance.
*p<.05
**p<.01

Testing Hypothesis 4 I hypothesized that Quality of Life scores as measured by the QOLS would increase from pre- to post- trip. There were no significant changes in QOLS

scores from pre to post intervention, pre to follow-up intervention, or post to follow-up intervention. See Table 9.

Results of the overall repeated measures ANOVA are non-significant (F = 316., df = 2, 21, p > .05). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can accept the null hypothesis and conclude that there is not inequality between the groups (i.e., time) means in the population.

Table 9

Pairwise Comparisons for QOLS

Time	Mean Difference	Std. Error	p-value	95% Confidence Interval	
pre to post	6.095	2.633	0.094	-0.784	12.974
pre to follow-up	4.19	2.472	0.317	-2.269	10.65
post to follow-up	-1.905	2.333	1	-8	4.19

Note: Bolded values indicate significance.
*p<.05
**p<.01

Testing Hypothesis 5 I hypothesized that Social Support scores as measured by the FSSQ would increase from pre- to post- trip. There were no significant changes in FSSQ scores from pre to post intervention, pre to follow-up intervention, or post to follow-up intervention. See Table 10.

Results of the overall repeated measures ANOVA are non-significant (F = 2.045, df = 2, 21, p > .05). The Sphericity assumption was not met thus the F from the Greenhouse-Geisser row was interpreted. We can accept the null hypothesis and conclude that there is not inequality between the groups (i.e., time) means in the population.

Table 10

Pairwise Comparisons for FSSQ

Time	Mean Difference	Std. Error	p-value	95% Confidence Interval	
pre to post	1.286	0.949	0.572	-1.194	3.765
pre to follow-up	-0.095	0.502	1	-1.407	1.216
post to follow-up	-1.381	0.77	0.264	-3.392	0.63

Note: Bolded values indicate significance.
*p<.05
**p<.01

Testing Hypothesis 6. I hypothesized that Mindfulness-Based Self Efficacy scores as measured by the MSESR would increase from pre- to post- trip. From pre to post intervention, there were no significant differences in mean MSESR scores. From pre to follow-up, there was a significant increase of 6.381 (df = 1, p <.05). From post to follow-up, there was a significant increase of 4.714 (df = 1, p <.05). See Table 11.

Results of the overall repeated measures ANOVA are significant (F = 9.611, df = 2, 21, p < .001). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can reject the null hypothesis and conclude that there is inequality between the groups (i.e., time) means in the population. Partial Eta-squared = 0.325 which tells us that 32.5% of the variance in the dependent variable (MSESR scores) is accounted for by or associated with the independent variable (time) in this sample. I also hypothesized that effects would be maintained through the one-month follow-up. The Bonferroni correction was used in running these tests in order to determine between which time groups significant difference (s) exist. Examination of the post-hoc test results and mean tables allow us to conclude that in the population (a) the means for pre and post do not differ from one-another; (b) the means for pre to follow-up differ from one-another; and (c) the means for post to follow-up differ from one-another; and (d) the means for post are greater than the means for pre; and (e) the means for follow-up are greater than the means for pre and post. Therefore, results indicate that

mindfulness-based self-efficacy increases as a result of direct effects, but this effect is only established four weeks after the completion of the intervention.

Table 11

Pairwise Comparisons for MSESR

Time	Mean Difference	Std. Error	p-value	95% Confidence Interval	
pre to post	-1.667	1.413	0.756	-5.358	2.025
pre to follow-up	-6.381*	1.776	0.005	-11.021	-1.741
post to follow-up	-4.714*	1.299	0.005	-8.107	-1.322

Note: Bolded values indicate significance.
*p<.05
**p<.01

Table 12

Overall Repeated Measures ANOVAS (N = 21)

	pre		*p (1/2)*	*post*		*follow-up*		*p (1/3)*	*p (2/3)*	*F*	*p (overall)*	ηp2
Measure	*M*	*SD*		*M*	*SD*	*M*	*SD*					
MSSES	143.9	15	0.036*	152.4	11.5	150.9	11.7	0.072	0.996	6.15	0.012*	0.235
GAD7	14.7	3.2	0.001**	11.5	3.6	12.3	4.9	0.007*	1	8.66	0.001**	0.302
PHQ9D	15.8	3.8	0.123	13.8	3.8	15.9	3.8	0.689	1	2.262	0.117	0.102
QOLS	45.7	12.2	0.094	39.6	14	41.5	13.4	0.317	1	3.16	0.053	0.136
FSSQ	16.4	6.41	0.572	15.1	6.7	16.5	6.8	1	0.264	2.045	0.159	0.093
MSESR	76	9	0.756	77.8	7.1	82.4	7.9	0.005*	0.005*	9.611	0.000**	0.325

* = p < .05 ** = p < .001

p - values for overall within-subjects changes in scores for all three time points

MSSES = Multiple Sclerosis Self Efficacy Scale
GAD7 = Generalized Anxiety Disorder - 7
PHQ9D = Patient Health Questionnaire Depression
QOLS = Quality of Life Scale
FSSQ = Functional Social Support Scale
MSESR = Mindfulness-Based Self Efficacy Scale - Revised

Repeated Measures Analysis of Variance by Each Activity Program

Post Hoc Exploratory Analysis. The overall sample of the pilot study consisted of a total of 21 participants. These 21 participants were collated from three separate programs, each

with their own unique location and adventure-based activity, to create one comprehensive data set for the aforenoted analysis. The aggregation of participants for the overall analysis creates a "nested-data" scenario in the data set. To further explore each unique program using the same measures and timepoints as the aforenoted analysis, the whole data set was split by groups to compare each group's unique statistical analyses and conclusions.

Results of the repeated measures ANOVAs split by program were analyzed to examine differences in responding across each unique group. Splitting these groups into smaller samples sizes causes limitation of statistical power, thus, these results are merely an explorative process and are not the focus of the overall statistical analysis. Significant findings are discussed below. The remaining analyses were all non-significant.

Program 1

Hypothesis 2. I hypothesized that Anxiety scores as measured by the GAD7 would decrease from pre- to post- trip. Among participants in Program 1, results of the repeated measures ANOVA are significant ($F = 5.81$, $df = 2, 8$, $p < .05$). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can reject the null hypothesis and conclude that there is some inequality between the groups (i.e., time) means in the population. Partial Eta-squared = 0.454 which tells us that 45.4% of the variance in the dependent variable (GAD7 scores) is accounted for by or associated with the independent variable (time) in this sample. I also hypothesized that effects would be maintained through the one-month follow-up. The Bonferroni correction was used in running these tests in order to determine between which time groups significant difference (s) exist. Examination of the post-hoc test results and mean tables allow us to conclude that in the population (a) the means for pre and post differ from one-another; (b) the means for pre to follow-up do not differ with statistical

significance from one-another; and (c) the means for post are less than the means for pre and follow-up.

Hypothesis 6. I hypothesized that Mindfulness-Based Self Efficacy scores as measured by the MSESR would increase from pre- to post- trip. Among participants in Program 1, results of the repeated measures ANOVA are significant ($F = 4.45$, $df = 2, 8$, $p < .05$). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can reject the null hypothesis and conclude that there is inequality between the groups (i.e., time) means in the population. Partial Eta-squared = 0.388 which tells us that 38.8% of the variance in the dependent variable (MSESR scores) is accounted for by or associated with the independent variable (time) in this sample. I also hypothesized that effects would be maintained through the one-month follow-up. The Bonferroni correction was used in running these tests in order to determine between which time groups significant difference (s) exist. Examination of the post-hoc test results and mean tables allow us to conclude that in the population (a) the means for pre and post do not differ with statistical significance from one-another; (b) the means for pre to follow-up do not differ with statistical significance from one-another; and (c) the means for post to follow-up differ from one-another; and (d) the means for post are greater than the means for pre; and (e) the means for follow-up are greater than the means for pre and post. See Table 13.

Program 2

Hypothesis 2. I hypothesized that Anxiety scores as measured by the GAD7 would decrease from pre- to post- trip. Among participants in Program 2, results of the repeated measures ANOVA are significant ($F = 3.97$, $df = 2, 7$, $p < .05$). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can reject the null hypothesis and conclude that there is some inequality between the groups (i.e., time) means in

the population. Partial Eta-squared = 0.398 which tells us that 39.8% of the variance in the dependent variable (GAD7 scores) is accounted for by or associated with the independent variable (time) in this sample. I also hypothesized that effects would be maintained through the one-month follow-up. The Bonferroni correction was used in running these tests in order to determine between which time groups significant difference (s) exist. Examination of the post-hoc test results and mean tables allow us to conclude that in the population (a) the means for pre and post do not differ with statistical significance from one-another; (b) the means for pre to follow-up differ from one-another; and (c) the means for follow-up are less than the means for pre and post.

Hypothesis 6. I hypothesized that Mindfulness-Based Self Efficacy scores as measured by the MSESR would increase from pre- to post- trip. Among participants in Program 2, results of the repeated measures ANOVA are significant ($F = 4.6$, $df = 2, 7$, $p < .05$). The Sphericity assumption was met thus the F from the Sphericity-Assumed row was interpreted. We can reject the null hypothesis and conclude that there is inequality between the groups (i.e., time) means in the population. Partial Eta-squared = 0.434 which tells us that 43.4% of the variance in the dependent variable (MSESR scores) is accounted for by or associated with the independent variable (time) in this sample. I also hypothesized that effects would be maintained through the one-month follow-up. The Bonferroni correction was used in running these tests in order to determine between which time groups significant difference (s) exist. Examination of the post-hoc test results and mean tables allow us to conclude that in the population (a) the means for pre and post do not differ with statistical significance from one-another; (b) the means for pre to follow-up do not differ with statistical significance from one-another; and (c) the means for post to follow-up do not differ with statistical significance from one-another; and (d) the means for

post are greater than the means for pre; and (e) the means for follow-up are greater than the means for pre and post. See Table 14.

Program 3

No significant changes in any of the measures were found in the scores of participants in Program 3. See Table 15.

Table 13

Repeated Measures ANOVAS for PROG 1 (N = 8)

PROG 1	**Pre**		**Post**		**Follow-Up**				
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	ηp2
MSSES	147.25	16.9	158.16	7.64	147.88	6.75	3.8	0.09	0.352
GAD7	13.8	3.45	10.38	3.29	12.5	5.14	5.81	0.02*	0.454
PHQ9D	14.5	3.39	12.38	3.11	13.88	3.87	1.87	0.19	0.21
QOLS	37.63	11.88	29.66	9.64	36.13	10.67	2.18	0.15	0.237
FSSQ	13.75	5	11.75	4	13.25	5.57	1.8	0.2	0.205
MSESR	78	10.74	78.75	9.32	85.25	7.25	4.45	0.03*	0.388

* = p < .05 ** = p < .001

p - values for overall within-subjects changes in scores for all three time points

PROG 1 = Rock Climbing, Colorado

Table 14

Repeated Measures ANOVAS for PROG 2 (N = 7)

PROG 2	**Pre**		**Post**		**Follow-Up**				
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	ηp2
MSSES	147.14	8.21	151.86	13.41	152.43	10.2	6.87	0.46	0.103
GAD7	14.14	2.73	12.14	3.24	10.57	3.1	3.97	0.05*	0.398
PHQ9D	14.86	3.76	13.7	3.04	14.57	2.94	0.36	0.71	0.056
QOLS	52.86	9.19	46.29	16.6	45.57	16.73	1.57	0.26	0.208
FSSQ	17.86	7.34	19	8.81	19	8.23	0.41	0.56	0.064
MSESR	73	6.83	76.14	5.49	80.57	9.85	4.6	0.03*	0.434

* = p < .05 ** = p < .001

p - values for overall within-subjects changes in scores for all three time points

PROG 2 = Whitewater Rafting on the McKenzie River, Oregon

Table 15

Repeated Measures ANOVAS for PROG 3 (N = 6)

PROG 3	**Pre**		**Post**		**Follow-Up**				
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	ηp2
MSSES	139.67	17.47	145.33	11	139.67	11.38	3.05	0.09	0.379
GAD7	16.68	3.01	12.33	4.46	14	3.22	2.53	0.13	0.336
PHQ9D	18.5	3.51	15.83	4.92	16.5	4.64	0.6	0.57	0.107
QOLS	48.17	10.72	45.17	8.28	44	11.92	0.44	0.66	0.08
FSSQ	18.33	6.77	15.17	4.92	18	5.66	3.43	0.07	0.407
MSESR	77	9.47	78.17	6.08	80.83	6.4	0.928	0.43	0.157

* = p < .05 ** = p < .001

p - values for overall within-subjects changes in scores for all three time points

PROG 3 = Whitewater Rafting on the Rogue River, Oregon

CHAPTER V

Discussion

This dissertation was designed and implemented to evaluate the potential therapeutic effects that participating in an outdoor adventure program can have on people living with multiple sclerosis. The majority of previous research on outdoor adventure programming and people with chronic health conditions have demonstrated that positive change can occur in nature through many different mechanisms of change. This dissertation took the opportunity to study a population that, at the time of this writing, has not previously been directly studied: people with multiple sclerosis. As multiple sclerosis is a chronic health condition affecting both physiological and psychological functioning, previous studies were selected that might help explain the mechanisms for change in people who participate in outdoor adventure programs.

Results from this study are mostly consistent with outcomes measured in the 2017 study conducted by Zebrack, Kwak, & Sundstrom on First Descents programs designed for people living with a cancer diagnosis. These studies found improvements in the reduction of psychological distress as well as improvements in self-efficacy. The current study is unique in that a measure was added to assess mindfulness-based self-efficacy, a construct increasingly associated with positive health outcomes.

Informed by previous research, some of the most measured constructs were examined as a pilot study in a population of 21 young adults who attended First Descents in the summer of 2019. These constructs included self-efficacy, anxiety, depression, quality of life, social support, and mindfulness-based self-efficacy. Borrowing from research previously conducted on people with a cancer diagnosis who attended First Descents where reductions in psychological distress, improvements in self-efficacy, and increases in social support were found (Zebrack et al., 2017),

similar constructs were measured for the first time in people with a multiple sclerosis diagnosis. Due to constraints regarding sample size, this study serves as a pilot to be modeled after once circumstances allow for an expansion of the research into a larger sample size. For the whole sample (N = 21) there were no significant changes overall for depression, quality of life, or functional social support scores in the population.

Self-Efficacy Increased

The results of the present study demonstrate the impact that participating in First Descents outdoor programming has on increasing self-efficacy in people with a multiple sclerosis diagnosis. Specifically, statistically significant changes were found in the population. These changes in self-efficacy scores indicate that participants experienced changes in their perceptions of their ability to take care of themselves after completing a program with First Descents. Interestingly, as evidenced by the mean scores for each timepoint, the significant changes occurred only between the pre to post timepoints, with no significant changes being maintained longitudinally. Reasoning for this will be discussed in the limitations section.

The results of this study are consistent with the results of previous research conducted on First Descents in the oncology population where self-efficacy scores increased after participation in a program (Zebrack et al., 2017). In previous research studying the effects of other adventure programs on people with various chronic health conditions, increases in self-efficacy were also found (Slavin, 2015 & Stevens et al., 2004). Additionally, the results of this study are consistent with previous research that utilized physical activity interventions to increase self-efficacy levels in participants with a multiple sclerosis diagnosis (Husted et al., 1999; Taylor et al., 2006; Wier 2011).

Anxiety Decreased

The results of the present study demonstrate the impact that participating in First Descents outdoor programming has on decreasing anxiety in people with a multiple sclerosis diagnosis. Statistically significant changes were found in the population. These changes in anxiety scores indicate that participants experienced decreases in their anxiety levels after completing a program with First Descents. Interestingly, as evidenced by the mean scores for each timepoint, the significant changes occurred not only between the pre to post timepoints, but these changes were also maintained longitudinally. This result allows us to conclude that the effects of the intervention on reducing participants anxiety levels occurred immediately after completing a program and lasts for at least one month later.

The results of this study are consistent with the results of previous research conducted on First Descents in the oncology population where anxiety scores decreased after participation in a program (Zebrack et al., 2017). No other studies examining the effects of other adventure programs on people with chronic health conditions except for Zebrack et al. (2017) found decreases in anxiety. Additionally, the results of this study are consistent with previous research that utilized physical activity interventions to decrease anxiety levels in participants with a multiple sclerosis diagnosis (Amhadi et al., 2013; Garrett et al., 2013; Petruzzello et al., 2009).

Mindfulness-Based Self-Efficacy Increased

The results of the present study demonstrate the impact that participating in First Descents outdoor programming has on increasing mindfulness-based self-efficacy in people with a multiple sclerosis diagnosis. Statistically significant changes were found in the population. These changes in mindfulness-based self-efficacy scores indicate that participants experienced changes in their mindfulness-based self-efficacy levels after completing a program with First

Descents. Interestingly, as evidenced by the mean scores for each timepoint, no significant changes occurred between the pre to post timepoints, however, changes were found between the pre and follow-up timepoints as well as between the post and follow-up timepoints. This result allows us to conclude that the effects of the intervention on reducing participants anxiety levels occurred with a month delay instead of immediately after completing a program.

In previous studies conducted on First Descents oncology population (Rosenberg et al.2014; Zebrack et al., 2017), mindfulness-based self-efficacy was not examined. In previous research studying the effects of other adventure programs on people with chronic health conditions, increases in mindfulness were also found (Slavin, 2015 & Stevens et al., 2004). Additionally, the results of this study are consistent with previous research that utilized physical activity interventions to increase mindfulness levels in participants with a multiple sclerosis diagnosis (Mostert & Kesselring, 2002; Velikonja et al., 2010). Recently, a pilot mindfulness-based intervention in young adults with multiple sclerosis demonstrated significant improvements in coping skills, and reductions in depression and stress (Morrow et al., 2020). It is possible that components of this intervention can be incorporated into adventure programming in future work, as they require relatively little training and would be highly compatible with the natural settings of programs like First Descents.

Separate Programs Unique Results

Program 1. This sample of eight participants who went in Rock Climbing in Colorado saw statistically significant changes in anxiety scores, with the significant changes occurring between the pre to post timepoints. This result suggests that the reductions in anxiety occurred immediately following participation in the program and the changes did not last longitudinally. Additionally, this program saw statistically significant changes in mindfulness-based self-

efficacy scores, with the significant changes occurring between the post to follow-up timepoints. This result suggests that the increases in mindfulness-based self-efficacy occurred one month after participation in the program. There were no significant changes overall for self-efficacy, depression, quality of life, or functional social support scores in the population.

Program 2. This sample of seven participants who went Whitewater Rafting on the McKenzie River in Oregon saw statistically significant changes in anxiety scores, with the significant changes occurring between the pre to follow-up timepoints. This result suggests that the reductions in anxiety occurred one month after participation in the program. Additionally, this program saw statistically significant changes in mindfulness-based self-efficacy scores, with no unique significant changes occurring between the three timepoints but the overall change was significant. This result suggests that the increases in mindfulness-based self-efficacy occurred overall during participation in the program. There were no significant changes overall for self-efficacy, depression, quality of life, or functional social support scores in the population.

Program 3. This sample of six participants who went Whitewater Rafting on the Rogue River in Oregon. All of the statistical tests conducted on this group were non-significant.

Null Results

A perplexing result of the present study was the null findings regarding social support. In this study, across the participants, there were no significant changes in social support. This result is inconsistent with previous research conducted on First Descents (Zebrack et al., 2017) where improvements in social support were found in the population of people with a cancer diagnosis. First Descents programs are highly social with group-based activities throughout, and participants often stay in touch after the program is complete. The review of literature on social support interventions in people with multiple sclerosis showed a consistent pattern of increases

in mental-health related quality of life (Schwartz & Frohner, 2005) as well as lower levels of anxiety and depression (Wakefield et al., 2013). One hypothesis for the social support measures not significantly changing is that the participants returned to their homelife immediately following the program which may have created a stark contrast between their week-long experience with people going through similar experiences and the social support they have in their home environment. It is possible that one week is not long enough to meaningfully change experienced social support. Future research could investigate the differences in social support measures for participants who complete the post-program survey before leaving the group of participants in the same geographical location versus the participants who complete measures of social support after returning home from the trip. It would also be interesting to quantitatively track ongoing connection between participants via phone/email/social media links to determine whether those who elect to stay connected express different social support experiences.

Demographic and Contextual Factors

The participants in this sample were not representative of the overall epidemiology of multiple sclerosis in the United States. This study was comprised of 19 female participants and only two male subjects enrolled. A recent study established a female to male ratio of 2.8 among people living with multiple sclerosis in the United States (Wallin et al., 2019). If this ratio were applied to the sample, there would have needed to be three to four more males. Regarding race in the general population, multiple sclerosis disproportionally effects African American and Hispanic people (Khan et al, 2015) and they are underrepresented in this study sample. While the sample was limited to adults ages 18 to 40 years old, this is a representative age range in the overall population of people living with multiple sclerosis in the United States (Wallin et al., 2019).

Implications for Clinical Practice and Training

It has been established that adventure programming program can improve mental health and overall quality of life in people with physical limitations and chronic illness. The physical activity and social components of adventure programming are likely to benefit people with multiple sclerosis, and our pilot study suggests that adventure programming may fill in the gaps and supplement the range of other treatment options available to providers and their patients. People with multiple sclerosis are a prime population to benefit from adventure programming. Hopefully this is the first of many studies to explore adventure program interventions in the multiple sclerosis population.

Having now seen some promising results that First Descents may improve outcomes in both cancer and multiple sclerosis patients, it is possible that people with other types of chronic illness would also benefit from this form of adventure programming. The "Prescribe Adventure" campaign adopted in 2019 is a first step in changing the way chronic disease is treated, and this empirical research supports this campaign.

This study found that participants experienced statistically significant reductions in anxiety levels after attending a First Descents program. While psychotherapy has been a traditionally effective method for reducing anxiety in people with a multiple sclerosis diagnosis (Mohr et al., 2000, 2001), as well as physical activity (Amhadi et al., 2013; Garrett et al., 2013; Petruzzello et al., 2009), the results of this study demonstrate that there are other ways to achieve improvements in mental health. This may be particularly important for people who have progressed in their multiple sclerosis symptomology to a point where the cognitive impairments such as memory loss have made psychotherapy less effective. Psychotherapy builds on the work that the clinician and patient do in session, and a prerequisite for a successful treatment can

sometimes require that the patient be able to recall the work they did in the last few sessions as well as in the time between sessions. While evidence-based short-term therapies do exist, this study demonstrates that beyond just psychotherapy, there are other options available for reducing anxiety in people with a multiple sclerosis diagnosis.

Regarding mindfulness, this study found that participation in a First Descents program may increase the levels of mindfulness a person will experience. Studies on mindfulness have shown that higher levels of mindfulness can bring about greater psychological health including reductions in distress, more emotional control, and behavioral regulation (Keng, Smoski, & Robins, 2013). The increase in mindfulness scores seen in this pilot study is encouraging, and supports further studies be done with a greater sample size to learn more about what specifically increases mindfulness in people in outdoor adventure programming so that interventions can target the mechanisms for change in the future.

Limitations and Directions for Future Research

There are several limitations to this research method as well as the methods of data collection in this study. An internet-based survey from a company named "Qualtrics" was employed to gather data from participants before, after, and one month after completion of their program with First Descents. While participants were given response windows and reminders to complete each survey, due to limitations of internet-based surveys, it was not possible control exactly when the participants completed the surveys. It is possible that some completed the surveys at different time periods than others, which could have skewed precise measurements of each scale. Another limitation of the study was that each scale utilized a Likert-Type self-report measure to gather data points. Likert-Type scales force participant responses into specific categories and can lack granularity. Another issue with this type of measure has to do with the

nature of self-report. The study might not be measuring actual levels of each construct, but the self-reported perceived level of each participant experience of the construct, a limitation designated to all self-report measures.

Perhaps the greatest limitation of this study was sample size and how the sample was combined from three separate programs. The overall analysis was run on a combination of three separate groups, thus creating a limitation with nested data. A separate analysis was run for each unique group. Results from the whole sample size should be interpreted with this limitation in mind. For this reason, it is best to conceptualize this study as a pilot study to be generalized to the population carefully and utilized as a model for extrapolation to a larger group of people with multiple sclerosis at a later date.

Sample size and demographics in this pilot study are a limitation for extrapolating these findings to the general population. The population studied was extremely homogenous, thus only allowing this researcher to make minor inference about the people who participated in this pilot study. This study serves as an example to build upon in future research that should not only have a larger sample size, but also strive to recruit participants from varying socioeconomic status, race, gender, and specific types of multiple sclerosis.

A qualitative analysis using focus groups or in-depth individual interviews could substantially contribute to the knowledge base regarding specific experiences that were most impactful during the week-long programs. These interviews could identify themes in participant experiences that could inform specific mental health constructs that should be measured in future studies. This could establish a better understanding of the mechanisms of change occurring in outdoor adventure programming and lead to programs that are more efficient and effective in bringing about positive change.

Future research could attempt to tease out the effects of adventure programming regarding indirect and direct effects on people with multiple sclerosis. There may be underlying factors that are creating the change in measures that are what is responsible for increases in wellness that should be parsed out in further studies. This can be achieved with qualitative interviews that ask respondents open-ended questions such as "What do you think helped you the most this week?"

It is possible that the intervention was not long enough at one-week, and that longer programs might see better or more long-term results. It is also possible that a weeklong program is overkill, and that the same changes can occur in a shorter time frame. Knowing how long a program needs to be to bring about the desired change could help them be more efficient and serve more people. Future studies may vary program duration to identify the optimal program length to maximize outcomes while maintaining feasibility in implementation.

Conclusions

This study found that a pilot sample of people with a multiple sclerosis diagnosis experienced an increase in self-efficacy, reductions in anxiety, and an increase in mindfulness-based self-efficacy after participation in a First Descent's outdoor adventure program. This study's findings demonstrate that the development and implementation of outdoor adventure programming as a treatment for people with a multiple sclerosis diagnosis is a worthwhile endeavor and may be used to inform treatment beyond traditional western medicine.

While this study demonstrated some promising results, the next step to validate these findings and begin to understand the mechanisms of change with a randomized controlled trial. As First Descents builds a waitlist of people who would like to participate in a program, a waitlist-control model would allow research with a comparison group with the waitlisted people

taking the same measures as the participants in the intervention. Not only would this greatly increase the sample size for further studies, but it would allow for researchers to make more causal statements about how participation in these types of outdoor adventure programs can, in fact, create change. The cause-and-effect relationship researchers could conclude would be imperative for integrating these interventions into primary care for people with multiple sclerosis.

Future research should expand on this pilot work in the multiple sclerosis population and aim to understand how similar interventions can be used to treat people with other chronic health conditions. This research calls to mental health professionals, researchers, neurologists, medical doctors, and patient advocacy organizations to better understand the practical application of outdoor adventure-based programs to better the lives of those living with multiple sclerosis and other chronic health conditions.

References

Ahmadi, A., Arastoo, A. A., Nikbakht, M., Zahednejad, S., & Rajabpour, M. (2013). Comparison of the effect of 8 weeks aerobic and yoga training on ambulatory function, fatigue and mood status in MS patients. *Iranian Red Crescent Medical Journal, 15*(6), 449-454.

Alphonsus, K. B., & D'Arcy, C. (2021). Is there an association between social support and pain among individuals living with multiple sclerosis? Journal of Evidence-Based Integrative Medicine, 26, 2515690X21991995.

Ahmadi, A., Arastoo, A. A., Nikbakht, M., Zahednejad, S., & Rajabpour, M. (2013). Comparison of the effect of 8 weeks aerobic and yoga training on ambulatory function, fatigue and mood status in MS patients. *Iranian Red Crescent Medical Journal, 15*(6), 449-454.

Anderson, L., Schleien, S. J., McAvoy, L., Lais, G., & Seligmann, D. (1997). Creating positive change through an integrated outdoor adventure program. *Therapeutic Recreation Journal, 31*(4), 214-229.

Annerstedt, M., & Wahrborg, P. (2011). Nature-assisted therapy: systematic review of controlled and observational studies. *Scandinavian Journal of Public Health, 39,* 371-388.

American Psychological Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC.

Bambara, J. K., Turner, A. P., Williams, R. M., & Haselkorn, J. K. (2011). Perceived social support and depression among Veterans with multiple sclerosis. *Disability and Rehabilitation, 33*(1), 1-8.

Beier, M., Bombardier, C. H., Hartoonian, N., Motl, R. W., & Kraft, G. H. (2014). Improved physical fitness correlates with improved cognition in multiple sclerosis. *Archives of Physical*

Medicine and Rehabilitation, 95(7), 1328-1334.

Bekesi, A., Torok, S., Kokonyei, G., Bokretas, I., Szentes, A., & Telepoczki, G. (2011). Health-related quality of life changes of children and adolescents with chronic disease after participation in therapeutic recreation camping program. doi: 10.1186/1477-7525-9-43

Bidell, M. P. (2010). Can nature heal? *Counseling Outcome Research and Evaluation, 1*(2), 68-79.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: a proposed operational definition. *Clinical Psychology: Science and Practice, 11*(3) 230-241.

Broadhead, W. E., Gehlbach, S. H., DeGruy, F. V., & Kaplan, B. H. (1988). The Duke-UNC functional social support questionnaire: measurement of social support in family medicine patients. *Medical Care, 26*(7), 709-23.

Brown, M. (2008). Comfort zone: Model or metaphor? *Journal of Outdoor and Environmental Education, 12*(1), 3-12.

Buckley, R. C., & Brough, P. (2017). Nature, eco, and adventure therapies for mental health and chronic disease. *Public Health, 5*(220).

Buettner, L. L. & Fitzsimmons, S. (2002). AD-venture program: therapeutic biking for the treatment of depression in long-term care residents with dementia. *American Journal of Alzheimer's Disease and Other Dementias, 17*(2), 121-127.

Burckhardt, C.S., Woods, S.L., Schultz, A. A., Ziebarth, D.M. (1989). Quality of life of adults with chronic illness: a psychometric study. *Nursina and Health, 12*, 347-354.

Burns, G. W. (1998). Nature-guided therapy: brief integrative strategies for health and well-being. Philadelphia, PA: Brunner/Mazel.

Carlson, K. P., & Cook, M. (2007). Challenge by Choice: Adventure-Based Counseling for Seriously Ill Adolescents. *Child and Adolescent Psychiatric Clinics of North America, 16*(4), 909-919.

Cason, D., & Gillis, H. L. "Lee". (1994). A meta-analysis of outdoor adventure programming with adolescents. *Journal of Experiential Education, 17*(1), 40–47.

Cayoun, B. A. (2011). Mindfulness-Based Self Efficacy Scale - Revised. MiCBT Institute & University of Tasmania.

Center for Disease Control. Communicating with and about people with disabilities. Retrieved from: https://www.cdc.gov/ncbddd/disabilityandhealth

Chwastiak, L. A., & Ehde, D. M. (2007). Psychiatric issues in multiple sclerosis. *The Psychiatric Clinics of North America, 30*(4), 803-817.

Cohen, J. (1973). Eta-squared and partial eta-squared in fixed factor ANOVA designs. *Educational and Psychological Measurements, 33,* 107-112.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Costa, D. C., Sá, M. J., & Calheiros, J. M. (2012). The effect of social support on the quality of life of patients with multiple sclerosis. *Arquivos De Neuro-Psiquiatria, 70*(2), 108-113.

Crisp, S. (1997). *Definition of adventure based therapy.* Unpublished manuscript.

Davis-Berman, J. & Berman, D.S. (1994). *Chapter 3: Early wilderness programs in wilderness therapy: Foundations, theory & research*. Dubuque, IA: Kendall/Hunt Publishing.

de Groot, V., Beckerman, H., Twisk, J. W., Uitdehaag, B. M., Hintzen, R. Q., Minneboo, A., Bouter, L. M. (2008). Vitality, perceived social support and disease activity determine the performance of social roles in recently diagnosed multiple sclerosis: A longitudinal

analysis. *Journal of Rehabilitation Medicine. 40*(2), 141-157.

Dorans, K.S., Massa, J., Chitnis, T., Ascherio, A., & Munger, K. Physical activity and the incidence of multiple sclerosis. *Neurology, 87*(17), 1170-1776.

Dalgas, U., & Stenager, E. (2012). Exercise and disease progression in multiple sclerosis: can exercise slow down the progression of multiple sclerosis? *Therapeutic Advances in Neurological Disorders, 5*(2), 81-95.

Eells, T. D. (2000). Can therapy affect physical health? *The Journal of Psychotherapy Practice and Research, 9*(2), 100-104.

Emotional Changes. (n.d.). Retrieved October 12, 2019, from National Multiple Sclerosis Society website: http://www.nationalmssociety.org/SymptomsDiagnosis/MSSymptoms/Emotional-Changes

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computers*, *28*, 1-11.

Fasczewski, K. S., Garner, L. M., Clark, L. A., Michels, H. S., & Migliarese, S. J. (2020). Medical Therapeutic Yoga for multiple sclerosis: Examining self-efficacy for physical activity, motivation for physical activity, and quality of life outcomes. Disability and Rehabilitation, 1-8.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160.

Flachenecker, P., Bures, A. K., Gawlik, A., Weiland, A.-C., Kuld, S., Gusowski, K., Streber, R., Pfeifer, K., & Tallner, A. (2020). Efficacy of an internet-based program to promote physical activity and exercise after inpatient rehabilitation in persons with multiple sclerosis: a randomized, single-blind, controlled study. International Journal of Environmental Research and Public Health, 17(12).

Fleming, N.D., & Mills, C. (1992) Not another inventory, rather a catalyst for reflection. *Improve the Academy, 11*, 137-144.

Gargano, V., & Turcotte, D. (2019). Helping factors in an outdoor adventure program. *Journal of Social Work, 0*(0), 1-19.

Garrett, M., Hogan, N., Larkin, A., Saunders, J., Jakeman, P., & Coote, S. (2013). Exercise in the community for people with minimal gait impairment due to MS: An assessor-blind randomized controlled trial. *Multiple Sclerosis, 19*(6), 782-789.

Van Geel, F., Geurts, E., Abasıyanık, Z., Coninx, K., & Feys, P. (2020). Feasibility study of a 10-week community-based program using the WalkWithMe application on physical activity, walking, fatigue and cognition in persons with multiple sclerosis. Multiple Sclerosis and Related Disorders, 42, 102067.

Gelkopf, M., Hasson-Ohayon, I., Bikman, M., & Kravetz, S. (2013). Nature adventure rehabilitation for combat-related posttraumatic chronic stress disorder: A randomized control trial. *Psychiatry Research, 209*(3), 485-493.

Gelkopf, M., Hasson-Ohayon, I., Bikman, M., & Kravetz, S. (2013). Nature adventure rehabilitation for combat-related posttraumatic chronic stress disorder: A randomized control trial. *Psychiatry Research, 209*(3), 485-493.

Ghaffar, O., & Feinstein, A. (2007). The neuropsychiatry of multiple sclerosis: A review of

recent developments. *Current Opinion in Psychiatry, 20*(3), 278.

Giesser, B. S. (2015). Exercise in the management of persons with multiple sclerosis. *Therapeutic Advances in Neurological Disorders, 8*(3), 123-130.

Golzari, Z., Shabkhiz, F., Soudi, S., Kordi, M. R., & Hashemi, S. M. (2010). Combined exercise training reduces IFN-γ and IL-17 levels in the plasma and the supernatant of peripheral blood mononuclear cells in women with multiple sclerosis. *International Immunopharmacology*, *10*(11), 1415-1419.s

Han, J.W., Choi, H., Jeon, Y.H., Yoon, C.H., Woo, J.M., & Kim, W. (2016). The effects of forest therapy on coping with chronic widespread pain: physiological and psychological differences between participants in a forest therapy program and a control group. *International Journal of Environmental Research and Public Health, 13*(3).

Harirchian, M. H., Fatehi, F., Sarraf, P., Honarvar, N. M., & Bitarafan, S. (2018). Worldwide prevalence of familial multiple sclerosis: A systematic review and meta-analysis. *Multiple Sclerosis and Related Disorders, 20*, 43-47.

Hart, S., Fonareva, I., Merluzzi, N., & Mohr, D. C. (2005). Treatment for depression and its relationship to improvement in quality of life and psychological well-being in multiple sclerosis patients. *Quality of Life Research, 14*(3), 695-703.

Hasanpour-Dehkordi, A., Jivad, N., & Solati, K. (2016). Effects of yoga on physiological indices, anxiety and social functioning in multiple sclerosis patients: a randomized trial. *Journal of Clinical and Diagnostic Research, 10*(6), 1-5.

Hattie, J., Marsh, H. W., Neill, J. T., & Richards, G. E. (1997). Adventure education and Outward Bound: out-of-class experiences that make a lasting difference. *Review of Educational Research, 67*(1), 43-87.

Hejazizadeh, N., Pazokian, M., & Nasiri, M. (2020). Self-efficacy in patients with multiple sclerosis: a model test study. Evidence Based Care, 9(4), 30-39.

Hill, N. (2007). Wilderness therapy as a treatment modality for at-risk youth: a primer for mental health counselors. *Journal of Mental Health Counseling, 29*(4), 338-349.

Hind, D., Cotter, J., Thake, A., Bradburn, M., Cooper, C., Isaac, C., & House, A. (2014). Cognitive behavioural therapy for the treatment of depression in people with multiple sclerosis: A systematic review and meta-analysis. *BMC Psychiatry, 14*(1), 5.

Hitzig, S. L., Alton, C., Leong, N., & Gatt, K. (2012). The evolution and evaluation of a therapeutic recreation cottage program for persons with spinal cord injury. *Therapeutic Recreation Journal, 46*(3).

Hogan, B. E., Linden, W., & Najarian, B. (2002). Social support interventions: Do they work? *Clinical Psychology Review, 22*(3), 381-440.

Holewski, E. (2016). *Connecting with nature: the process in adventure programming* (M.A., Prescott College). Retrieved from: http://search.proquest.com/docview/1796968895/abstract/C02E8DD3D9BB45D3PQ/1

Hooper, K. (2011). Managing progressive MS. New York, NY: National Multiple Sclerosis Society.

Howell, D. C. (2006). *Statistical Methods for Psychology.* Belmont, CA: Wadsworth Publishing Company.

Husted, C., Pham, L., Hekking, A., & Niederman, R. (1999). Improving quality of life for people with chronic conditions: The example of t'ai chi and multiple sclerosis. *Alternative Therapies in Health and Medicine, 5*(5), 70-74.

Itin, C. (1997). Exploring the boundaries of adventure therapy: international perspectives.

Proceedings of the First International Adventure Therapy Conference - International Adventure Therapy. Retrieved from https://internationaladventuretherapy.org/resource/proceedings-of-the-first-international-adventure-therapy-conference/

Johns Hopkins Medicine Health Library (2018, September 18). *Relapsing-remitting multiple sclerosis.* Retrieved from https://www.hopkinsmedicine.org

Kellert, S. R., & Wilson, E. O. (1995). The biophilia hypothesis. Washington, D.C: Island Press.

Kelly, F. J., & Baer, D. J. (1969). Jesness inventory and self-concept measures for delinquents before and after participation in Outward Bound. *Psychological Reports, 25*(3), 719-724.

Keng, S. J., Smoski, M. J., & Robins, C. J. (2013). Effects of mindfulness on psychological health: a review of empirical studies. *Clinical Psychology Review, 31*(6), 1041-1056.

Kesselring, J., & Beer, S. (2005). Symptomatic therapy and neurorehabilitation in multiple sclerosis. *The Lancet Neurology, 4*(10), 643-652.

Khan, O., Williams, M. J., Amezcua, L., Javed, A., Larsen, K. E., & Smrtka, J. M. (2015). Multiple sclerosis in US minority populations: clinical practice insights. *Neurology: Clinical Practice, 5*(2), 132-142.

Klauer, T., & Zettl, U. K. (2008). Compliance, adherence, and the treatment of multiple sclerosis. *Journal of Neurology, 255*(6), 87-92.

Kraft, R., & Sakofs, M. (1985). The theory of experiential education. Boulder, CO: Association of Experiential Education.

Kroenke, K, Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: validity of a brief depression severity measure. *The Journal of General Internal Medicine, 16*, 606-613.

Latimer-Cheung, A. E., Pilutti, L. A., Hicks, A. L., Martin Ginis, K. A., Fenuta, A. M.,

MacKibbon, K. A., & Motl, R. W. (2013). Effects of exercise training on fitness, mobility, fatigue, and health-related quality of life among adults with multiple sclerosis: A systematic review to inform guideline development. *Archives of Physical Medicine and Rehabilitation, 94*(9), 1800-1828.

Le Page, C., Bourdoulous, S., Béraud, E., Couraud, P. O., Rieu, M., & Ferry, A. (1996). Effect of physical exercise on adoptive experimental auto-immune encephalomyelitis in rats. *European Journal of Applied Physiology and Occupational Physiology*, *73*(1), 130-135.

Le Page, C., Ferry, A., & Rieu, M. (1994). Effect of muscular exercise on chronic relapsing experimental autoimmune encephalomyelitis. *Journal of Applied Physiology (Bethesda, Md.: 1985)*, *77*(5), 2341-2347.

Leray, E., Moreau, T., Fromont, A., & Edan, G. (2016). Epidemiology of multiple sclerosis. *Revue Neurologique, 172*(1), 3-13

Levine, T. R. & Hullett, C. R. (2002). Eta squared, partial eta squared, and misreporting of effect size in communication research. *Human Communication Research, 28*(4), 612-625.

Lowe, B., Decker, O., Muller, S., Brahler, E., Schelberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the General Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care, 46*(3), 266-274.

Lublin, F. D., Reingold, S. C., Cohen, J. A., Cutter, G. R., Sørensen, P. S., Thompson, A. J., Polman, C. H. (2014). Defining the clinical course of multiple sclerosis: the 2013 revisions. *Neurology, 83*(3), 278-286.

Luckner, J. L., & Nadler, R. S. (1997). *Processing the Experience: Strategies to Enhance and Generalize Learning. Second Edition.* Dubuque, IA: Kendall/Hunt Publishing Company.

Magnani, S., Olla, S., Pau, M., Palazzolo, G., Tocco, F., Doneddu, A., Marcelli, M., Loi, A.,

Corona, F., Corona, F., Coghe, G., Marrosu, M. G., Concu, A., Cocco, E., Marongiu, E., & Crisafulli, A. (2016). Effects of six months training on physical capacity and metaboreflex activity in patients with multiple sclerosis. *Frontiers in Physiology*, *7*, 531.

Marrie, R. A., Elliott, L., Marriott, J., Cossoy, M., Blanchard, J., Leung, S., & Yu, N. (2015). Effect of comorbidity on mortality in multiple sclerosis. *Neurology, 85*(3), 240-247.

Mayo Clinic (2019). *Multiple Sclerosis Overview.*

Merluzzi, T. V., Nairn, R. C., Hegde, K., Martinez Sanchez, M. A., & Dunn, L. (2001). Self-efficacy for coping with cancer: revision of the cancer behavior inventory (version 2.0). *Psychooncology, 10*(3), 206-217.

Miccinesi, G., Manetti, M., & Marini, M. (2020). Tailored sailing experience to reduce psychological distress and improve the quality of life of breast cancer survivors: A survey-based pilot study. International Journal of Environmental Research and Public Health, 17(12), 4406.

Miles, J. C., & Priest, S. (1999). *Adventure Programming.* Venture Publishing, Inc.

Minden, S.L., & Schiffer, R.B. (1990). Disorders in multiple sclerosis: review and recommendations for clinical research. *Archives of Neurology.* 47.

Mohr, D. C., Boudewyn, A. C., Goodkin, D. E., Bostrom, A., & Epstein, L. (2001). Comparative outcomes for individual cognitive-behavior therapy, supportive-expressive group psychotherapy, and sertraline for the treatment of depression in multiple sclerosis. *Journal of Consulting and Clinical Psychology, 69*(6), 942-949.

Mohr, D. C., & Goodkin, D. E. (1999). Treatment of depression in multiple sclerosis: Review and meta-analysis. *Clinical Psychology: Science and Practice, 6*(1), 1-9.

Mohr, D. C., Likosky, W., Bertagnolli, A., Goodkin, D. E., Van Der Wende, J., Dwyer, P., &

Dick, L. P. (2000). Telephone-administered cognitive-behavioral therapy for the treatment of depressive symptoms in multiple sclerosis. *Journal of Consulting and Clinical Psychology, 68*(2), 356-361.

Moore, S. M., Khalaj, A. J., Kumar, S., Winchester, Z., Yoon, J., Yoo, T., Martinez-Torres, L, Yasui, N., Katzenellenbogen, J., A., Tiwari-Woodruff, S., K. (2014). Multiple functioning therapeutic effects of the estrogen receptor β agonist indazole-Cl in a mouse model of multiple sclerosis. *Proceedings of the National Academy of Sciences of the United States of America, 111*(50), 18061-18066.

Morrow, S. A., Riccio, P., Vording, N., Rosehart, H., Casserly, C., & MacDougall, A. (2021). A mindfulness group intervention in newly diagnosed persons with multiple sclerosis: A pilot study. Multiple Sclerosis and Related Disorders, 52, 103016.

Mostert, S., & Kesselring, J. (2002). Effects of a short-term exercise training program on aerobic fitness, fatigue, health perception and activity level of subjects with multiple sclerosis. *Multiple Sclerosis, 8*(2), 161-168.

Motl, R. W., & Gosney, J. L. (2008). Effect of exercise training on quality of life in multiple sclerosis: A meta-analysis. *Multiple Sclerosis Journal, 14*(1), 129-135.

Motl, R. W., & Sandroff, B. M. (2020). Randomized controlled trial of physical activity intervention effects on fatigue and depression in multiple sclerosis: secondary analysis of data from persons with elevated symptom status. Contemporary Clinical Trials Communications, 17, 100521.

Motl, R. W., & McAuley, E. (2009). Longitudinal analysis of physical activity and symptoms as predictors of change in functional limitations and disability in multiple sclerosis. *Rehabilitation Psychology*, *54*(2), 204-210.

Motl, R. W., & McAuley, E. (2011). Association between change in physical activity and short-term disability progression in multiple sclerosis. *Journal of Rehabilitation Medicine*, *43*(4), 305-310.

Motl, R. W., McAuley, E., Wynn, D., & Vollmer, T. (2011). Lifestyle physical activity and walking impairment over time in relapsing-remitting multiple sclerosis: results from a panel study. *American Journal of Physical Medicine & Rehabilitation*, *90*(5), 372-379.

Motl, R. W., Snook, E. M., McAuley, E., & Gliottoni, R. C. (2006). Symptoms, self-efficacy, and physical activity among individuals with multiple sclerosis. *Research in Nursing & Health*, *29*(6), 597-606.

Motl, R. W., Snook, E. M., McAuley, E., Scott, J. A., & Gliottoni, R. C. (2007). Are physical activity and symptoms correlates of functional limitations and disability in multiple sclerosis? *Rehabilitation Psychology*, *52*(4), 463-469.

Motl, R. W., Snook, E. M., & Schapiro, R. T. (2008). Symptoms and physical activity behavior in individuals with multiple sclerosis. *Research in Nursing & Health*, *31*(5), 466-475.

Motl, R. W., Snook, E. M., Wynn, D. R., & Vollmer, T. (2008). Physical activity correlates with neurological impairment and disability in multiple sclerosis. *The Journal of Nervous and Mental Disease*, *196*(6), 492-495.

Motl, R. W., & Gosney, J. L. (2008). Effect of exercise training on quality of life in multiple sclerosis: A meta-analysis. *Multiple Sclerosis Journal*, *14*(1), 129-135.

Murray, T. J. (2006). Diagnosis and treatment of multiple sclerosis. *BMJ, 332*(7540), 525-527.

Mutz, M., & Müller, J. (2016). Mental health benefits of outdoor adventures: results from two pilot studies. *Journal of Adolescence, 49*, 105-114.

National Multiple Sclerosis Society. Find support. Retrieved

from: http://www.nationalmssociety.org/Resources-Support/Find-Support

National Multiple Sclerosis Society (2011). Multiple sclerosis: just the facts. New York, NY.

National Multiple Sclerosis Society (2020, 5 15). Exercise. Retrieved from: http://www.nationalmssociety.org/Living-Well-With-MS/Diet-Exercise-Healthy-Behaviors/Exercise

Neill, J. T., & Dias, K. L. (2001). Adventure education and resilience: the double-edged sword. *Journal of Adventure Education and Outdoor Learning, 1*(2), 35-42.

Nielsen, S., Germanos, R., Weier, M., Pollard, J., Degenhardt, L., Hall, W., Buckley, N., & Farrell, M. (2018). The use of cannabis and cannabinoids in treating symptoms of multiple sclerosis: A systematic review of reviews. *Current Neurology and Neuroscience Reports, 18*(2), 8.

Newes, S., & Bandoroff, S. (2004). What is adventure therapy. *Coming of Age: The Evolving Field of Adventure Therapy,* 1-30.

Pallant, J. (2020). *SPSS Survival Manual: A Step by Step Guide to Data Analysis using IBM SPSS* (7th ed.). Open University Press.

Panicucci, J. (2007). Cornerstones of adventure education. *Adventure Education: Theory and Applications,* 33-48.

Pasek, P. B., & Schkade, J. K. (1996). Effects of a skiing experience on adolescents with limb deficiencies: an occupational adaptation perspective. *The American Journal of Occupational Therapy, 50*(1), 24–31.

Pedersen, B. K., & Saltin, B. (2015). Exercise as medicine-evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scandinavian Journal of Medicine & Science in Sports, 25*, 1-72.

Petajan, J. H., Gappmaier, E., White, A. T., Spencer, M. K., Mino, L., & Hicks, R. W. (1996). Impact of aerobic training on fitness and quality of life in multiple sclerosis. *Annals of Neurology, 39*(4), 432-441.

Petruzzello, S. J., Snook, E. M., Gliottoni, R. C., & Motl, R. W. (2009). Anxiety and mood changes associated with acute cycling in persons with multiple sclerosis. *Anxiety, Stress, & Coping, 22*(3), 297-307.

Prakash, R. S., Snook, E. M., Erickson, K. I., Colcombe, S. J., Voss, M. W., Motl, R. W., & Kramer, A. F. (2007). Cardiorespiratory fitness: A predictor of cortical plasticity in multiple sclerosis. *NeuroImage*, *34*(3), 1238-1244.

Prakash, R. S., Snook, E. M., Motl, R. W., & Kramer, A. F. (2010). Aerobic fitness is associated with gray matter volume and white matter integrity in multiple sclerosis. *Brain Research*, *1341*, 41-51.

Prescribe Adventure: The Rx for FD. (2018, July 24). Retrieved October 12, 2019, from First Descents website: https://firstdescents.org/prescribe-adventure-rx/

Rao. S.M. (2004). Cognitive function in patients with multiple sclerosis: impairment and treatment. *International Journal of MS Care, 6*, 9-22.

Romberg, A., Virtanen, A., & Ruutiainen, J. (2005). Long–term exercise improves functional impairment but not quality of life in multiple sclerosis. *Journal of Neurology*, *252*(7), 839-845.

Romberg, A., Virtanen, A., Ruutiainen, J., Aunola, S., Karppi, S.-L., Vaara, M., Surakka, J., Pohjolainen, T., & Seppänen, A. (2004). Effects of a 6-month exercise program on patients with multiple sclerosis: a randomized study. *Neurology*, *63*(11), 2034-2038.

Rosenberg, R. S., Lange, W., Zebrack, B., Moulton, S., & Kosslyn, S. M. (2014). An outdoor adventure program for young adults with cancer: Positive effects on body image and

psychosocial functioning. *Journal of Psychosocial Oncology, 32*(5), 622-636.

Rossi, S., Furlan, R., De Chiara, V., Musella, A., Lo Giudice, T., Mataluni, G., Cavasinni, F., Cantarella, C., Bernardi, G., Muzio, L., Martorana, A., Martino, G., & Centonze, D. (2009). Exercise attenuates the clinical, synaptic and dendritic abnormalities of experimental autoimmune encephalomyelitis. *Neurobiology of Disease*, *36*(1), 51-59.

Roszak, T., Gomes, M. E., & Kanner, A. D. (1995). *Ecopsychology - restoring the earth, healing the mind.* San Francisco, CA: Sierra Club Books.

Sabapathy, N. M., & Minahan, C. L. (2011). Comparing endurance and resistance-exercise training in people with multiple sclerosis: a randomized pilot study. *Clinical Rehabilitation, 25*, 14-24.

Sandroff, B. M., Klaren, R. E., Pilutti, L. A., Dlugonski, D., Benedict, R. H. B., & Motl, R. W. (2014). Randomized controlled trial of physical activity, cognition, and walking in multiple sclerosis. *Journal of Neurology*, *261*(2), 363-372.

Schwartz, C. E. (1999). Teaching coping skills enhances quality of life more than peer support: Results of a randomized trial with multiple sclerosis patients. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association, 18*(3), 211-220.

Schwartz, C. E., Coulthard-Morris, L., Zeng, Q., & Retzlaff, P. (1996). Measuring self-efficacy in people with multiple sclerosis: a validation study. *Archives of Physical Medicine and Rehabilitation, 77*, 394-398.

Schwartz, C., & Frohner, R. (2005). Contribution of demographic, medical, and social support variables in predicting the mental health dimension of quality of life among people with multiple sclerosis. *Health & Social Work, 30*(3), 203-212.

Shepanski, M. A., Hurd, L. B., Culton, K., Markowitz, J. E., Mamula, P., & Baldassano, R. N. (2005). Health-related quality of life improves in children and adolescents with inflammatory bowel disease after attending a camp sponsored by the Crohn's and Colitis foundation of America. *Inflammatory Bowel Diseases, 11*(2), 164-170.

Sibthorp, J., & Jostad, J. (2014). The social system in outdoor adventure education programs. *Journal of Experiential Education, 37*(1), 60-74.

Sibthorp, J., Paisley, K., & Gookin, J. (2007). Exploring participant development through adventure-based programming: A model from the national outdoor leadership school. *Leisure Sciences, 29*(1), 1-18.

Slavin, M. (2015). *Climbing out: exploring the psychosocial impacts of an adventure programme for young adult survivors of cancer* [Unpublished doctoral dissertation/master's thesis]. University of Glasgow.

Spitzer, R. L., Williams, J. B. W., & Kroenke, K. (1999). Primary care evaluation of mental disorders patient health questionnaire. *Pfizer Inc.*

Stevens, B., Kagan, S., Yamada, J., Epstein, I., Beamer, M., Bilodeau, M., & Baruchel, S. (2004). Adventure therapy for adolescents with cancer. *Pediatric Blood & Cancer, 43*(3), 278-284.

Sugerman, D. (2005). "I am more than my cancer:" An exploratory examination of adventure programming and cancer survivors. *Journal of Experiential Education, 28*(1), 72-83.

Stuifbergen, A. K., Blozis, S. A., Harrison, T. C., & Becker, H. A. (2006). Exercise, functional limitations, and quality of life: a longitudinal study of persons with multiple sclerosis. *Archives of Physical Medicine and Rehabilitation*, *87*(7), 935-943.

Taylor, L. P., & McGruder, J. E. (2006). The meaning of sea kayaking for persons with spinal

cord injuries. *The American Journal of Occupational Therapy, 50*(1), 39-46.

Turner, A. P., Kivlahan, D. R., & Haselkorn, J. K. (2009). Exercise and quality of life among people with multiple sclerosis: Looking beyond physical functioning to mental health and participation in life. *Archives of Physical Medicine and Rehabilitation, 90*(3), 420-428.

Uccelli, M. M., Mohr, L. M., Battaglia, M. A., Zagami, P., & Mohr, D. C. (2004). Peer support groups in multiple sclerosis: Current effectiveness and future directions. *Multiple Sclerosis Journal, 10*(1), 80-84.

van den Akker, L. E., Beckerman, H., Collette, E. H., Eijssen, I. C. J. M., Dekker, J., & de Groot, V. (2016). Effectiveness of cognitive behavioral therapy for the treatment of fatigue in patients with multiple sclerosis: A systematic review and meta-analysis. *Journal of Psychosomatic Research, 90*, 33-42.

Velikonja, O., Curic, K., Jazbec, S. S. (2010). Influence of sport climbing and yoga on spasticity, cognitive function, mood and fatigue in patients with multiple sclerosis. *Clinical Neurology and Neurosurgery, 112*(7), 597-601.

Vörösvári, E. (2016). Effects of an outdoor adventure camp experience on adults with brain injury. *Palaestra, 30*(2), 43-49.

Wakefield, J. R. H., Bickley, S., & Sani, F. (2013). The effects of identification with a support group on the mental health of people with multiple sclerosis. *Journal of Psychosomatic Research, 74*(5), 420-426.

Wallin, M. T., Culpepper, W. J., Campbell, J. D., Nelson, L. M., Langer-Gould, A., Marrie, R. A., Cutter, G. R., Kaye, W. E., Wagner, L., Tremlett, H., Buka, S. L., Dilokthornsakul, P., Topol, B., Chen, L. H., & LaRocca, N. G. (2019). The prevalence of MS in the United States: a population-based estimate using health claims data. *Neurology, 92*, 1029-1040.

Walsh, A., & Walsh, P. A. (1989). Love, self-esteem, and multiple sclerosis. *Social Science & Medicine, 29*(7), 793-798.

Wassif, J. A. (2014). *The utilization of adventure based programming to foster posttraumatic growth within a veteran population: a mixed methods study* (6920) [Doctoral dissertation/Master's thesis, West Virginia University]. Graduate Theses, Dissertations, and Problem Reports.

White, L. J., & Dressendorfer, R. H. (2004). Exercise and multiple sclerosis. *Sports Medicine. 34*(15), 1077-1100.

Wier, L. M., Hatcher, M. S., Triche, E. W., & Lo, A. C. (2011). Effects of robot-assisted versus conventional body-weight-supported treadmill training on quality of life for people with multiple sclerosis. *Journal of Rehabilitation Research & Development, 48*(4), 483-492.

Yalom, I. D., & Crouch, E. C. (1990). The theory and practice of group psychotherapy. *The British Journal of Psychiatry, 157*(2), 304-306.

Zabriskie, R. B., Lunberg, N.R., Groff, D. G. (2005). Quality of life and identity: the benefits of a community-based therapeutic recreation and adaptive sports program. *Therapeutic Recreation Journal, 39*, 176-191.

Zaenker, P., Favret, F., Lonsdorfer, E., Muff, G., de Seze, J., & Isner-Horobeti, M.E. (2018). High-intensity interval training combined with resistance training improves physiological capacities, strength and quality of life in multiple sclerosis patients: A pilot study. European *Journal of Physical and Rehabilitation Medicine, 54*(1), 58-67.

Zajicek, J., Fox, P., Sanders, H., Wright, D., Vickery, J., Nunn, A., UK MS Research Group. (2003). Cannabinoids for treatment of spasticity and other symptoms related to multiple sclerosis (CAMS study): Multicenter randomized placebo-controlled trial. *Lancet, 362*(9395),

1517-1526.

Zebrack, B., Kwak, M., Sundstrom, L. (2017). First Descents, an adventure program for young adults with cancer: who benefits? *Supportive Care in Cancer.* doi:10.1007/s00520-017-3792-7

APPENDIX A

Participant Information and Consent

Your responses are being sent to the researcher only and identifying information will be secured and your privacy protected. These questions are used for research purposes only. Your personal responses will not be shared with anybody but the researcher who will secure them following institutional best-practices for protecting the identities of research participants. Please take your time and answer the following questions as best as you can. Thank you for participating in this research.

APPENDIX B

Demographic Information

Reminder: Your responses are being sent to the researcher only and identifying information will be secured and your privacy protected. These questions are used for research purposes only. Your personal responses will not be shared with anybody but the researcher who will secure them following institutional best-practices for protecting the identities of research participants.

What is your birthdate?

What is your age?

What gender do you identify with?

Male Female Non-Binary Other

What is your race?

What is your marital/relationship status?

_____ Not married OR not in a relationship

_____ Currently married OR in a relationship

Are you working or in school?

_____ No

_____ Yes

What type of multiple sclerosis are you diagnosed with?

_____ Relapse-Remitting MS

_____ Secondary-Progressive MS

_____ Primary-Progressive MS

_____ Progressive-Relapsing MS

How many years (or months) ago where you first diagnosed with multiple sclerosis?

Which program are you attending?

_____ Rock Climbing in Rocky Mountain National Park - Colorado

_____ Whitewater Rafting on the McKenzie river - Oregon

_____ Whitewater Rafting on the Rogue river - Oregon

APPENDIX C

Patient Health Questionnaire - 9

PHQ-9 Depression

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(Use "✔" to indicate your answer)*	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving .around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
Column totals	___	+ ___	+ ____	+ ___

= *Total Score* _____

From the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD PHQ). The PHQ was developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke and colleagues. For research information, contact Dr. Spitzer at rls8@columbia.edu. PRIME-MD® is a trademark of Pfizer Inc.

APPENDIX D

Generalized Anxiety Disorder - 7

GAD-7 Anxiety

Over the last 2 weeks, how often have you been bothered by the following problems? *(Use "✔" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

Column totals: ___ + ___ + ___ + ___

= *Total Score* _____

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	**Somewhat difficult**	**Very difficult**	**Extremely difficult**
☐	☐	☐	☐

APPENDIX E

The Multiple Sclerosis Self-Efficacy Scale

Table 2: The Multiple Sclerosis Self-Efficacy Scale (MSSE)

FUNCTION: *As of now, how certain are you that you can:*									
1. Walk 100 feet on flat ground?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
2. Walk 10 steps downstairs?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
3. Take good care of your home or yard?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
4. Get dressed or undressed without assistance?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
5. Get in and out of the passenger side of a car without assistance from another person and without physical aids?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
6. Speak clearly to express your needs or ideas?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
7. Write clearly so that others can read what you wrote?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
8. Take a bath or shower without assistance from someone else?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
9. Go on a trip that keeps you away from home for the whole day?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
CONTROL									
1. How certain are you that you can control your fatigue?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
2. How certain are you that you can regulate your activity so as to be active without aggravating your MS?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
3. As compared to other people with MS like yours, how certain are you that you can manage your MS symptoms during your daily activities?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
4. How certain are you that you can manage your MS symptoms so that you can do the things you enjoy doing?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
5. How certain are you that you can deal with the frustration of MS?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
6. How certain are you that you can deal with the uncertainty of MS?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
7. How certain are you that you can decrease your fatigue quite a bit?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
8. How certain are you that you can continue most of your daily activities?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain
9. How certain are you that you can keep your MS symptoms from interfering with your time spent with friends or family?									
10 very uncertain	20	30	40	50	60 moderately certain	70	80	90	100 very certain

APPENDIX F

The Duke-UNC Functioning Social Support Questionnaire

Duke–UNC Functional Social Support Questionnaire (FSSQ)

Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please read each statement carefully and place an 'X' in the column that is closest to your situation. Give only 1 answer per row.

	5	4	3	2	1
	As much as I would like	Almost as much as I would like	Some, but would like more	Less than I would like	Much less than I would like
1. I have people who care what happens to me.					
2. I get love and affection.					
3. I get chances to talk to someone about problems at work or with my housework.					
4. I get chances to talk to someone I trust about my personal or family problems.					
5. I get chances to talk about money matters.					
6. I get invitations to go out and do things with other people.					
7. I get useful advice about important things in life.					
8. I get help when I am sick in bed.					

Source: adultmeducation.com

APPENDIX G

Quality of Life Scale

QUALITY OF LIFE SCALE (QOL)

Please read each item and circle the number that best describes how satisfied you are at this time. Please answer each item even if you do not currently participate in an activity or have a relationship. You can be satisfied or dissatisfied with not doing the activity or having the relationship.

	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
1. Material comforts home, food, conveniences, financial security	7	6	5	4	3	2	1
2. Health - being physically fit and vigorous	7	6	5	4	3	2	1
3. Relationships with parents, siblings & other relatives- communicating, visiting, helping	7	6	5	4	3	2	1
4. Having and rearing children	7	6	5	4	3	2	1
5. Close relationships with spouse or significant other	7	6	5	4	3	2	1
6. Close friends	7	6	5	4	3	2	1
7. Helping and encouraging others, volunteering, giving advice	7	6	5	4	3	2	1
8. Participating in organizations and public affairs	7	6	5	4	3	2	1
9. Learning- attending school, improving understanding, getting additional knowledge	7	6	5	4	3	2	1
10. Understanding yourself - knowing your assets and limitations - knowing what life is about	7	6	5	4	3	2	1
11. Work - job or in home	7	6	5	4	3	2	1
12. Expressing yourself creatively	7	6	5	4	3	2	1
13. Socializing - meeting other people, doing things, parties, etc	7	6	5	4	3	2	1
14. Reading, listening to music, or observing entertainment	7	6	5	4	3	2	1
15. Participating in active recreation	7	6	5	4	3	2	1
16. Independence, doing for yourself	7	6	5	4	3	2	1

APPENDIX H

The Mindfulness-Based Self Efficacy Scale - Revised - MSES-R

Mindfulness-Based Self Efficacy Scale - Revised© (MSES-R)

Bruno A. Cayoun,
MiCBT Institute & University of Tasmania

NAME……..…….. DATE…….. Session/Week No.…..…

Circle one number in the shaded column according to how much you now agree with each statement below, using the following scale:

Not at all	A little	Moderately	A lot	Completely
0	1	2	3	4

Try not to spend too much time on any one item. There are no right or wrong answers.

1.	I get easily overwhelmed by my emotions	0 1 2 3 4
2.	I find it difficult to make new friends	0 1 2 3 4
3.	I try to avoid uncomfortable situations even when they are really important	0 1 2 3 4
4.	When I feel very emotional, it takes a long time for it to pass	0 1 2 3 4
5.	I feel comfortable saying sorry when I feel I am in the wrong	0 1 2 3 4
6.	It is often too late when I realise I overreacted in a stressful situation	0 1 2 3 4
7.	I get so caught up in my thoughts that I end up feeling very sad or anxious	0 1 2 3 4
8.	When I have unpleasant feelings in my body, I prefer to push them away	0 1 2 3 4
9.	I can resolve problems easily with my partner (or best friend if single)	0 1 2 3 4
10.	I can face my thoughts, even if they are unpleasant	0 1 2 3 4
11.	My actions are often controlled by other people or circumstances	0 1 2 3 4
12.	I get caught up in unpleasant memories or anxious thoughts about the future	0 1 2 3 4
13.	I can deal with physical discomfort	0 1 2 3 4
14.	I feel I cannot love anyone	0 1 2 3 4
15.	I am often in conflict with one (or more) family member	0 1 2 3 4
16.	I avoid feeling my body when there is pain or other discomfort	0 1 2 3 4
17.	I do things that make me feel good straightaway even if I will feel bad later	0 1 2 3 4
18.	When I have a problem, I tend to believe it will ruin my whole life	0 1 2 3 4
19.	When I feel physical discomfort, I relax because I know it will pass	0 1 2 3 4
20.	I can feel comfortable around people	0 1 2 3 4
21.	Seeing or hearing someone with strong emotions is unbearable to me	0 1 2 3 4
22.	If I get angry or anxious, it is generally because of others	0 1 2 3 4

If you use(d) the Internet automated scoring, what is the 4-character CODE given to you?:……..….