CONNECTING WITH NATURE DURING COVID-19:

THE EFFECT OF A TIME ON THE LAND PROGRAM ON PERCEPTIONS OF EXPERIENCES OF AFFECT AND STRESS IN ADULTS

BROOKE GREENWOOD

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Dr. E. Greidanus Thesis Supervisor	Associate Professor	Ph.D.
Dr. S. Pelech Thesis Examination Committee Member	Associate Professor	Ph.D.
Dr. D. Burleigh Thesis Examination Committee Member	Associate Professor	Ph.D.
Dr. E. Antoniadis External Examiner Red Deer Polytechnic Red Deer, Alberta	Associate Professor	Ph.D.
Dr. R. Marynowski Chair, Thesis Examination Committee	Professor	Ph.D.

DEDICATION

To my boyfriend, family, and friends who have continuously supported me throughout my academia journey. I am forever grateful for your unwavering encouragement as I see this chapter through to the end. I would also like to dedicate this work to the four-legged friends in my life who have a very special place in my heart and kept me grounded throughout this process.

ABSTRACT

Social restrictions due to the COVID-19 pandemic, imposed significant barriers for individuals seeking mental health supports and coping resources which negatively impacted wellbeing. Over the past couple of decades, spending time in nature has become an increasingly popular coping resource for enhancing wellbeing. To bridge affordability, safety, and accessibility, Dreamcatcher Nature Assisted Therapy developed a Time on the Land therapeutic recreation program to provide a unique opportunity for individuals and families to escape the unique stressors imposed during the COVID-19 pandemic and connect with nature by interacting with animals and exploring rural farm environment located in Ardrossan, Alberta. With a focus on investigating emotional wellbeing, this mixed-methods pre-post research study explored the effect of Time on the Land on perceptions of perceived stress, affect, and potential mechanisms underlying such changes in adults during the COVID-19 pandemic (July to November 2021). Data was gathered from 48 participants and datasets were compared at two points in time; baseline, and post-session after participants attended a one-hour session of Time on the Land. Significant differences in perceived stress, negative affect, and positive affect were observed. Participants reported subjective experiences of Time on the Land derived five common qualitative themes which were considered as perceived mechanisms that facilitated changes in stress and affect: (1) being immersed in the moment, (2) a psychological sanctuary, (3) a greater sense of purpose, (4) gained broader perspective, and (5) human-nature relationship. Further, mixed methods analysis provided opportunity to identify and explore implications of harnessing nature-based experiences within therapeutic, and daily settings. Findings extend previous theoretical perspectives, highlight potential new pathways of benefits, and explore how an interactive relationship between humans and nature enhances adults' emotional wellbeing.

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LIST OF ABBREVIATIONS

CAMH	Centre for Addiction and Mental Health
COVID-19	Coronavirus Disease
PANAS	Positive and Negative Affect Schedule
PSS-10	10 item – Perceived Stress Scale
WHO	World Health Organization

CHAPTER 1: Introduction

The outbreak of a novel coronavirus infectious disease (COVID-19) in December 2019, evolved into a global pandemic that produced significant psychological and social effects on communities around the world.

> Uncertain prognoses, looming severe shortages of resources for testing and treatment and for protecting responders and healthcare providers from infection, imposition of unfamiliar public health measures..., large and growing financial losses, and conflicting messages from authorities are among the major stressors that undoubtedly will contribute to widespread emotional distress and increased risk for psychiatric illness associated with COVID-19. (Pfefferbaum & North, 2020, p. 510)

Across the globe, billions of people were quarantined in their homes, as nations went into lockdown to implement public health and safety measures by the federal government and the World Health Organization (WHO) to limit the spread and risk of infection (Government of Canada, 2020; WHO, 2020a, 2020b, 2020c, 2020d). Restrictions included school and daycare closures, prohibitions on social gatherings, closures of non-essential businesses, travel restrictions, and mandatory self-isolation for those exposed and/or infected with COVID-19 (Government of Canada, 2020). Although these measures were necessary to prevent the spread of disease, the short-and long-term effects on the psychological wellbeing of adults has been significant (Best et al., 2020; Brooks et al., 2020; Ganson et al., 2020; Helliwell, 2020).

Prior to the COVID-19 pandemic, concerns for mental health were highly prevalent amongst adult populations (Goodwin, 2002, 2003; Goodwin, et al., 2020). However, since the onset of COVID-19, research suggests rates increased substantially, as new mental health concerns developed, and pre-existing conditions were exacerbated (Khan et al., 2020; Oomen et

al., 2021). At the onset of the COVID-19 pandemic, millions of Canadians were asked to follow stay at home orders, which for many, presented a challenging set of new circumstances. While the COVID-19 protection measures can be effective against disease transmission (Tian et al., 2020), the impact of lockdowns, and the resulting changes in behaviour patterns and functioning on emotional wellbeing was substantive (Glowacz & Schmits, 2020; Helter et al., 2022; Torales et al., 2020). Emerging evidence from several studies indicated that lockdown measures (e.g., social distancing) led to increases in depressive symptoms, anxiety, severe stress, and suicidal ideation (Brooks et al., 2020; Qiu et al., 2020), which is consistent with findings from studies on the psychological consequences of former pandemics (Hawryluck et al., 2004; Wheaton et al., 2012).

Previous social and psychological supports were inaccessible, and the uncertainty about the anticipated timeline of the pandemic strengthened feelings of fear, stress, and confusion (Brooks et al., 2020). Approximately 68% of adults aged between the ages of 18 and 34 years old were experiencing social isolation, and several studies indicated that adults reported experiencing higher rates of negative mental health outcomes such as anxiety, depression, insomnia, and suicidal ideation (Benke et al., 2020; Best et al., 2020; Czeisler et al., 2020; Every-Palmer et al., 2020). Furthermore, adults reported sources of stress that tended to reflect specific aspects of the COVID-19 pandemic, such as worry about the future, impacts of social restrictions and confinement, and concern for the health and safety of others (Whitehead & Torossian, 2021). The psychological impacts of COVID-19 seem to have been magnified by added vulnerabilities faced by adults such as pre-existing isolation (Heidinger & Richter, 2020; Krendl & Perry, 2020), mobility limitations (Webber et al., 2010), financial vulnerability (Moos et al., 2006), and elevated health risk (Musich et al., 2018).

Many people used technology-based communication, such as video conferencing platforms (e.g., Zoom), to maintain remote social connection with friends, family, and colleagues during the COVID-19 pandemic. However, research conducted over the past couple of years has highlighted how online communication led to unintended psychological consequences that took an emotional toll on users. One of the most cited problems was videoconferencing fatigue (commonly known as Zoom fatigue), which contributed to increased depressive symptoms and emotional exhaustion (Bennett et al., 2021; Elbogen et al., 2022). Overall, mental health concerns amongst adults represented a serious, growing public health concern during the COVID-19 pandemic (WHO, 2020a). Therefore, research is needed to identify coping resources that could effectively counter, if not minimize, potential negative psychological consequences and promote the emotional wellbeing of adults while in the face of a public health crisis.

Psychological aspects of wellbeing are increasingly recognized and studied as fundamental components of healthy human functioning. Wellbeing does not have a single standardized definition (La Placa et al., 2013), however there is general agreement that wellbeing includes the presence of positive emotions and moods (e.g., happiness, contentment), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfilment in the development of one's potential, having a sense of purpose, and experiencing positive relationships (Headey et al., 1993; Huppert et al., 2009; Pavot et al., 1993). These wellbeing indicators have been described as conducive in supporting human flourishing and thriving (Burns et al., 2022; Park et al., 2022). Although there are many constructs related to wellbeing, the current study explores *emotional wellbeing* which is defined as

> a multi-dimensional composite that encompasses how positive an individual feels generally and about life overall. It includes both experiential features (emotional quality

> of momentary and everyday experiences) and reflective features (judgments about life satisfaction, sense of meaning, and ability to pursue goals that can include and extend beyond the self). These features occur in the context of culture, life circumstances, resources, and life course. (Park et al., 2022).

In other words, emotional wellbeing is described as "an overall positive state of one's emotions, life satisfaction, sense of meaning and purpose, and ability to pursue self-defined goals" (National Institutes of Health, 2018). Measures of emotional wellbeing often assess life satisfaction and affect (Keyes, 2005). Considering the latter, Kahneman and Deaton (2010) discuss emotional wellbeing as the emotional quality of everyday experiences, specific to positive and negative affect which makes one's life pleasant or unpleasant. Most importantly Park et al. (2022) notes the extent of one's emotional wellbeing is determined and supported through resources. Relative to the documented scarcity and limited access to coping resources during the COVID-19 pandemic, this study aimed to investigate the emotional wellbeing of adults through examining perceived stress and affect.

When events are appraised as stressful, coping is engaged by utilizing available coping resources to combat the stress (Whitehead, 2021). The association between perceived stress and negative affect influences the extent to which stress impacts emotional wellbeing (Blaxton et al., 2020). Generally, chronic stressors are appraised as intense and threatening (Whitehead, 2021), and are consistently associated with higher levels of daily perceived stress and negative affect (Bolger et al., 1989; Montpetit et al., 2010), and lower positive affect (Blaxton et al., 2015). Increased positive affect often corresponds with enhanced emotional wellbeing (Fredrickson & Joiner, 2002) and negative affect has strong positive ties to mental health outcomes such as anxiety, and depression (Trick et al., 2016; Whitehead & Bergeman, 2013). Therefore, higher

levels of perceived stress and negative affect are thought to impact greater stress reactivity and decreased emotional wellbeing (Montpetit et al., 2010). Since adults appraised the COVID-19 pandemic as a chronic stressor, identifying coping resources can help to reduce distress and overall emotional toll (Whitehead, 2021).

There is a considerable body of evidence that shows that spending time in and engaging with nature can improve human wellbeing (Kaplan, 1995; Wilson, 1984). More recent studies have suggested that those who engaged with nature during the COVID-19 pandemic as a coping resource showed improvements to their wellbeing (Darcy et al., 2022; Lin et al., 2023). Some studies found that people sought out natural environments more often since the pandemic began (Heo et al., 2020; Venter et al., 2020), leading to recommendations that we should protect accessibility to green spaces within urban cities during lockdowns (Slater et al. 2020; Ugolini et al., 2020), and identified being outdoors was often associated with significant affective benefits (i.e., higher positive affect, lower negative affect) during the COVID-19 pandemic (Stieger et al., 2021). However, what has yet to be explored is the emotional effects of engagement with rural (i.e., open land, countryside, distant from urban cities and towns) outdoor environments during the COVID-19 pandemic.

Given the gaps in the literature on examining potential emotional benefits of engagement with rural natural environments during the COVID-19 pandemic, and the pressing need to counteract negative psychological effects resulting from the COVID-19 pandemic, this study aimed to explore the experiences and perceptions of adults' emotional wellbeing after attending a nature-based therapeutic recreation program called Time on the Land located at Dreamcatcher Nature Assisted Therapy in Ardrossan, Alberta.

In this pre-post mixed-methods study, Time on the Land is explored as a coping resource to support adults' emotional wellbeing during the COVID-19 pandemic through assessing adults' perceptions of perceived stress, affect, and meaningful subjective experiences that may shed light on potential mechanisms that facilitated emotional changes. Moreover, since the COVID-19 pandemic presented barriers that limited accessibility to preventative mental health services and coping resources (Duden et al., 2022; Radfar et al, 2021), this study provides insights into how spending time in natural, rural environments can seek to fulfill human beings innate need for belonging and social connection and in turn, support adults' emotional wellbeing during times of crisis.

Purpose

This study seeks to investigate the effect of Time on the Land on adults' perceptions of perceived stress, affect, and subjective experience during COVID-19 from July to November 2021, in relation to their emotional wellbeing. Specifically, this study investigates the well documented daily stress-affect relationship (Blaxton et al., 2020) as a function of assessing emotional wellbeing, and this converges with assessing meaningful qualitative descriptions of participants subjective experiences to contextualize and expand upon findings. The hypothesis of the current study is: if spending time in nature has beneficial effects on adults' emotional wellbeing, then we predict that participants will report lower levels of perceived stress, lower levels of negative affect, and higher levels of positive affect, after attending a one-hour Time on the Land session.

The current study is framed by the following research questions:

1. What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on perceived stress levels in adults?

2. What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on positive and negative affect levels in adults?
3. How do participants describe their experience with Time on the Land?
4. How do the themes mentioned by the participants' help to explain changes in levels of perceived stress? Positive and negative affect?

CHAPTER 2: Literature Review

Global Trends of Stress in Adults

The WHO considers mental health to be one of the most important health indicators that causes considerable morbidity (WHO, 2003). Many psychosocial factors are considered to contribute to adults' mental health status such as past experiences, genetic predisposition, social support, and exposure to severe or long-term stress (WHO, 2021). Considering the latter, the Centre for Addiction and Mental Health (CAMH) validates stress as a normal part of the human experience that can be beneficial to our productivity and survival (CAMH, 2021). However, CAMH (2021) indicates that when stress becomes overwhelming and prolonged (i.e., long-term), the risk for mental health problems increases (CAMH, 2021).

According to Lazarus and Folkman (1984), stress is conceptualized as a function of the interaction between an individual's characteristics (e.g., resources, vulnerabilities, past experiences), and their context (e.g., geography, historical period, etc.). Stress affects one's mental and physical wellbeing via appraisal, where the person considers the stressor and its relative stressfulness. For instance, if an individual appraises an event as stressful, coping is engaged, meaning that the person utilizes available resources to combat the stress. Notably, both appraisal and coping behaviours are naturally influenced by individual characteristics and contextual realities (Delongis & Holtzman, 2005; Lazarus & Folkman, 1984). Stress levels in

adults can either be incidental or chronic. Chronic stress can lead to serious, long-term psychological conditions, including rumination, depression, and chronic fatigue syndrome (Bratman et al., 2015b; Stigsdotter et al., 2011).

During the COVID-19 pandemic, many studies were conducted to assess wellbeing and sources of stress within adult populations. Key themes within these studies indicated that the pandemic created increased rates of mental health concerns, including but not limited to anxiety, depression, insomnia, substance use, suicidal ideation, and hopelessness (Brooks et al., 2020; Glowacz & Schmits, 2020; Raihan, 2021). For instance, Czeisler and colleagues (2020) stated that 41% of adults reported symptoms of anxiety and/ or depression, which was largely stable since the onset of the pandemic in March 2020. According to a report by CTV News (2020), the Distress Centre in Calgary reported suicide-related calls, texts, and chats were up 66% in October 2020 compared to October 2019. Furthermore, a survey conducted in June 2020 indicated that 11% of adults reported thoughts of suicide within the past 30 days, and 13% of adults reported new or increased substance use due to coronavirus related stress (Czeisler et al., 2020). In support of this finding, Statistics Canada (2021) indicated that 24% of those who previously consumed alcohol, and 34% of those who previously consumed cannabis said their consumption had increased during the pandemic. Notably, respondents indicated that stress, boredom, and loneliness contributed to that increase (Statistics Canada, 2021). Overall, these survey results suggested that rates of mental health concerns worsened amidst the COVID-19 pandemic and harmful coping strategies were engaged. From an optimistic point of view, the announcement and administration of COVID-19 vaccines worldwide instilled a sense of hope for some (Kashte et al., 2021). Yet for others, the longer the pandemic endured, people reported

concerns related to living without the very thing that gives their lives purpose, social connection (Banerjee & Rai, 2020).

Human Beings Innate Need for Social Connection

Humans have a set of basic, psychological, and self-fulfillment needs that must consistently be met for survival. Humans are social beings that rely on one another to fulfill innate needs for social connection and belonging (Maslow, 1943; House et al., 1988). Research shows that social connection can lower anxiety and depression, aid emotional regulation processes, lead to higher self-esteem and empathy, and improve immune system functioning (Ozbay et al., 2007). On the other hand, research suggests that a lack of human connection can be more harmful to health than obesity, smoking, and high blood pressure (House et al., 1988). Without it, additional research has shown that a lack of social connection leads to elevated feelings of loneliness, which negatively impacts physical and emotional health (Cruwys et al., 2014; O'Shea et al., 2021). By neglecting the innate human need to connect, physical and mental health is placed at risk. Social isolation is identified as a prominent factor that contributed to negative COVID-19 experiences.

However, a limited number of studies have explored the positive impacts of the COVID-19 pandemic on the general population (Mills et al., 2022; Prati & Mancini, 2021). Nevertheless, few studies indicated an increase in wellbeing and a decrease in anxiety in people with pre-existing mental health conditions (Fancourt et al., 2020; Pinkham et al., 2020). Other research suggests that the shared experience of the pandemic may have strengthened social connectedness, since people reported feeling as though we are all in this together (Luchetti et al., 2020; Prati & Mancini, 2021; Tull et al., 2020). Themes of resilience and healthy coping have also emerged, such as finding sense and meaning in the pandemic (Mathias et al., 2020).

Additional positive experiences that have been reported include more time to do enjoyable activities, increased quality time with partners, be in nature, and exercise (Williams et al., 2021).

Although recent research has highlighted some positive psychological impacts of the COVID-19 pandemic, it is equivocally worth exploring how the COVID-19 pandemic created negative experiences, such as the conditions of living that lacked capacity and opportunity for attaining social connection, which in turn negatively impacted wellbeing (Helliwell, 2020).

Psychological Impacts of the COVID-19 Pandemic on Adults

Previous research suggests that an intense stress response often develops amongst people during crises, and the adversities encountered within these periods can have both short and long-term negative effects on mental health (Wu et al., 2009). There is a growing body of literature suggesting that the stresses associated with COVID-19 created several psychological consequences that impacted wellbeing (Qiu et al., 2020; Torales et al., 2020; Wang et al., 2020).

Besides the rising number of cases and fatalities during the pandemic, there were also significant psycho-social impacts (Zajacova et al., 2020). Billions of people were quarantined in their own homes, and nations went into lock down to implement social distancing as a measure to contain and prevent the spread of infection (WHO, 2020b). However, what wasn't anticipated was the social and emotional toll that social distancing measures took on adults (Spencer-Laitt et al., 2022). Adults reported experiencing increased loneliness, rumination, worry, and alienation associated with the development of post-traumatic stress disorder (Zhu et al., 2021b). Adult populations also appraised the COVID-19 pandemic as a chronic stressor that was intense and threatening, which resulted in greater levels of perceived stress, anxiety, and depression. In considering the appraisal of the COVID-19 pandemic as a chronic stressor, and the limited

accessibility to mental health supports and coping resources due to social distancing measures, the wellbeing of adults was a growing public health concern.

There were several noteworthy psychological impacts of the COVID-19 pandemic. The following three sections seek to describe these impacts in greater detail in relation to: (1) lack of social connection, (2) reduced sense of wellbeing, and (3) unintended consequences of technology use.

Lack of Social Connection

Given the directives for social distancing and isolation, research suggested that individuals reported a lack of social connection and increased feelings of loneliness (Banerjee & Rai, 2020). Previous literature suggests that people under the age of 25 already show elevated levels of loneliness, and the pandemic may worsen these feelings (Domagala-Krecioch & Majerek, 2013). Health measures such as mandatory mask use in public spaces (Government of Canada, 2020) restricted capacities for social gatherings (i.e., weddings, family events, birthdays, team sports, etc.), and in some countries, lockdowns were in effect which eliminated all opportunities for in-person social connection (MacIntyre & Hasanain, 2020). Despite the critical role that social support plays in mitigating the risks of experiencing mental health concerns (Gloster et al., 2020; Merz et al., 2010; Reid et al., 2016), social distancing policies during the COVID-19 pandemic hindered accessibility to obtaining social connection (Okabe-Miyamoto et al., 2021), which was suggested as a key factor that negatively impacted adults wellbeing across the world (Geirdal et al., 2021; Lowe et al., 2022; Tyson et al., 2022).

Reduced Sense of Wellbeing

Previous research has identified long-lasting impacts of worldwide pandemics on human wellbeing. Notably, Aydin (2017) argues that worldwide pandemics, like COVID-19, can elicit

collective trauma that may lead to several psychological, relational, physiological, and spiritual consequences. Specifically, research has noted a variety of mental health consequences that have included: stress, depression, anxiety, feelings of panic, feelings of hopelessness, frustration, feelings of desperation, struggles with suicidal ideation, insomnia, irritability, emotional exhaustion, grief, and traumatic stress symptoms (Akat & Karatas, 2020; Best et al., 2020). Furthermore, studies of pandemics, including COVID-19, show that the psychological effects of contagion and quarantine are not limited to the fear of contracting the virus (Barbisch et al., 2015). Other stress inducing elements include separation from loved ones, reduced opportunities for socialization, uncertainty about the advancement of the disease, and feelings of helplessness (Cao et al., 2020). Overall, the stressors associated with the COVID-19 pandemic imposed greater stress reactivity which in turn negatively impacted emotional wellbeing of adults.

Unintended Consequences of Technology Use

Social lockdowns led individuals to increasingly rely on remote video conferencing and other technology-based interactions to fulfill social needs (Canale et al., 2022; Dimmock et al., 2021). While using technology seemed adaptive during the time of crisis of the COVID-19 pandemic, previous research suggests it can be cognitively taxing (Kock, 2004), promote negative outcomes such as "Zoom fatigue" (Wiederhold, 2020), and lack rich non-verbal cues which may hinder mutual understanding (Walther, 1992). Although adaptive and supplemental, using technology as a means of social interaction may not be considered enough to fulfill human beings innate need for belonging and social connection, rather face-to-face communication fosters higher quality interactions and has been suggested to predict enhanced quality of life (Lee et al., 2011). Given the public health policies and restrictions imposed during the COVID-19 pandemic were important for maintaining good physical health (WHO 2020a), identifying

adaptive means to facilitate social connection meaningfully and safely was vital for supporting mental health and wellbeing.

The COVID-19 pandemic was a significant historic event that impacted the world. Scientific research is of great importance to understand the social, political, psychological, educational, and economic impacts. With new measures introduced to restrict movement as part of efforts to prevent the spread, such as social distancing, the COVID-19 pandemic led to lifestyle change and adaptations in nations across the world. The combination of living through the uncertainty of a global pandemic and the subsequent economic, employment, and relationship hardships may be particularly burdensome on the mental health of adults. Due to COVID-19, adults were experiencing inflated levels of anxiety, depression, fear, anger, pessimism, and hopelessness (Akat & Karatas, 2020). The restrictions imposed by public health officials have limited the opportunity for social interaction, and thus adults are grieving the loss of human connection. Therefore, there was a pressing need to identify effective mental health coping resources that will serve to minimize the negative psychological effects of the COVID-19 pandemic.

Mental Health Coping Resources

In supporting positive outcomes associated with mental health and wellbeing, there are many mental health supports and coping resources that exist. Generally, there are three pathways in which programs are often designed and developed to promote mental health and wellbeing which include the following: (1) therapeutic interventions, (2) self-care practices, and (3) therapeutic recreation programs. Each of these modalities of support are described in greater detail below.

Therapeutic Interventions

In the context of applied psychology, *therapeutic interventions* are evidence-based activities implemented by a mental health professional (albeit psychologist, psychiatrist, etc.), that are intended to guide treatment plans, alleviate presenting symptoms, modify behaviours and/or emotional states, and most importantly, promote change (Cook et al., 2017; Roberts & Yeager, 2004). Interventions are continuously researched for treatment efficacy in various clinical populations. For instance, a psychologist trained in cognitive behavioural therapy may use identifying and challenging irrational beliefs as an intervention to promote change in a client who may be experiencing symptoms consistent with a mental disorder (e.g., generalized anxiety disorder, major depressive disorder, etc.) (Corey, 2017; Wright et al., 2017; Young, 2021). Therapeutic interventions are conceptualized as empirically validated approaches consistent with the theoretical orientation of the mental health professional who conceptualizes treatment planning and administers the interventions (Collins, 1999).

Self-Care Practices

The concept of *self-care* broadly refers to engagement in behaviours that serve to maintain and promote wellbeing (Maranzan et al., 2018; Myers et al., 2012). Most relevant to adults, a wide array of potential activities fall under this category, including but not limited to sleep hygiene, physical exercise, social support, emotional regulation strategies, mindfulness-based practices, and the pursuit of pleasurable and relaxing activities such as one's personal hobbies, and spending time with family and friends (Diener, 1984; Hansson et al., 2005; Maranzan et al., 2018; Myers et al., 2012). During the pandemic, adults' engagement with self-care practices was a helpful protective factor against negative mental health outcomes (Hamer et al., 2020), yet social distancing policies created barriers to accessing regular in-person self-care activities which threatened opportunities for social connection (Lowe et al., 2022).

Therapeutic Recreation Programs

Another approach to promote wellbeing is through the provision of therapeutic recreation programs. *Therapeutic recreation programs* promote health and wellness by restoring, remediating, and rehabilitating individuals' levels of functioning and independence in life activities (Austin, 1982; Robertson & Long, 2008). Previous literature indicates that therapeutic recreation programs provide a variety of positive health outcomes for individuals of all ages with varying presenting conditions (García-Villamisar et al., 2017; Kim et al., 2020). Stumbo et al. (2018) discuss how therapeutic recreation programs strive to enhance participants outcomes by providing cost-effective services in small group settings, which can also serve to enhance or replace other costly services. These types of programs focus on using activity-based interventions to address the assessed needs of individuals and enhance their quality of life. Like the wellness practice of self-care, therapeutic recreation programs address the whole person, with a focus on enhancing functioning within physical, social, cognitive, and emotional domains (Robertson & Long, 2008). However, therapeutic recreation programs often integrate unique recreation-based activities to enhance wellbeing. Interestingly, an increasingly popular way that therapeutic recreation programs have been developed is based upon activities that involve nature (Hawkins et al., 2016; Picton et al., 2020).

Coping Resources Utilized During COVID-19

Considering the lack of accessibility to mental health supports, and the emotional toll of COVID-19 related stressors, identifying accessible and safe coping resources became crucial for supporting adults' emotional wellbeing during the COVID-19 pandemic. Importantly, these resources needed to adhere to social distancing measures, yet provide ample opportunity for connection (Maslow, 1943; WHO, 2020d). The following sections explore the role of (1) remote

psychotherapy, (2) mindfulness-based practices, and (3) time spent in nature, as means of coping resources during the COVID-19 pandemic.

Remote Psychotherapy

Providing remote psychotherapy became an acceptable necessity, as teletherapy was suggested as the most popular psychological service during the COVID-19 pandemic (Miu et al., 2020). Former bodies of literature discuss how online therapies and in-person therapies are compatible regarding the working therapeutic alliance (Simpson & Reid, 2014), and that online psychotherapy can be similarly effective (Backhaus et al., 2012). However, despite these empirical findings, a review of the literature identifies three key limitations of teletherapy worth discussing. Firstly, teletherapy has been criticized for being impersonal due to the loss of immediate physical presence (Burgoyne & Cohn, 2020). Without face-to-face interaction, this method of psychotherapeutic delivery also creates potential for misunderstandings since visual social cues are absent or limited (College of Alberta Psychologists, 2018), which in turn limits the opportunity to fulfill the human need for social connection (Maslow, 1943; Toon, 2002). Békés et al. (2021) highlighted another limitation of teletherapy from the point of view of mental health professionals who reported relational, technical, and practical challenges using teletherapy during the COVID-19 pandemic. The authors found that teletherapists experienced reduced emotional connection with clients, increased distractibility, reduced privacy, increased negative attitude toward online therapy, and lower perceived quality of the therapeutic alliance (Békés et al., 2021). This finding is important relative to common factors theory, which seeks to identify the therapeutic alliance as the most important factor in predicting meaningful and significant client outcomes within psychotherapy (Rosenzweig, 1936; Wampold, 2015). Since remote

psychotherapy may hinder communication, attention, and relational rapport, these factors not only impact clients' progress but can also influence wellbeing.

Mindfulness

Several studies suggested practicing mindfulness was beneficial in supporting adults' wellbeing during the COVID-19 pandemic (Lesser & Nienhuis, 2020; Shapira et al., 2021; Zhu et al., 2021a). Specifically, mindfulness-based practices such as yoga, meditation, deep-breathing, guided imagery, and progressive muscle relaxation creates opportunity for oneself to notice moment-to-moment awareness with a nonjudging attitude of acceptance to reduce distress (Kabat-Zinn, 1990; Reibel et al., 2001). Furthermore, other mindfulness-based practices included integrating physical exercise (Lesser & Nienhuis, 2020), and mindfully limiting consumption of COVID-19 related media to lessen worry, agitation, and stress (WHO, 2020c). Interestingly, recent research suggests that a popular way adults practiced mindfulness during the COVID-19 pandemic was through spending time in nature (Desrochers et al., 2022; Lades et al., 2020).

Time Spent in Nature

Under normal circumstances, there is a wealth of evidence showing that being outdoors is associated with wide-ranging positive outcomes in terms of emotional wellbeing (Bowler et al., 2020; Frumkin et al., 2017; Hartig et al., 2014; Kondo et al., 2018). Under conditions of social distancing, where outdoor recreation is severely reduced and restricted (Rice et al., 2020), the ability to spend time in nature is likely to take on added importance to support emotional wellbeing (Burtscher et al., 2020). Indeed, since the beginning of the pandemic, many people have been spending more time in nature (Desrochers et al., 2022). A case study compared park use from early spring 2019 to 2020 and found that there was a 140% increase in visits to forested areas, mostly by new visitors (Derks et al., 2020).

Some research has also examined the wellbeing impacts of spending time in nature during the COVID-19 pandemic. For example, a recent study suggested that going into nature was an effective coping strategy to boost and maintain subjective wellbeing amongst Canadian university students during the pandemic (Desrochers et al., 2022). Another study suggested spending time in natural environments was associated with significantly higher positive affect and lower negative affect in adults amidst the COVID-19 pandemic (Lades et al., 2020). Although these studies have demonstrated benefits of engaging with nature during the pandemic, no studies have explicitly investigated how utilizing a nature based therapeutic recreation program as a coping resource during the pandemic may influence wellbeing outcomes in adults.

Connecting with Nature

Belief in the benefits of spending time in nature has precedents that stretch back thousands of years. In *On the Parts of Animals*, Aristotle said, "For in all natural things there is something marvellous" (Lennox, 2001). This quote invites curiosity into further examining the affective benefits of time spent in nature.

Defining Nature

Nature, in the broadest sense, refers to the phenomena of the physical world (Ducarme & Couvet, 2020). The word nature is derived from the Latin word natura, that refers to essential qualities, and innate disposition (Ducarme & Couvet, 2020; Lotze & Thomson, 2009). The concept of nature refers to the physical universe of living plants and animals, geological processes, weather, and physics such as matter and energy (Ducarme & Couvet, 2020). Often in discussions involving nature, the term natural environments, is used to refer to wild animals, rocks, forest, beaches, and other general areas that have not been substantially altered by humans.

> The natural world is an incredible wonder that inspires us all. It underpins our economy, our society, indeed our very existence. Our forests, rivers, oceans, and soils provide us with the food we eat, the air we breathe, and the water we irrigate our crops with. We also rely on them for numerous other goods and services we depend on for our health, happiness, and prosperity. (World Wildlife Fund, 2021, p. 1)

Over the last decade, a growing body of literature in this area has indicated that greater exposure to, or contact with, natural environments is associated with better health and wellbeing (Rakow & Eells, 2019; Hartig, 2014; Howell et al., 2011; Russell et al., 2013; White et al., 2019).

Affective Benefits of Time Spent in Nature on Wellbeing

Spending time in nature can be beneficial to one's mental health (Berman et al., 2012; Hunter et al., 2019; Kuo, 2015; Park et al., 2010). Indeed, Annerstedt & Wahrborg, (2011) found that spending time in natural environment can alleviate symptoms of psychological distress more thoroughly than is often accomplished in traditional mental health treatment settings. Furthermore, contact with the natural environment can contribute substantially to healing and the development of resilience (Ottosson & Grahn, 2008). Other research identifies the pivotal role of time spent in natural environments in creating affective and cognitive benefits. For example, in a study of 20 individuals diagnosed with major depressive disorder, results suggested that positive affect, working memory capacity, and overall mood improved to a much greater extent after a nature walk than after an urban walk (Berman et al., 2012). Interestingly, this finding is also consistent within other experimental studies conducted with non-clinical populations (Berman et al., 2008; Bratman et al., 2015a, 2015b; Janeczko et al., 2020; Koselka et al., 2019). Other bodies of research have highlighted impacts of spending time in nature as being supportive of cognitive

processing (Berman et al., 2008), increased ability to reflect on life problems, and is partially mediated by increases in one's perceived connectedness to nature (Mayer & Frantz, 2004; Mayer et al., 2009).

Some researchers have raised questions about the most effective amounts of time spent in natural settings (i.e., time doses). A meta-analysis of ten studies indicated that measures of wellbeing showed the greatest changes after only five minutes of green exercise (Barton & Pretty, 2010). After that, improvements continued for up to one hour, but at diminished rates. In a similar experiment, Hunter et al. (2019) asked 44 participants to immerse themselves in nature at least 2.5 times a week for eight weeks. Subjects were free to have each nature-based experience last from ten minutes up to an hour. Using a pre-post research design, participants answered questions about their mental wellbeing and their ability to concentrate before and immediately after each green exercise event (Hunter et al., 2019). After just ten minutes in nature, stress indexes went down, and participants reported improvements in their focus, mood, and energy levels (Hunter et al., 2019). While all indexes continued to improve after greater time durations, it was again, at a reduced rate of increase (Hunter et al., 2019). Extending beyond the outdoor environment itself, often green spaces house domestic and/or wild animals. Building on this, alternative research directions have consisted of an examination of the psychological, biological, and physiological mechanisms underlying benefits of human-animal interactions.

The Healing Power of Animals

People who routinely interact with animals know that there is something about being with animals that creates a special "X factor", that makes the time spent with an animal particularly rewarding, on a physical, psychological, emotional, and spiritual level. While there may be countless reasons offered as explanation for this, such as the temporary "time-out" from our

stressful lives that interacting with an animal provides, or the satisfaction that mutual love and affection offers, there are numerous empirical studies that highlight its benefits (Bona, 2020).

Previous research indicates that animals induce a state of relaxation, the moment they attract and hold our attention (Crawford et al., 2006). Studies on pet ownership have found that having animals in our lives can mean fewer trips to the doctor, lower blood pressure (Allen et al., 2002), lower cholesterol levels (Anderson et al., 1992), and a decreased risk of heart attack (Friedman et al., 1982). Furthermore, Lefkowitz et al. (2005) noted that interaction with an animal, lowers an individual's heart rate, subjective feelings of anxiety, and overall level of physiological arousal, even from a resting state. Additional research provides further evidence to suggest that animals provide people with stress-reducing social support (Serpell, 1996; Siegel, 1990; Wilson & Turner, 1998).

Furthermore, animals have also been found to be beneficial for emotional development (Bona, 2020). People who have contact with animals tend to have higher self-esteem (Schulz et al., 2020; White-Lewis, 2020), be more involved in activities such as sports, hobbies, clubs, or chores (Melson, 1990), and develop more nurturing behavior. They also tend to be more empathetic toward both animals and people (Ascione, 1992).

Theoretical Frameworks

In exploring the effect of time spent in nature on wellbeing during the COVID-19 pandemic, this study was approached with meaning making through an integration of two key theoretical frameworks: (1) Maslow's (1943) hierarchy of needs, and (2) the biophilia hypothesis (Wilson, 1984). These theoretical frameworks are discussed below.

Maslow's Hierarchy of Needs

Maslow's (1943) hierarchy of needs seeks to identify how humans have a set of basic, psychological, and self-fulfillment needs that must be met for individuals to achieve self-actualization. In other words, self-actualization refers to the idea that Maslow (1943) believed all people have an inborn desire to be all they can be. To achieve this, however, several preceding basic needs must be met such as the need for food, safety, love and belonging, and self-esteem (Maslow, 1943). Maslow's (1943) hierarchy of needs is conceptualized as a pyramid with five different levels preceding from the bottom to the top of the pyramid, respectively: physiological, safety, love/belonging, esteem, and self-actualization. Needs at the bottom represent the basic physical need for food, water, shelter, sleep, and warmth. Once the lower levels needs are met, people can move up to the next level of needs, and so forth. Notably, as individuals progress up the pyramid, needs become increasingly psychological and social. Soon the need for love and belonging through social connection becomes important (Maslow, 1943). However, the restrictions enacted during the COVID-19 pandemic created conditions of living that lacked capacity and opportunity for attaining social connection, which in turn impacted wellbeing (Helliwell, 2020). Therefore, all forms of connection are conceptualized as a fundamental human need that is deemed essential in supporting emotional wellbeing.

The Biophilia Hypothesis

Mental health research in the context of connecting with nature has generated a growing body of literature since the emergence of the biophilia hypothesis in the mid 1980s (Grinde & Patil, 2009; Howell et al., 2011; Kaplan, 1995; Wilson, 1984). Briefly, developed by Wilson (1984), the *biophilia hypothesis* is the predominant theoretical foundation in this domain of research that seeks to identify humans' innate tendency to seek connection with nature and other forms of life. Wilson (1984) goes on to describe biophilia as "the passionate love of life and of

all that is alive", and goes on to state that we, as a species, have a deeply rooted affiliation for all living things, and that, as a result, we are influenced cognitively, emotionally, and behaviourally by them. In this hypothesis, human dependence on nature goes beyond a physical dependence, as it also includes aesthetic, intellectual, cognitive, and spiritual satisfaction (Wilson, 1984).

For over two decades, research has supported Wilson's (1984) biophilia hypothesis as a theory that posits natural environments (and the animals that live within them), promote human health and wellbeing (Kuo, 2015; Maller et al., 2005). Throughout history, nonhuman animals have been portrayed in various cultures as facilitating health and reaffirming our connection to the natural world (Fine, 2010). In recent years, it has become widely accepted that animals, especially domesticated ones, can have a profound positive impact on the health and wellbeing of people. Research demonstrates several benefits that stem from human-animal interactions, including improved confidence (Dimitrijevic, 2009), social skills (Thompson, 2009), emotional well-being (Nimer & Lundahl, 2007; Rowan & Beck, 1994), and decreased anxiety (Barker & Dawson, 1998; Barker et al., 2003), and depression (Souter & Miller, 2007).

Most of the research conducted in this area thus far examines the recuperative effects of nature on wellbeing, and its beneficial properties following researcher's arguments of humanity's affiliation for nature (Grinde & Patil, 2009; Wilson, 1984). Supporting research has been well documented in literature during the last few decades. These include natural movement (Hancock, 1993), natural sounds (Fisher, 1999), children's engagement in activities within green settings (Louv, 2005; Taylor et al., 2001), as well as esthetic preferences for nature and natural forms (Depledge et al., 2011; Kaplan & Kaplan, 1989). Therefore, through the lens of the Biophilia hypothesis (Wilson, 1984), there are numerous multifaceted benefits that are suggested to occur when humans spend time in nature.

What is Time on the Land?

Given the urgency of deterring the negative psychological effects of the COVID-19 pandemic, and the benefits of spending time in nature on wellbeing, it seems engaging with nature as a coping resource may be conducive in supporting adults' emotional wellbeing during a time of crisis. Developed near the beginning of the COVID-19 pandemic (March 2020), Eileen Bona, the founder and clinical director of Dreamcatcher Nature Assisted Therapy, developed a therapeutic recreation program called *Time on the Land* which is a one-hour nature-based experience that was originally designed for individuals and families to escape isolation from their homes and reconnect with nature amidst the COVID-19 pandemic. Since the COVID-19 pandemic, Eileen Bona continues to run Time on the Land as there continues to be high demand and interest for the program within surrounding communities.

Time on the Land is unlike any random walk outdoors, it was strategically designed by a mental health professional, that combines the unique "x" factor sustained through the human-nature relationship and facilitates a sense of connection through all that nature has to offer. During the one-hour time frame, individuals are invited to freely roam the 40-acre property located in Ardrossan, Alberta, and interact with most of the animals within the boundary of a fence. In addition to the staff and volunteers who facilitate the program, Dreamcatcher Nature Assisted Therapy is the home of many animals including horses, donkeys, goats, cats, and chickens. Time on the Land encompasses unique benefits in terms of leveraging spending time in natural environments with an aim to decrease stress, enhance mindfulness, and promote a sense of connection with oneself and nature.

Purpose

The current study seeks to explore time spent in nature as a coping resource through investigating the effect of Time on the Land on adults' perceptions of perceived stress, affect, and subjective experiences in relation to emotional wellbeing during the COVID-19 pandemic. The hypothesis of the current study is: if spending time in nature has beneficial effects on adults' emotional wellbeing, then we predict that participants will report lower levels of perceived stress, lower levels of negative affect, and higher levels of positive affect, after attending a one-hour Time on the Land session. The current study is framed by the following research questions:

1. What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on perceived stress levels in adults?
2. What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on positive and negative affect levels in adults?
3. How do participants describe their experience with Time on the Land?
4. How do the themes mentioned by the participants' help to explain changes in levels of perceived stress? Positive and negative affect?

CHAPTER 3: Methods

Design

The study followed a quasi-experimental (pre-post) within-subjects design, that used mixed methodology to assess the same group of participants at two different time points: before Time on the Land (baseline) and immediately after Time on the Land (post-session). A mixed methods approach is especially useful in understanding contradiction between quantitative and qualitative findings (Hanson et al., 2005). Such that, it adds breadth to our understanding in elucidating more information than what can be obtained in only quantitative research (Creswell & Plano Clark, 2007). The data was collected with survey methodology using a Triangulation:

Convergence Model design (Creswell & Plano Clark, 2007) to directly compare and contrast statistical data, and validate/expand upon the results with qualitative data (see Figure 1). To determine the differences in perceived stress and affect, two quantitative measures were used. The surveys also included open ended questions, developed by the primary researcher, that allowed for qualitative analysis.

Participants

A total amount of 48 adults participated in the study. The participants had the option to attend Time on the Land individually or within a group of people from their immediate household: 19 participants participated individually, and 29 participants participated within a group of other adults.

This study used a convenience sampling technique whereby participants were asked if they would be willing to complete the surveys through advertising from Dreamcatcher Nature Assisted Therapy's social media, and through supplementary advertising marketed to the lay public through the primary researcher's (Brooke Greenwood) social media platforms (via Facebook, Instagram, Twitter) (see Appendix E). Interested individuals were directed to Dreamcatcher Nature Assisted Therapy's website to book their one-hour time slot through a secure online platform called Eventbrite.

Inclusion/ Exclusion Criteria

To avoid conflict of interest and adhere to the chosen population, there were two criteria that individuals were required to meet to participate in this study: individuals needed to be (1) 18 years old or older, and (2) not an existing, nor former client of Dreamcatcher Nature Assisted Therapy. Individuals who did not successfully meet these criteria were excluded from participating in the study (see Appendix A).

Location

This study took place during the summer months of June – November 2021 at Dreamcatcher Nature Assisted Therapy in Ardrossan, Alberta. The last day of data collection was November 30th, 2021. Eileen Bona, the founder, and clinical director of Dreamcatcher Nature Assisted Therapy granted the primary researcher permission to conduct this research with a signed letter of agreement (see Appendix D).

Measures

The surveys consisted of a combination of quantitative measures, and qualitative questions designed by the primary researcher. The baseline survey consisted of 37 questions (36 closed, 1 open-ended) distributed in the following categories: (1) descriptive data of the participants (6 items); (2) Perceived Stress-Scale (PSS-10; Cohen et al., 1983; 10 items); (3) the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; 20 items); (4) qualitative open ended question developed by the primary researcher (1 item) (see Appendix A). The post-session survey consisted of 34 questions (30 closed, 4 open-ended) distributed in the following categories: (1) PSS-10 (Cohen et al., 1983; 10 items), (2) PANAS (Watson et al., 1988; 20 items), and (3) qualitative questions developed by the primary researcher (4 items) (see Appendix B).

Demographics

The demographic items consisted of five questions relating to age, gender, working status, marital status, and level of education. Participants were able to indicate their age in years to ensure they fit the criteria of this study (adults only). Participants were also asked about their gender, yearly income, working status, and level of education (see Appendix A). These

demographic items were included in the survey to compare average findings across varying demographics.

Perceived Stress Scale

The 10-item Perceived Stress Scale (PSS-10) assesses stress levels based on the degree to which an individual has perceived life as unpredictable, uncontrollable, and overloading. This measure was used because it provided insight into the difference in participants daily perceived stress before and after attending Time on the Land (Cohen et al., 1983; Cohen & Williamson, 1988). Like Blaxton et al. (2020), the current study assessed participants perceived levels of stress over the course of one day. The measure includes items that asks individuals to reflect on thoughts and feelings, within a specific time context, that pertains to stress such as "Today, how often have you felt nervous and stressed?", or "Today, I felt difficulties were piling up so high that I could not overcome them" (see Appendix A, B). Response options ranged from 0 to 4 on a 5-point Likert scale (*0= never, 1= almost never, 2= sometimes, 3= fairly often, 4= very often*). Individual scores can range from 0 to 40, with higher scores indicating higher levels of perceived stress (see Appendix C). Cronbach's Alpha for the baseline survey was $\alpha = 0.85$, and the post-session survey was $\alpha = 0.84$. The PSS-10 is an updated version of the original 14 item scale, with better factor structure and internal reliability than the PSS-14 (Cohen & Williamson, 1988). Consideration was also given to the 4-item version (Cohen & Williamson, 1988). However, this scale only had marginal reliability with a Cronbach's alpha of 0.67 (Leung et al., 2010). Whereas the PSS-10 had a test-retest reliability of 0.86 using a 7-day interval (Siqueira Reis et al., 2010), and 0.77 using a two-week interval (Remor, 2006).

Positive and Negative Affect Schedule

The 20-item Positive and Negative Affect Schedule (PANAS) was included in both surveys to assess participants' daily positive and negative affect, before and after their Time on the Land session (Watson et al., 1988). To assess daily affect, participants were asked to indicate the extent to which they have felt each positive emotion (e.g., enthusiastic, excited, inspired, interested) and negative emotion (e.g., irritable, alert, nervous, upset, etc.) over the course of one day (*today*) (Watson et al., 1988). Response options ranged from 1 to 5 (*1= very slightly or not at all, 2= a little, 3= moderately, 4= quite a bit, 5= extremely*) (Watson et al., 1988). The measure includes positive affect items such as "ashamed", and "afraid", whereas items for positive affect included "inspired" and "strong". Individual scores can range from 10-50, with higher scores indicating higher levels of positive/negative affect, and lower scores indicating lower levels of positive/negative affect (see Appendix C). Cronbach's α ranges from 0.85 to 0.90 for positive affect and from 0.84 to 0.87 for negative affect (Crawford & Henry, 2004; Heubeck & Wilkinson, 2019). For this study, Cronbach's α for positive affect for the baseline survey was α = .905 and for the post-session survey was α = .924. The Cronbach's α for negative affect for the baseline survey was α = 0.912 and for the post-session survey was α = 0.9. Therefore, these values suggest good to excellent reliability (Tavakol & Dennick, 2011).

Qualitative Open-Ended Questions

Extending beyond quantitative means of analysis, the primary researcher developed original open-ended questions that were meant to capture participants subjective experiences of Time on the Land. In the event where this study may not find significant quantitative findings, the qualitative questions may provide deeper detail of meaningful experiences that are otherwise not possible within Likert scales. These questions are intentionally thought-provoking and require a deeper level of reflection within the participants. The qualitative items of this study

consisted of a total of five questions across both surveys (baseline survey= one question, post-session survey= four questions).

Baseline Survey. The baseline survey had one open-ended qualitative question that asked participants to reflect on what their expectations are prior to arriving at Dreamcatcher Nature Assisted Therapy for their scheduled Time on the Land session, "Please describe below what you hope to attain attending your Time on the Land session at Dreamcatcher Nature Assisted Therapy (e.g., stress relief, relaxation, quality time with family, an adventure, etc.)" (see Appendix A).

Post-Session Survey. The post-session survey had four open-ended qualitative questions that asked participants to describe their experience of Time on the Land. The four questions in this survey include: (1) "How were you feeling when you first arrived at Dreamcatcher? Please describe.", (2) "After your 1-hour experience with Time on the Land, please describe how you are feeling right now", (3) "What happened since you got here that lead to changes in your feelings?", and (4) "What about your experience at Dreamcatcher today would you like to hold on to?" (see Appendix B).

Procedure

After individuals expressed their interest in participating in the study through Dreamcatcher Nature Assisted Therapy personnel, or the primary researcher (i.e., Brooke Greenwood), participants were directed to the Dreamcatcher Nature Assisted Therapy website to book their one-hour Time on the Land timeslot through Eventbrite. The surveys were assembled in electronic format using Qualtrics. The primary researcher sent out the surveys by email and participants completed them at their respective times (baseline surveys were completed by participants before their scheduled one-hour Time on the Land session; post session surveys

were completed by participants immediately after their scheduled one-hour Time on the Land session or before 11:59 pm on the same day).

Upon arrival to Dreamcatcher Nature Assisted Therapy, participants were greeted by the primary researcher who confirmed the baseline survey was completed for each participant. After this, a facilitator (staff member of Dreamcatcher Nature Assisted Therapy) led participants through a 10-minute tour of Dreamcatcher Nature Assisted Therapy, and instructed participants on how to safely interact with the animals within the boundary of a fence. Following this, participants were then instructed to roam the facility freely for one-hour. After the one-hour Time on the Land session was completed, participants were instructed to return to the main office where they were provided with a comfortable space to sit down and complete the post-session survey as guided by the primary researcher.

In the event a participant wanted to enact their ethical right to withdraw their data from the study, participants were assigned random digitized study ID numbers to remove and erase the information collected to the point of withdrawal. The primary researcher and supervisor were the only individuals who had access to this information.

Data Analysis

The quantitative data from the baseline and post-session surveys were analyzed using descriptive statistics, parametric paired 2-sample t-tests, and the non-parametric Wilcoxon signed rank test. Descriptive statistics were analyzed to assess the results of the five demographic questions from the baseline survey, to ensure that participants met the required inclusion/exclusion criteria. The dependent variables of perceived stress in the PSS-10 (Cohen et al., 1983; Cohen & Williamson, 1988) and positive and negative affect in the PANAS (Watson et al., 1988) are both measures that utilize ordinal Likert scales. Tests of normality were conducted

to determine whether the distribution of the differences of the dependent variables met the assumption of normality, which subsequently determined whether parametric or non-parametric statistical tests were used. For normal distributions, the parametric, paired-samples t-test was used to determine whether there was a statistically significant mean difference between dependent variables assessed at baseline and post-session. Parametric tests are often favoured in pre-post research designs since they usually have more statistical power that allow for greater likelihood to detect significant effects and are more robust to deviations from normality (Corder & Foreman, 2014). For distributions that are not normal, the non-parametric, Wilcoxon signed rank test was used to understand whether there was a significant median difference over time (difference in dependent variables baseline survey and post-session survey). All statistical analyses were conducted using SPSS.

For the qualitative analysis, the data was assessed using thematic analysis, coupled with integration of meaning making as a personal process through a term known as assemblage, which provides a more comprehensive analysis based upon theory, data, and thought (Augustine, 2014). Consistent with the triangulation design: convergence mixed methods model (Creswell & Plano Clark, 2007), the qualitative data was used to inform the interpretation of quantitative results, and to identify meaningful nuances that were not otherwise captured within the statistical findings (see Figure 1).

The Nature and Importance of Qualitative Research Methods

Unique from standardized procedures and assumptions involved in quantitative analysis, qualitative analysis demands thoughtful inquiry, intentionality, and reflective processes to cultivate meaning through the integration of theory, data, and thought (Augustine, 2014; Deleuze & Guattari, 1987; Marshall, 1981; Wertz et al., 2011). It is through these processes by which

qualitative research addresses the question of "what?", in understanding the context of data, the consequences/outcomes, and even the significance of what is investigated in the larger world (Wertz et al., 2011).

Qualitative research is endlessly creative and interpretive (Braun & Clarke, 2006). Considering this, Wertz et al. (2011) speaks to how qualitative research is often easily taken for granted, as some people perceive that findings of qualitative research are unreliable, biased, and lack generalizability (Harper & Kuh, 2007; Wertz et al., 2011). However, these are perceptions that tend to be understood as myths and misconceptions about using qualitative methods (Harper & Kuh, 2007). Rather, asking good qualitative questions and using careful, self-critical, methodical, and accountable procedures to answer them is crucial for science (Wertz et al., 2011). Therefore, it is important to choose well established research methods that will allow for the development of qualitative findings to demonstrate their value and utility, as well as their complementarity to established quantitative methods (Wertz et al., 2011).

Methodical Approach to Qualitative Analysis: Thematic Analysis

Qualitative interpretations of analysis are constructed, and various techniques can be used to make sense of the data, such as phenomenological, grounded theory, thematic analysis discourse analysis, narrative research, and intuitive inquiry (Braun & Clarke, 2006; Glaser & Strauss, 1967; Wertz et al., 2011). In the context of the current study, the survey questions were analyzed using thematic analysis. Thematic analysis is a widely used qualitative research method to identify patterns of meaning within data (Braun & Clarke, 2006). Thematic analysis can be used across a range of theoretical approaches and is a flexible analytical tool that can provide a rich analysis of data (Braun & Clarke, 2006). Since there are different orientations in thematic analysis, it is important to be clear on how thematic analysis will be approached (Braun &

Clarke, 2006; Terry et al., 2017). An inductive, semantic, and realist approach was applied in this study. An inductive approach was used because the codes and themes were generated from and strongly related to the data (Nowell et al., 2017). With a semantic approach, the themes captured the explicit meaning of the data and mirror participants responses to the open-ended survey questions (Braun & Clarke, 2006). A realist approach reflected the focus on reporting the experiences, meanings, and reality of the participants evident in the data (Braun & Clarke, 2006). The research aims, objectives and question of the current study directly informed the approach taken to thematic analysis. The intent behind asking the five open-ended qualitative questions was to create opportunity for participants to relate their experience in their own words to explore richness in patterns of meaning that often cannot be derived from quantitative data. Thematic analysis is useful for analyzing perspectives of various participants, identifying similarities and differences, and exploring unanticipated understandings (Braun & Clarke, 2006).

Braun and Clarke's (2006) six-phase process was used to ensure thematic analysis process was conducted in a rigorous and structured manner. The process involved six steps: (1) familiarization with data, (2) creating initial codes, (3) generating themes, (4) reviewing themes, (5) defining and naming themes, (6) writing up the report (Braun & Clarke, 2006). Thematic analysis is not a linear process and requires a constant back and forth among the six steps (Braun & Clarke, 2006; Nowell et al., 2017). A sample of the thematic analysis (see Table 8) demonstrates the creation of codes, categories, and themes from sections of the participant responses transcript. Participant characteristics (demographics, PSS-10, and PANAS) provided contextual information for analysis (Cohen et al., 1983; Watson et al., 1988). Following the six phases, Braun and Clarke's (2006, p. 96) checklist of 15 criteria was used to ensure a good thematic analysis was generated (see Appendix I). A description of each step is presented below.

Step 1. Familiarization with data is a critical step in the thematic analysis process. The primary researcher employed analytical processes of identifying patterns/ themes in the dataset. This step spanned across two weeks, where observational notes were made by the primary researcher in a reflection journal to then identify initial patterns. This step provided the first opportunity for the primary researcher to absorb and engage with the dataset (Augustine, 2014; Terry et al., 2017; Wertz et al., 2011).

Step 2. The second step involves systematically and thoughtfully creating codes related to specific parts of the dataset (Terry et al., 2017). The primary researcher generated initial codes by labelling features of the data using phrases listed in an initial coding Word document. The coding process is flexible because codes were revised later in the analysis process to capture specific concepts more clearly (Terry et al., 2017).

Step 3. Following initial coding, the primary researcher constructed themes using the list of codes identified across the dataset to form potential categories. The primary researcher then grouped categories to highlight the overarching themes. Following this, an initial thematic map was created as a visual aid to understand the relationship between codes, between themes, and between different levels of themes (see Figure 5).

Step 4. Initial themes were refined or rejected in the Reviewing Themes step (Terry et al., 2017). The primary researcher looked to ensure the themes represented a good fit with the codes, dataset, and research questions. First, codes that formed each theme were reviewed to determine whether they seemed to form a coherent pattern (Braun & Clarke, 2006). Themes that did not seem to fit were revised. Next, the primary researcher considered the validity of each theme in relation to the entire data set and created a revised thematic map of the data (see Figure 5).

Step 5. The fifth step involved defining, and further refining the generated themes, by capturing the essence of each theme (Braun & Clarke, 2006). The primary researcher developed a detailed analysis of individual themes and subthemes. It was important to not only consider the themes themselves, but also in relation to each other (Braun & Clarke, 2006).

Step 6. The sixth and final step involved producing a write-up of the report with the reviewed themes. The primary researcher embedded specific data extracts with the analytic narrative to provide evidence of the themes within the data and make an argument relative to the four research questions of this study.

CHAPTER 4: Results

In this section, the results from the quantitative and qualitative analysis will be presented and afterwards compared and contrasted to show the overall results of participants reported perceptions of perceived stress, affect, and subjective experiences relevant to understanding the impact of time spent in nature on adult participants emotional wellbeing.

The Quantitative Results

Descriptive Statistics

The participants in the study consisted of adults (N = 48) ranging in age from 23 to 63 years old (M = 38.12, SD = 11.217) with a higher number of females in comparison to males with a ratio of 70.8% (n = 34) to 29.2% (n = 14) (see Table 1). Although demographic information on income, education, and employment was collected, in the final analysis it was not deemed relevant to the current study and is therefore not included in the analysis.

Perceived Stress

Participants perceived stress was assessed within the same day, before and after attending Time on the Land, using the PSS-10 (Cohen & Williamson, 1988). To test for normality, a

Shapiro-Wilk test was performed and showed that the distribution of the difference of participants perceived stress before and after Time on the Land suggested the data is not normal (W = 0.036, p<0.05). However, the Kolmogorov-Smirnov test suggested otherwise (0.076, see Table 2) and the histogram did not show any major deviations from normality, except for one outlier (see Figure 1). Inspection of the outlier did not reveal it to be extreme and it was kept in the analysis. Based on these outcomes, a parametric paired samples t-test was used to determine whether there was a statistically significant mean difference between perceived stress before and after participants attended Time on the Land. Although parametric tests tend to be most robust to non-normal distributions (Corder & Foreman, 2014), a non-parametric test was also conducted to make sure the results of the paired t-test were valid (Z = 3.817, p <0.001). Participants rated scores of perceived stress were higher before attending Time on the Land (M = 15.7917, SD = 6.7506) compared to after attending Time on the Land (M = 11.25, SD = 5.76674), with a statistically significant mean decrease of 4.54167, $t(47) = 4.290$, $p < 0.001$, $d = 0.619$.

The following percentages represent participants perceived stress scores based on Cohen et al. (1983) scoring (see Appendix C) at baseline; 41.7% low perceived stress, 52.1% moderate perceived stress, and 6.2% high perceived stress. These findings indicate that participants were experiencing higher levels of perceived stress at baseline. After attending Time on the Land, post-session survey percentages of perceived stress indicated that perceived stress reduced; 54.2% low perceived stress, 45.8% moderate perceived stress, 0.0% high perceived stress. Participants perceived stress decreased significantly after Time on the Land, with no participants scoring within high perceived stress, and an increase of 12.5% of participants scoring within low perceived stress (see Appendix C). In answering the first research question of this study, these

results suggest that there was a significant decrease in perceived stress after participants attended Time on the Land.

Positive Affect

Determining the distribution of positive affect was important for choosing an appropriate statistical method. A Shapiro-Wilk test was used as a test of normality (W= 0.382, p-value <0.05) which suggested the data was normal. This finding was also supported through the analysis of the histogram which demonstrated a continuous, bell-shaped, symmetrical probability distribution, with most values near the central peak (see Figure 2). Since the normality assumption was met, a parametric paired-samples-t-test was used to determine whether there was a statistically significant mean difference between participants reported levels of positive affect before and after attending Time on the Land. Participants scores of positive affect at baseline was (M = 29.5417, SD = 7.98924) and post-session (M = 35.7917, SD = 8.43992), with a significant mean difference of -6.25, $t(47) = -7.637$, $p < 0.001$, $d = 1.102$. Considering scoring of the PANAS (see Appendix C), higher scores indicate higher levels of positive affect (Watson et al., 1988). Therefore, the results of the PANAS suggest that participants positive affect increased after attending Time on the Land (see Table 6).

According to PANAS scoring (see Appendix C), Watson et al. (1988) notes that scores can range from a minimum score 10 to a maximum score of 50, with higher scores representing higher levels of positive affect and lower scores representing lower levels of positive affect, and vice versa for negative affect. However, further context is necessary to quantify the significance of these values. Unlike the PSS-10, the PANAS does not categorize scores into categories of severity (Cohen & Williamson, 1988; Watson et al., 1988). Therefore, results for both positive and negative affect, as measured by PANAS, will be contextualized through the comparison of

mean scores from the current study data to the normative data upon which the PANAS was developed and validated (Watson et al., 1988). As such, participants' baseline scores of positive affect (M= 29.54) mirror what would be expected from a normal sample (M = 29.1) (Watson et al., 1988), and participants mean score of positive affect after attending Time on the Land (M = 35.79) is higher than the average of PANAS normative data (M = 29.1) (Watson et al., 1988).

Negative Affect

The difference of negative affect scores of the baseline and post-session scores were distributed on a histogram which indicated a right skew in the data, and by the Shapiro Wilk (W = < 0.001, p < 0.05), meaning the assumption of normality was violated and the data is not normal (see Table 2, Figure 4). Since the data is not normal, a non-parametric test (Wilcoxon signed-rank test) was conducted to determine if median negative affect is significantly different before and after Time on the Land intervention, as assessed by the PANAS. As indicated on Table 8, there was a statistically significant median decrease in negative affect from baseline (Mdn = 15) to post-session (Mdn = 12), z = -4.847, p = <0.001, r = -0.49.

After completing a Wilcoxon signed rank test, the results of the PANAS suggest that there was a statistically significant median difference in participants reported levels of negative affect before (Mdn = 15) and after (Mdn = 12) attending Time on the Land (see Table 7). In other words, supporting the hypothesis, participants negative affect decreased after attending Time on the Land. Negative affect scores from the PANAS range from a minimum score of 10 to a maximum score of 50, with higher scores representing higher levels of negative affect and lower scores representing lower levels of negative affect (see Appendix C) (Watson et al., 1988). These results are contextualized through comparison to Watson et al.'s (1988) PANAS normative sample data.

Before attending Time on the Land, participants seemed to be experiencing more negative affect (*M* = 17.8, see Table 7) than what would be expected in a presumed normative population (*M* = 16.3) (Watson et al., 1988). However, perhaps the most noteworthy finding is that the mean score of negative affect after attending Time on the Land (*M* = 13.48), reflected a lower score, than the normative mean noted above (*M* =16.3) (Watson et al., 1988). Therefore, in answering research question two, negative affect decreased, and positive affect increased significantly within adult participants after attending a one-hour Time on the Land session. What now becomes important is exploring qualitative themes to help expand upon and elucidate the "why" behind these quantitative results.

The Qualitative Findings

In assessment of the qualitative data and exploring the third research question of this study, participants were asked to describe their subjective experience attending Dreamcatcher Nature Assisted Therapy's Time on the Land program during the COVID-19 pandemic (July – November 2021). Thematic analysis yielded five dominant themes: (1) being immersed in the moment, (2), a psychological sanctuary, (3) a greater sense of purpose, (4) gained broader perspective, and (5) human-nature relationship. These dominant themes are presented as five themes with corresponding sub-themes (see Figure 6). Themes echoed relaxation, enhanced positive affect in natural environments, gratitude and awe, and feelings of oneness with nature. The five themes are then explored further to help explain changes in participants levels of perceived stress, positive affect, and negative affect based on the mixed methods theoretical approach of this study.

Theme 1: Being Immersed in the Moment

This theme depicts the increase in awareness of moment-to-moment experience that was described by all participants. For many participants, engagement with Time on the Land involved experiencing elements of present centered awareness with sensory stimulation.

Present Centered Awareness. Present-centred awareness is a core component of the state of mindfulness (Bishop et al., 2004). Some participants described an experience whereby the richness of the information in the environment facilitated a sense of being completely absorbed in what they were doing, seeing, and feeling. Others stated explicitly that they felt more 'present minded' or 'mindful' of their experience.

Absorption in the moment and an absence of extraneous thought were frequently described, as one participant described Time on the Land as an experience that created space for "sometime not thinking of what all has gone wrong, or what will have to happen next, or how I will be able to cope with that" (Participant 44). Another participant described experiencing a "clearer and quieter mind, feeling able to cope… possibly following an hour being present and way from my weariful thoughts" (Participant 15).

Descriptions of experiencing affect that would preclude experiencing a present centred level of awareness included a participant's description of their own experience of "mindfulness, calm, happiness and more centred" (Participant 39) after attending Time on the Land. Another participant reported feeling "very calm, connected, fulfilled and grateful" (Participant 20). Moreover, one participant described present awareness as a form of distraction, as they reported feeling "distracted by being present in nature..." (Participant 41). Similarly, a couple participants described a sense of ease, the first participant's experience of ease was perceived to have occurred following attunement to stimuli within the present moment of their immediate surroundings, as they reported "being able to focus on simple pleasures like how the different

animals are." (Participant 18). The second participant described the impact of their experience as "joy and ease and living in the moment" (Participant 22).

When asked to describe what contributed to shifts in their feelings after experiencing Time on the Land, one participant spoke about experiencing less worry (reduced negative affect) when directing their attention to the moments that comprised their experience, "I would like to hold on to the feeling of bliss. Not worrying about anything but how I felt in those moments" (Participant 34).

Sensory Stimulation. The second important sub-theme reflects participants experience of sensory stimulation in nature, and how this sensory capacity supports present-centered awareness and related somatic experiences.

Some participants described experiencing sensory stimulation through reflecting on the basic human senses that were activated, and related somatic impacts of spending time in nature. One participant highlighted the benefits of the "sun being outside, the sounds and of course the animals in nature" (Participant 17). Others described aspects of the natural environment such as "being outside, fresh air..." (Participant 29), "energy in trails and comfort in leaves…" (Participant 28) and resulting relaxation by "taking a few deep breaths…" (Participant 18). Within this present-centered awareness and experiencing sensory stimulation, participants described the sounds of nature as recuperative. Overall, these finding suggests spending time in nature can be considered an intentional practice where individuals can nurture their connection to themselves by orienting to the present moment with a felt sense of safety (peace, calm, ease, resilience) (Porges & Dana, 2018).

Theme 2: A Psychological Sanctuary

This theme encompasses participant perspectives on how nature provides a psychological sanctuary in supporting mental and emotional processes. Nature was described as uniquely supportive, promoting emotional wellbeing for the participants through three main sub-themes. The three sub-themes that constitute this theme are that nature provides space for emotional processing, a sanctuary from stressors, and as a means of coping for emotional regulation.

Facilitates a Processing Space. The first important sub-theme of theme two is that nature is unique in its capacity to provide a space to process emotions or reflect on current difficulties. In a rather articulate fashion, one participant's response was a mother who spoke to the concept of attending Time on the Land in hopes of finding a new fun and interactive way to process emotions with her children to attain a sense of relief.

> I hope to connect with my children and our emotions. Be able to process our week and find comfort and fun as we do it. I find it difficult to be the steward of our children's emotions. I like to find ways to ease that burden. (Participant 41)

Sanctuary from Psychological Stressors. The second sub-theme was the perception that natural environments are relatively free from man-made interference which provided sanctuary from psychological pressures, perceived judgments, stressors of everyday life and stressors unique to the context of the COVID-19 pandemic. Immersion in natural landscapes over rural cities, specifically, meant time for introspection, distraction from stressors, a change of pace that cultivated slowness with a reduced sense of urgency, not available when immersed in the business of mundane life. For instance, one participant described "we lead a busy life and taking intentional time to have an experience at the farm together helped to decrease that feeling of 'producing'" (Participant 24), and another described it was a nice "change of pace, when I'm in town with the kids it feels so hectic" (Participant 5). Similarly, other participants reported

enjoying “a break from my busy work life” (Participant 44), “quiet time with my son with no interruptions from anyone” (Participant 14), and “love for the outdoors, keeps me away from news, current state of society and social media- same as holidays takes a weight off the mind” (Participant 59). It seemed that participants reported experiencing mental and emotional “peace from the stress of the pandemic” (Participant 15). As illustrated above, everyday life concerns and expectations are revealed to be a constraint on feelings of happiness. For this participant, nature was described as a unique space, free of cues that could evoke anxiety, as they described they “didn’t think of things wrong in my life or anxiety about what I am to do” (Participant 3). Time on the Land seemed to provide a space of mental relief and increased capacity.

Some participants described being immersed within a natural landscape was a key component of Time on the Land, in comparison to their normal daily life experiences within urban environments, as participants hoped to attain “experience of a natural environment and be outside of the urban environment. (Participant 24), and another noted “being outside at this farm was a new and fun environment compared to being at home” (Participant 5). In considering the important context of the circumstances of the COVID-19 pandemic, social distancing policies were crucial for health and safety. However, these lockdown measures seemed to elevate the risk for social isolation and loneliness (National Academies of Sciences, Engineering, and Medicine, 2020). It seems that having the opportunity to enter a new environment, that was a safe outdoor activity, created a sense of optimism in reducing stress reactivity, instead of continuing to remain occupied within the same indoor environment.

Engagement with Parasympathetic Nervous System. This sub-theme describes what participants hoped to attain, and what they perceived they successfully attained after attending Time on the Land. Many participants described seeking “stress relief” before attending Time on

the Land and reported experiencing “relaxation” afterwards. The parasympathetic nervous system predominates in quiet “rest and digest” conditions while the sympathetic nervous system drives the “fight or flight” response in stressful situations (Tindle & Tadi, 2020). The main purpose of the parasympathetic nervous system is to regulate bodily functions and relieve physiological stress from the body (Tindle & Tadi, 2020). Considering this, an interpretation to summarize these responses is that it seems reasonable to suggest participants were seeking engagement with their parasympathetic nervous system while attending Time on the Land. Therefore, this subtheme is then suggested as a mechanism of change in participants reported reduced levels of perceived stress and negative affect. According to the daily stress-affect relationship, this association suggests an experience that supports emotional wellbeing (Blaxton et al., 2020; Bolger et al., 1989; Whitehead, 2021).

Theme 3: A Greater Sense of Purpose

This theme seeks to explain participants descriptions of Time on the Land as an experience that reduced stress through positive social experiences that fostered deeper social connections, a sense of togetherness, and ultimately, a greater sense of purpose. Participants described a greater sense of purpose that comprised a synergy of three key subthemes: increasing social cohesion through dedicated time spent with loved ones and positive interpersonal interactions, witnessing momentous experiences of children, and venturing into novel experiences.

Increased Sense of Belonging. A sense of belonging refers to “the way in which people feel accepted, respected, included and supported by a community in which they are involved” (Berryman & Eley, 2019). Many participants described their experience with Time on the Land as an opportunity to fulfill their desire to re-connect with their loved ones through meaningful

quality time (e.g., family, partner/spouse, friends). For example, a mother described looking forward to "quality time with my son" (Participant 14), other participants spoke to feeling overjoyed to experience quality time with family and friends (Participant 32, 33), and another noted described their momentous experience as spending "quality time with my partner" (Participant 44). It seems that by spending quality time with loved ones, participants experienced an increase sense of human connection and belonging.

Likewise, another participant described feeling engaged following positive interpersonal interactions with the Dreamcatcher Nature Assisted Therapy staff as they described "very friendly and calm staff were positive and pleasant, which kept me in the moment" (Participant 15). The accumulation of attaining positive social experiences with loved ones and even with strangers, seemed to create a strengthened sense of belonging explained through an enhanced sense of solidarity between participants (family members, friends), and the community of those around them during their experience at Time on the Land.

Parents Witnessing their Children's Transformational Experiences in Nature. Many participants described feeling a sense of fulfillment in observing and appreciating children's experience of Time on the Land. Particularly, examples of responses comprising this subtheme involved participants witnessing children's fascination with the animals and world around them. Participants also reported feeling impacted observing these experiences of children, which cultivated increased positive affect (i.e., happiness, inspiration, and joy) and an enhanced sense of belonging. A couple mothers described Time on the Land as a positive experience with affective benefits from "seeing my daughter have such a good time. (Participant 29) and "watching my daughter have courage and respect in approaching and feeding the animals was also peace-generating for me" (Participant 15). Many participants described "the kids'

interactions with the animals were priceless" (Participant 47), noting it was impactful to be "seeing reactions of children to farm surroundings" (Participant 16), and "seeing and hearing children laugh" (Participant 28), and noticing "how much my kids enjoyed feeding the animals" (Participant 46). One participant described feeling overjoyed (increased positive affect) in observing her daughter's interactions with the animals serve as a medium for hands on learning and character development:

> I will hold on to the memory of my 3-year old's excitement and witnessing her growing personality and characteristics, such as making sure all the goats who wanted a treat were able to have one. I learned about how she is understanding 'fairness'. (Participant 24)

Valued Experiences. The third important subtheme identifies participants descriptions of yearning to seek and willfully embrace new experiences to create new memories, and others who reflected on former meaningful memories. One participant reported "looking forward for a fun filled, relaxing family experience and also have never been to a farm so it's a first lifetime experience for me" (Participant 4). Some described feeling excited about experiencing "something new" (Participant 1). Another participant reported feeling inspired as they described a host of meaningful new experiences for their child, "today was the first time my 5-month-old child saw and heard horses, chickens, and goats, so I will hold on to knowing it was a 'first' for him" (Participant 24).

On the other hand, some participants described looking forward to seeking out a new adventure. One participant spoke to feeling excited about having "quality time with family, and an adventure to have my daughter see and learn something new" (Participant 7). Similarly, another participant described looking forward to "having a fun time with family and enjoying the adventure!" (Participant 31).

Others described wanting to hold on to newly developed memories and reminiscing on former memories. A mother described a meaningful moment of her experience of Time on the Land as a new family memory, which she reported "I will also hold memories of being with my partner and witnessing his joy in time spent with his children and myself" (Participant 24). A few participants described feeling an increase in positive affect in anticipating their experience of Time on the Land while reflecting on their own childhood memories. For example, one participant described feeling "calmness, inspiration, happiness, and a feeling of joy to be in the country with animals – as I was raised on a farm" (Participant 25). Similarly, another participant reported what helped to create changes in how they were feeling was their experience of Time on the Land that allowed them to reconnect with "revisiting my youth" (Participant 16). Participants described Time on the Land as a unique experience that facilitated a greater sense of purpose through enhancing social cohesion to loved ones, witnessing transformative moments of children, forming new memories, and reminiscing on former memories.

Theme 4: Gained Broader Perspective

After attending Time on the Land, this theme describes how participants were impacted by the enormity, intricacy, and interconnectedness of the natural world, which prompted them to realize their place in the larger ecological construct. Participants responses described they 'gained broader perspective' through three subthemes: oneness, facilitation of a sense of awe and gratitude, and resultant changes in perspective.

Oneness. The first sub-theme reflects the idea that immersion in nature facilitates an experience of being part of a greater whole and feeling a sense of oneness. Some participants used the term 'connected' to describe this experience, such as "I feel calmer and more connected to the wider world, especially nature and the animals" (Participant 22). Another participant

reported “spending time outside, visiting with the animals and feeling connected to them...” (Participant 44). Other participants described “the calm of the forest path, the joy of being with animals, the family unity we had” (Participant 18), an experience of a formation of unity through interactions with nature, animals, and loved ones.

Elicits Awe and Gratitude. Participants described the sense of gratitude that comes from immersion in nature and the resulting affective benefits. A participant described the impact of their experience, writing “my heart is happy, I feel appreciation for this land, the animals, the planets, trees, sounds peaceful it has made my day, and I will share with others my experience” (Participant 17). Similarly, another participant spoke to the benefits of “appreciating the healing properties of nature” (Participant 41).

The processes of nature that prompted such gratitude involved this idea of inviting intentional slowness, to enjoy and appreciate the beauty of life through experiencing nature in the present. One participant described this: “to enjoy nature and all it has to offer and not take it for granted, to take time to smell the roses” (Participant 17). Another participant described experiencing awe, with emphasis on the benefits of spending time in nature during the stressful and unprecedented time of COVID-19, as they described “the awe of nature, especially during these trying times” (Participant 43).

Invites a Change in Perspective. Participants reported that becoming aware of the immensity and interconnectedness of the natural world and broader universe facilitated changes in perspective resulting in a reduced worry about problems that now seemed trivial. After Time on the Land, one participant described feeling “relaxed, connected with the basics & nature, reminded of what is truly important in life” (Participant 19), and another commented on a realization “that trivial things don’t matter I can choose happiness” (Participant 28).

Other participants described a shift in perspective regarding an enhanced sense of confidence in their own perceived capacity to navigate daily stressors, which seemingly resulted in enhanced resilience in approaching personal life adversities. Examples of this included: “I am feeling uplifted and feel like I finally felt some joy. I got the boost I needed to handle the rest of my day” (Participant 36), and “I feel content and ready to focus on the rest of my day” (Participant 40). Similarly, another participant commented that they felt “calmer, and able to have perspective for life - on what can be managed and overcome” (Participant 18).

Participants seemed to re-evaluate aspects of their lives while attending Time on the Land, which created opportunity for reflection as they gained perspective on their concerns. This kind of rethinking of everyday experience in relation to the natural world was identified as a pathway through which participants experienced enhanced emotional wellbeing.

Theme 5: Human-Nature Relationship

Many participants described the value of their interactions with the various animals at Dreamcatcher Nature Assisted Therapy. Overall, there were two sub themes that involved an exploration of affective benefits following interactions with the animals, and valuable perceptions of nature as a stimulus for learning.

Affective Benefits from Human-Animal Interactions. This sub-theme was developed in accordance with similar themes amongst several participant responses. Many participants described feeling enlightened, calmer, and happier after interacting with the animals during Time on the Land. For example, one participant described “I love the calm energy that comes from petting an animal” (Participant 1), another identified feeling drawn to “the calming nature of the horses and their wisdom” (Participant 22), and one other participant reported their mood was enhanced following “interaction with horses and their calming energy” (Participant 28).

Likewise, one participant described an element of surprise in reflecting on the impacts of connecting with the horse (i.e., Zeus), donkey (i.e., Moonshine), goats, while with family:

> Spending time with Zeus really was special. He was so funny and also so sweet. Moonshine was also such a sweetheart! I never knew petting a donkey would be so calming. The goats made us all laugh and just spending time with my kids and my husband, having everyone laugh and enjoy the animals in the fresh air was wonderful. (Participant 45)

Nature as Teacher. Within the second sub-theme, participants reported experiences seemed to posit nature as a great source of wisdom that carries important life lessons for those who want to learn. Within the preceding theme that discussed the role of witnessing children experience Time on the Land, the quoted response of participant 24 described the impacts of seeing her daughter learn about 'fairness' through her interactions with the goats. Another participant described feeling excited for their children to experience learning within an outdoor environment. Overall, many of the participants described their interactions with the animals at Dreamcatcher Nature Assisted Therapy had transformative effects on enhancing affect, decreasing stress, and in facilitating learning.

The Mixed Methods Findings

Qualitative Findings that Inform Interpretation of Quantitative Results

In accordance with research question four, the Convergence Model: Triangulation Design mixed methods design was chosen for the current study to expand upon quantitative results with qualitative data (Creswell & Plano Clark, 2007). Specific aspects of the qualitative thematic analysis were particularly helpful in informing the interpretation of the quantitative results. The

following section identifies and elaborates on sub-themes that were perceived as meaningful in reducing stress, increasing positive affect, and reducing negative affect within participants.

Reduced Perceived Stress. There were three key perceived mechanisms inherent with participants subjective experiences of Time on the Land whereby participants reported experiencing stress relief: (1) sanctuary from psychological stressors [subtheme of Theme 2], (2) parasympathetic engagement [subtheme of Theme 2], and (3) increased social cohesion [subtheme of Theme 3].

Many participants reported the benefits of spending time within the natural environment of Dreamcatcher Nature Assisted Therapy was particularly relaxing compared to the urban environments they inhabit daily. Being within the natural environment, and away from urban, man-made environments, seemed to provide a sanctuary from psychological stressors by which participants could experience freedom from the urgency of external demands and expectations. For instance, participants described feeling relief from "not having to watch the time" (Participant 18), and "taking intentional time to have an experience at the farm together helped to decrease that feeling of 'producing'" (Participant 24).

Similarly, participants responses that described seeking and experiencing stress relief was interpreted as a result of parasympathetic engagement, related to Theme 2, which increased feelings of relaxation, and reduced experiences of negative affect. Furthermore, considering the time at which this study was conducted, many participants described experiencing a sense of pause from the unprecedented stressors that many adults were faced with by the COVID-19 pandemic. Amongst many participants, one participant described they felt "wound up and overwhelmed by the current state of the world" (Participant 18). After attending Time on the Land, this participant described feeling positively impacted by "the calm of the forest path, the

joy of being with animals, and the family unity we had" (Participant 18). From this it seemed that not only did the natural environment and animals provide a sense of stress relief, but also the time spent with loved ones.

Related to this idea, the second perceived mechanism whereby participants reported experiencing reduced stress was through experiencing uninterrupted quality time with family, and friends. Discussed within Theme 3, this unique experience in nature facilitated opportunity to re-connect with loved ones which seemed to reduce stress through increased social cohesion. Several participants described feeling appreciative of the "quality time" (Participant 7, 14, 32, 22, 44) they were able to spend with the people most important to them during their Time on the Land experience, which in turn seemed to cultivate a greater sense of purpose.

Increased Positive Affect & Decreased Negative Affect. Likewise, participants reported many perceived mechanisms by which positive affect increased, and negative affect decreased. The four key aspects of subthemes from thematic analysis that highlight a perceived pathway by which these changes occurred include (1) present centered awareness [Theme 1], (2) sense of belonging [Theme 3], (3) positive emotional impacts from human-animal interactions [Theme 4], and (4) gaining a broader perspective [Theme 5].

Firstly, while spending time in nature during Time on the Land participants reported experiencing present-centered awareness which allowed them to fully connect and orient to their immediate environment. For many this was transformative in increasing positive emotions such as joy. To this effect, one participant commented "I want to hold onto the joy I attained from the experience, I want to hold on to the lightness I felt" (Participant 36). Others reported they felt at peace from being "distracted by being present in nature" (Participant 41), and a sense of ease with "being able to focus on simple pleasures like how the different animals are" (Participant

18). Additionally, absorption in the moment and absence of mental noise was frequently described. For instance, a participant reported experiencing a "clearer and quieter mind, possibly following an hour being present and away from my weariful thoughts' (Participant 15) which seemed to reduce experiences of rumination and negative affect. Overall, participants orienting to the here-and-now seemed to create important shifts towards cognitive and affective benefits.

Under Theme 3, participants described increased feelings of joy, fulfillment, peace, and pride as they experienced an increased sense of belonging when observing their children's experience of Time on the Land. For example, a mother described "being at the farm and watching the pure joy and reactions of my children, together with my partner, filled my heart with happiness" (Participant 24). Many other participants described feeling grateful for "the ability to connect with my kids, see them with the animals, and have fun" (Participant 43), and a mother described seeing her son and feeling "joy at watching him enjoy his day" (Participant 14). Feelings of awe and inspiration also seemed to evolve as a participant described "seeing my niece and nephew were very apprehensive of the new environment and creatures they have only seen from a far and seeing them overcome their fear of being close to the animals was a great feeling" (Participant 40). Others seemed to also observe children's experience as they described feeling impacted by "seeing and hearing children laughter" (Participant 28). In sum, it seemed that observing children experience time in nature through Time on the Land was meaningful in increasing positive emotions.

Stemming from experiences unique to Time on the Land, participants also reported increased feelings of calm, connection, and stillness after interacting with the animals at Dreamcatcher Nature Assisted Therapy. This is demonstrated in many of the participants responses. For instance, a participant described the emotional resonance after spending time with

the animals, “the animals give off a very calm demeanour and I feel like that transferred over to me” (Participant 34), another noted “interacting and connecting with the animals just really soothes me and brings me into the present” (Participant 20), a different participant reported feeling “in a better mood after having a lot of fun interacting with the animals” (Participant 21) and a participant commented “I love the calm energy that comes from petting an animal” (Participant 1). Overall, several participants highlighted the emotional benefits of human-animal interactions, and this was also represented within the following response:

> I felt impacted by being around the animals that were happy to see me (and the food I had), and the calming nature of the horses and their wisdom. The animals reminded me of the basics in life and to live in the moment. (Participant 22).

Lastly, participants reported increased positive emotions of awe, gratitude, and fulfillment inherent within Theme 5 as they reported gaining perspective following time spent in nature with Time on the Land. A participant described “I feel calmer and more connected to the wider world” (Participant 22), others reported increased feelings of hope related to changed perspectives of experiencing increased confidence in navigating stressors after attending Time on the Land, as participants reported feeling “calmer, able to have perspective for life and what can be managed and overcome” (Participant 18), and the benefits of experiencing “the awe of nature, especially during these trying times” (Participant 43). Therefore, it seems that spending time in nature elicited a range of positive emotions in participants which supported their emotional wellbeing.

Practical Significance

Sullivan (2012) states that in reporting and interpreting studies, both the effect size and statistical significance are essential results to be reported. While statistical significance relates to

whether an effect exists, practical significance refers to the magnitude of the effect and seeks to determine whether the effect is big enough to be meaningful in the real world (Peeters, 2016). In other words, is it large enough to care about? Statistical significance is denoted by p-values, whereas practical significance is represented by effect sizes (Rosen & DeMaria, 2012). This metric quantifies the extent to which a sample diverges from expectations, which can provide important information about the results of a study and are recommended for inclusion in addition to statistical significance (Kelley & Preacher, 2012; Wilkinson, 1999; Vacha-Haase et al., 2000).

Effect Size of PSS-10

The strength of the statistically significant difference in participants perceived stress after attending Time on the Land is supported by $d = .619$ (see Table 4). According to Sawilowsky (2009), this value suggests a medium to large effect size.

Effect Sizes of PANAS

Similarly, practical significance of affect was assessed through the differences of participants scores on the PANAS (Watson et al., 1988), before and after attending Time on the Land. Parametric analyses of positive affect indicated a large to very large effect size as supported by $d = 1.102$ (see Table 4) (Sawilowsky, 2009). Specific to negative affect, non-parametric statistical analyses of indicated an effect size of $r = 0.49$, which according to Cohen (1988) is characterized as a large effect size (see Table 4).

CHAPTER 5: Discussion

The purpose of this study was to explore the effect of time spent in nature during the COVID-19 pandemic (July – November 2021) on adults' emotional wellbeing through assessing changes in perceptions of perceived stress and affect after attending a one-hour nature-based therapeutic recreation program called Time on the Land. This study had four research questions

which leveraged the mixed method of enquiry by providing rich and meaningful data to better understand participants experiences of nature through Time on the Land and the opportunity to explore their experience in relation to pre-existing theories while also discovering potential new theoretical pathways. Overall, the hypothesis was supported: participants reported lower levels of perceived stress and negative affect, and higher levels of positive affect after attending Time on the Land. In effect, this answers research questions one and two. Quantitative results showed significant differences in perceived stress, negative affect, and positive affect that is consistent with existing bodies of literature which highlights the affective benefits of time spent in nature on wellbeing. Participants subjective experiences were captured through qualitative means to identify what aspects of Time on the Land were most meaningful which were then translated into five salient themes that answered research question three: (1) being immersed in the moment, (2) a psychological sanctuary, (3) a greater sense of purpose, (4) gained broader perspective, (5) human-nature relationship. In answering the final research question, this discussion then extends to explain how these themes may explain the mechanisms of change within stress and affect that were conducive in supporting participants emotional wellbeing.

Previous research on the positive impact of nature on human wellbeing has been guided by many theories: biophilia hypothesis (Chang et al., 2020; Grinde & Patil, 2009; Wilson, 1984), attention restoration theory (Kaplan & Kaplan, 1989; Kaplan, 1995; Pearson & Craig, 2014), stress reduction theory (Barton & Pretty, 2010; Hunter et al., 2019), nature connection models (Howell et al., 2011; Mayer & Frantz, 2004; Mayer et al., 2009), and mindfulness (Howell et al., 2011). Exploration of these theories together with qualitative themes suggest that, to an extent, these traditional theories combined help conceptualize some of the effects of nature. Therefore, a person’s experience of emotional wellbeing from time spent nature is multidimensional and may

be understood by factors described in more than one of those theories as well as factors not conceptualized by these traditional theories. This discussion interprets the findings of the current study in the following four sections; (1) a multi-faceted understanding of emotional wellbeing from time spent in nature, (2) unanticipated findings, (3) value of effect sizes, and (4) implications for mental health professionals, and strategies to improve the human-nature relationship, (5) recommendations for future research, and (5) strengths and limitations.

A Multifaceted Understanding of Emotional Wellbeing from Time Spent in Nature

Traditional theories vary considerably in how they relate with the current findings with no one model reflecting all themes. Exploration of the extant theory literature together with the current findings, suggests that, to an extent, these traditional theories are not so much competing theories, but different dimensions that, when combined, help conceptualize some of the effects of nature and the value of the human-nature relationship. However, there are aspects of participants responses that are not presently recognized by the traditional theories. Therefore, an individual's experience of emotional wellbeing from nature is multi-dimensional and may be understood by factors from more than one theory, as well as factors not conceptualized by these traditional theories.

The traditional theories vary considerably in how they relate with the current findings with no single model reflecting all themes. Indeed, the current findings of salient themes highlight the role of the theoretical frameworks of this study. Theme 3 explores how nature can meet human needs for social connection and belonging, and theme 5 explores the benefits of the human-nature relationship corresponding with the Biophilia hypothesis.

An integration of four other traditional theories helps explain the benefits of spending time in nature. Attention restoration theory (ART) indicates that characteristics of a natural

environment help to replenish and recover directed capacity to focus and concentrate (Kaplan & Kaplan, 1989; Kaplan, 1995), and these characteristics related to themes 1, 2, and 4. Stress reduction theory (SRT) suggests humans have innate preferences for natural environments, as they promote recovery from stress (Ulrich, 1991), which relates to descriptions of participants experience of Time on the Land encompassed within theme 2. Nature connection theory advocates for experiences of oneness and meaning in life (Mayer et al., 2009), which relates to themes 4 and 5. The theory of mindfulness harnesses present-centered awareness coupled with sensory stimulation, which corresponds with theme 1. However, what has yet to be explored within this field of research is an exploration of the psychosomatic aspects of nature-based experiences demonstrated in theme 2. This somatic lens of conceptualizing the effect of time spent in nature through Time on the Land is addressed within the following section.

Elements in Themes Captured in Traditional Theoretical Models

Maslow's Hierarchy of Needs and the Biophilia Hypothesis. The findings of this study are supportive of the biophilia hypothesis and are suggestive of how this innate tendency to seek connections with nature and other forms of life can serve as a pathway to meet basic human needs that are conducive for thriving (Maslow, 1943; Wilson, 1984). However, before continuing the discussion of themes, an important aspect to note is the largely unknown Blackfoot influence (Kapisi et al., 2022) on Maslow's theory of human motivation, the hierarchy of needs (Maslow, 1943).

Many people believe Maslow's (1943) hierarchy of needs is universal, but centuries of Indigenous knowledge, wisdom, and Maslow's interactions with the Blackfoot Nation challenge this notion (Wahba & Bridwell, 1976; Kapisi et al., 2022). The Blackfoot Nation's concept of human motivation emphasizes a community approach to wellbeing, contrary to Maslow's

individualistic model. As such, the Blackfoot model places emphasis on the importance of community and interdependence in achieving self-actualization – in stark to Maslow's linear, hierarchical approach (Ryan & Deci, 2000). Given the profound influence of the Blackfoot Nation on Maslow's work, it is reasonable to expect credit would be given to Maslow's original thesis. However, the Blackfoot Nation's contributions have remained largely unacknowledged (Kapisi et al., 2022). It then becomes important to recognize that Maslow's model is inherently Eurocentric and shaped by capitalist ideologies that promote scarcity, materialism, and consumption (Wahba & Bridwell, 1976; Kapisi et al., 2022). This raises ethical questions about the appropriation of Indigenous knowledge without proper attribution (Battiste & Henderson, 2000). The Blackfoot Nation's model contributes to a more holistic understanding of wellbeing integrating physical, emotional, social, and spiritual aspects, rather than simply striving for individual success. In relation to the current study, there are findings which address individualistic pathways to support emotional wellbeing from time spent in nature (e.g., theme 1: being immersed in the moment, theme 2: a psychological sanctuary), and simultaneously there are themes that emphasize the value of connection through community in supporting emotional wellbeing (e.g., theme 3: a greater sense of purpose). Therefore, Maslow's (1943) hierarchy of needs may not be compatible with some of the findings, other theories noted, and interpretations that focus on individualism.

Many participants described Time on the Land as a transformative experience that enhanced their connection to living things (i.e., animals, people, nature), which supports previously documented findings about the role of the biophilia hypothesis and evidence base of the psychological benefits of time spent in nature (Wilson, 1984). Previous and current research has suggested that people have a universal appreciation for the appearance of the natural world,

with its rich diversity of shapes, colours, and life (Chang et al., 2020). This was representative of the many participants subjective experiences as they described actively engaging with nature through the senses, perceiving beauty, and in finding meaning from experiences in nature.

Furthermore, the qualitative findings of this study demonstrated the intrinsic appeal, and emotional reactions evoked directly by the natural scene and/or animal(s). Participants comments generally expressed the sentiment that human-built environments were not as emotionally evocative or as pleasant as natural environments were. Therefore, supporting the findings that are consistent with the biophilia hypothesis (Wilson, 1984), which posits that people are inherently drawn to nature and are inclined to respond with emotional intensity to the greater-than-human natural world.

Participants also provided descriptions of emotions evoked through the interactions they had with the animals located at Dreamcatcher Nature Assisted Therapy. Similar to findings of previous research, time spent with animals provided participants with a sense of calmness, reduced anxiety, and promoted feelings of safety. Most of the research exploring the influence of human-animal interactions during the COVID-19 pandemic focused on companion animal owners, or in other words, pet ownership (Bowen et al., 2020; Ratschen et al., 2020): whereas the focus of this study was on non-companion animals (i.e., wildlife, unfamiliar domestic animals). Further implications show that interactions with non-companion animals had a positive impact on emotional wellbeing. Participants often reported a sense of awe and privilege when seeing animals within nature. Some participants even went as far as to describe that seeing an animal in their natural environment provided opportunities for distraction from their inner feelings of distress due to the pandemic. Several participants noted that interactions with the non-companion animals provided a source of companionship and ameliorated feelings of loneliness. Previous

qualitative evidence has identified feelings of normalcy and positive distraction as a possible mechanism for the benefits of human-animal interactions. For instance, research on animal-assisted interventions has suggested that a positive distraction is a major benefit and is more than just emotional support, as animals can distract from pain, stress, and other difficulties (Coakley & Mahoney, 2009; Pedersen et al., 2012). Thus, the current findings not only provide further validation of the biophilia hypothesis but also extend these mechanisms of benefit to human-animal interactions outside of the parameters of a therapy session and with non-companion animals.

In general, participants descriptions of their interactions with nature were representative of the key findings of the biophilia hypothesis (Wilson, 1984), and demonstrated how these experiences helped to meet the basic human needs of belonging and having a sense of purpose (Fiske, 2004; Maslow, 1943; Myers, 2000). Many participants described feeling a sense of belonging as they reflected on their connection to loved ones, unfamiliar others, and the greater world around them. Experiencing enhanced social connection and solidarity would arguably be especially important under the unique circumstances of social distancing policies during the COVID-19 pandemic. Therefore, Time on the Land was described as an opportunity to strengthen social connection, during the period of the COVID-19 pandemic that unfortunately fostered social disconnection (Parent et al., 2021).

Furthermore, many participants reported experiencing positive emotions from reflecting on how their interactions with the animals served as a function of meeting the animals' basic needs. For instance, one participant described feeling happy from the "simplicity of meeting the base needs/wants of animals" (Participant 3), and another described their "connection to the animals and meeting their basic requirements (food)" (Participant 31). In effect, caring for the

animals through activities such as feeding them, seemed to enhance participants sense of purpose and self-worth. Therefore, this finding highlights that affective benefits were accrued from active involvement with nature, that not only met the primary needs of humans, but also that of animals.

Attention Restoration Theory. Similar to ART's concept of being away, theme 2, a psychological sanctuary, encompasses participants expressions of finding refuge from the over stimulation and stress associated with their day-to-day lives and provoked by the COVID-19 pandemic. However, a point of difference is that participants in this study indicated that nature was unique in its capacity to provide an emotional sanctuary, not solely a cognitively restorative experience. ART can also be applied to theme 1 as participants descriptions of their subjective experience of Time on the Land reflected two cognitive states of attention, along the way to restoration. Kaplan (1995) identifies the first stage of cognitive restoration is characterized by a clearing of the mind. Related to this stage participants expressed their thoughts, concerns, worries, and residual information that was demanding their attention, passed, and faded naturally as they immersed themselves in nature. Furthermore, ART identifies soft fascination as aspects of the environment that capture attention effortlessly. Soft fascination occurs in response to gentle stimuli which are moderate in intensity, is common in natural settings (e.g., hearing wind in the trees, viewing a sunset), and best promotes attention restoration as it allows one to think freely (Herzog et al., 1997). Related to theme 4, ART's concept of compatibility identifies that a restorative environment is well-suited to individuals desire to be exposed to, and appreciate the environment (Herzog et al., 1997; Kaplan, 1995). Participants engaged in activities (interactions with the animals, exploration of the rural farmland, time spent with family and friends) that aligned with their expressed desires and interests in attending Time on the Land. From this,

participants described a sense of awe and gratitude for nature which created opportunities for individuals to withdraw their directed attention and gain restoration through engagement with the environment. These findings suggest that the proposed three components of ART- being away, soft fascination, and compatibility- are likely to enhance and contribute to attentional recovery, and their combined effects was conducive in supporting participants emotional wellbeing.

Stress Reduction Theory. Participants reported effects of Time on the Land that comprise theme 2 can be understood through two traditional theories. While ART seeks to explain the cognitive processes that restore capacity for attention while in natural settings, stress reduction theory (SRT) seeks to explain the emotional and physiological reactions to natural spaces (Ulrich, 1991). In general, SRT states that exposure to natural environments reduces physiological stress while man-made environments induce physiological stress. Related to this finding, many participants reported feeling positively impacted from the change of environment. For example, one participant described Time on the Land as a positive "change of pace, when I'm in town with the kids it feels so hectic" (Participant 5), while another participant reported "the peace, nature, and simplicity of nature is calming" (Participant 21). Consistent with SRT, participants reported that being in an unthreatening natural environment or viewing natural elements activates a positive affective response, and a reduction in physiological symptoms of stress (Ulrich, 1991). Therefore, integrating ART and SRT aids in understanding participants reported cognitive and affective benefits following Time on the Land.

Nature Connectedness. An accumulation of these elements seemed to create a close relationship between participants and their natural surroundings during Time on the Land. This ideal relationship sheds light on the concept of *nature connectedness* which refers to the way humans relate to and experience nature (Mayer et al., 2009). Research suggests that the quality of

humans' relationship with nature is part of the reason for its positive impact on wellbeing (Mayer et al., 2009; Seymour, 2016). Studies have shown that nature connectedness tends to be higher in people who have previous (childhood) experiences of nature (Hinds & Sparks, 2008) and in those who experience nature more frequently. Nature connectedness is also associated with lower levels of poor mental health, in particular, lower depression and anxiety levels.

Mindfulness. Theme 1, being immersed in the moment, was a major theme in participants responses. It describes a state of awareness, observation, and attention to the present moment as it continually unfolds (Dreyfus, 2011). An important factor to participants was nature's presentation of different and distinct experiences that supported a sense of present-centered awareness. Mindfulness is the skill and practice of focusing attention of the present moment without judgment (Bishop et al., 2004; Brown & Ryan, 2003). Western conceptualizations of mindfulness identify active processes, such as meditation and yoga (Lutz et al., 2015; Schmalzl et al., 2015), as active processes that foster and enable individuals to get into a mindful state. Perhaps different to these practices, findings from this study suggest that time spent in nature invites or directs attention on the physical quality of being. Salient within theme 1 were participants reports of an embodied experience. Participants described being more in their body and less in their mind, aware of the concrete and immediate, through nature's striking characteristics. These findings suggest that nature may support a mental state grounded in the present moment due to its rich, striking, and complete sensory stimulation that evokes present-centered awareness with a host of affective benefits.

Elements in Themes Not Captured in Traditional Theoretical Models

Psychosomatic Lens of Understanding Effects of Time Spent in Nature. Two important aspects from the findings in this study were not well captured in any one of the

current, popular theoretical paradigms. In theme 2, the subtheme that describes stress relief through the purported process of engagement with the parasympathetic nervous system during Time on the Land positively impacted participants emotional wellbeing. This sub-theme reflects how time spent in nature provided opportunity for participants to orient to their surroundings, and settle their nervous system, which then allowed for enhanced social engagement with living things (people, animals, nature), and meaningful experiences of felt sensations of safety. Interestingly, this is a theoretical assumption proposed within Stephen Porge's (1995, 2011) polyvagal theory, a theory that has yet to be explored within the context of benefits of time spent in nature and human wellbeing. Polyvagal theory proposes that the nervous system is crucial for survival by mobilizing fight-flight-freeze behavioural responses in reaction to perceived danger, and in returning to a regulated state after connecting to safety and absence of threat through the social engagement system (Porges, 1995, 2011). Somatic experiencing is a therapeutic intervention developed by Peter Levine that applies polyvagal theory to treat trauma through identifying internal and external resources which are then utilized as tools to shift individuals from primitive responses to social engagement (Levine, 1977, 1997, 2010; Vagnini et al., 2023). Under this theoretical assumption, nature could be considered as an external resource that creates capacity for individuals to experience enhanced embodied sensations of safety, and result in positive physiological and affective shifts. The argument here is that, like the contextualization of the findings of this study through traditional theories of ART, mindfulness, Maslow's hierarchy of needs, nature connectedness, and SRT, participants descriptions of Time on the Land also have the potential to be conceptualized through the lens of polyvagal theory. However, further research is needed to better understand and develop insight into the role of polyvagal theory in seeking to explain the benefits of time spent in nature on wellbeing.

Potential New Indirect Mechanism of Affective Benefits from Time Spent in Nature. Furthermore, the findings of this study represented in theme 3, show there is a critical gap in the literature that would greatly benefit from studying how affective benefits experienced by parents observing their children interacting in nature results in affective benefits. In conjunction, it should be highlighted that children had transformative learning experiences when interacting with nature that numerous participants reported feeling positively impacted by. For example, a participant reported I will hold on to the memory of my 3-year old's excitement and witnessing her growing personality and characteristics, such as making sure all the goats who wanted a treat was able to have one. I learned about how she is understanding "fairness" (Participant 24). Currently, there are existing bodies of research that seeks to identify the benefits of using nature as a stimulus for learning through the pedagogical concept of nature-based learning experiences (Jordan & Chawla, 2019; Kuo et al., 2019; Norwood et al., 2021). However, after a review of the literature there is no research that highlights the role of parents witnessing their childrens experiences in nature as an indirect mechanism that may mediate the relationship between nature exposure and accrued affective benefits.

Unanticipated Findings

There were two findings discovered within theme 5 (human-nature relationship) that offered nuanced and unanticipated findings: (1) a unique contextualization of the human-nature relationship, and (2) the role of nature as teacher. These findings are discussed in greater detail below.

Firstly, current bodies of research exploring the human-nature relationship tend to highlight the benefits of human-nature relationship through an ecological lens as a framework to understand motivations behind supporting and enacting sustainability efforts (Ives et al., 2018;

Kim et al., 2023). Whereas the results of this study highlight the role of the relationship between humans and nature in supporting emotional wellbeing.

Secondly, an interesting unanticipated finding was participants descriptions of an outcome resulting from human-animal interactions. Specifically, observations of how nature experiences promoted learning within children. This finding is supported by former research that has noted the developmental and psychological benefits of children playing in nature. For instance, Nicholson (1971) seeks to explain nature through the theory of 'loose parts', that posits nature as an accumulation of what it is comprised of (dirt, sticks, water, bugs, animals), promotes child development by encouraging creative, self-direct play. In exploring applications of Nicholson's (1971) theory further, Kuo et al. (2019) describes that nature appears to provide a calm, quiet, safe context for learning where a combination of loose parts (Nicholson, 1971), and autonomy fosters developmentally beneficial forms of play. Kuo et al. (2019) highlights that nature forms a cooperative learning context that often cultivates learning outcomes such as academic achievement, personal development, and stewardship through a stronger connection to nature. Considering this information highlights how nature-based experiences can support mental processes in not only improving mood, but in acquiring knowledge.

Value of Effect Sizes

Not only were there statistically significant results in participants reported perceptions of reduced negative affect, increased positive affect, and reduced perceived stress, but Time on the Land seemed to result in large effect sizes worth mentioning. After attending Time on the Land, results indicated a 12.5% increase of participants scoring in the low perceived stress category of PSS-10 scoring (see Appendix C) from baseline to post-session, which is not an insignificant change. Further, the effect size from the PSS-10 (d = 0.619) indicates a medium-large effect size

(Sawilowsky, 2009), and the large effect sizes of affect resulting from the PANAS (Cohen et al., 1983; Watson et al., 1988), positive affect (d = 1.102) and negative affect (r = 0.49), indicate these findings have practical significance. In other words, Time on the Land was effective in creating change, with effect sizes of a large magnitude, that is meaningful in terms of supporting participants emotional wellbeing.

Comparison of Current Findings to Cognitive Behavioural Therapy

Cognitive behavioural therapy (CBT) is a psychotherapeutic approach that is commonly listed within the top 5 evidence-based treatments for mental disorders, with bodies of literature suggesting strong research support over the past couple of decades (American Psychiatric Association, 2013; Butler et al., 1991; Hofmann et al., 2012; Ladouceur et al., 2000; Mitte, 2005). In a review of CBT efficacy studies, Geschwind et al. (2019) sought to compare treatment outcomes between traditional CBT (T-CBT) to positive CBT (P-CBT) in a within-subjects sample of participants experiencing major depressive disorder. To monitor progress in participants across sessions, depressive symptoms, positive and negative affect (measured by PANAS), and other positive mental health indices were measured (e.g., optimism, overall happiness) (Geschwind et al., 2019). Forty-nine participants received 16 weekly sessions of CBT, which were organized in to two blocks of eight sessions (8 session T-CBT followed by 8 session P-CBT, and vice versa) with randomized starting order (Geschwind et al., 2019). Results indicated that negative affect was significantly lower during P-CBT than during T-CBT (d = 1.00), while average differences for positive affect were in favour of P-CBT (d = 1.23) but not statistically significant (Geschwind et al., 2019).

While Geschwind et al. (2019) observed very large effect sizes across 16 weekly sessions of CBT, the results of the current study indicated large to very large effect sizes for positive

affect (d = 1.102), and negative affect (r = 0.49) following 1-hour of Time on the Land. In comparison, similar effect sizes were observed across both studies. However, the current study highlights that a similar effect size was obtained in a shorter duration period of one-hour of Time on the Land, compared to Geschwind et al. (2019) 16-week period of CBT treatment. Therefore, this study highlights that time spent in nature may be a faster pathway in which significant changes in affect can be observed. In support of this, former research has suggested that the benefits of nature exposure are observed within as little as 5-10 minutes, which highlights the benefits of shorter duration than traditional 16-week CBT models (Hunter et al., 2019). These findings suggest that a short amount of time spent in nature may prevent and mitigate psychological harm faster than traditional CBT models. Therefore, spending time in nature should be strongly considered as a coping resource to support emotional wellbeing, given its significant effects within a shorter duration.

Implications for Mental Health Professionals

Given the affective benefits of nature exposure, mental health professionals should strongly consider using nature and/or animal assisted interventions in their practice as a therapeutic modality and suggest time spent in nature as an accessible and affordable coping resource to support the emotional wellbeing of their clients. In alignment with the biophilia hypothesis, many participants reported they were inclined to be within natural environments compared to man-made environments. This has practical implications for practitioners who prescribe nature activities to their clients in order to boost wellbeing. Clients are likely to remain motivated and committed to their nature-guided therapeutic assignment and are thus likely to experience a boost in mood from which therapists can build upon to address other goals (Burns, 1998).

Implications for Improving the Human-Nature Relationship

Research conducted by the Mental Health Foundation of England (2021) reported five distinct pathways that provides a new approach to improving human-nature relations: (1) senses, (2) emotion, (3) beauty, (4) meaning, and (5) compassion. Notably, these five pathways were inherent within participants descriptions of their subjective experience of Time on the Land. The first pathway suggests noticing and actively engaging with nature through the senses. For instance, listening to birdsong, smelling wildflowers, or watching the wind breeze in the trees. Furthermore, experiencing the joy and calm nature can bring, includes talking about and reflecting on one's emotions about nature, and appreciating the beauty of nature through observation, art, music, and/or words. Like previous studies, exploring and celebrating how nature brings meaning to life can aid emotional processing, support wellbeing, and strengthen one's sense of purpose (Lumber et al., 2017; Mental Health Foundation of England, 2021). When asked how finding meaning is valuable, Dr. Blake Victor Kent reported "meaning gives us a framework, a narrative, to place ourselves in a larger story and arrive at the conclusion that our existence matters" (Lennon, 2022). This was inherent within participants descriptions of their experience of Time on the Land, as many reported shifts in perspective, feelings of awe, and an enhanced sense of belonging to the world around them. Finally, practicing compassion through taking actions that are good for nature (e.g., making ethical product choices) can also improve humans' connection with nature.

The pathways provide a flexible design framework to help bring about a closer relationship with nature, to maximize benefits for wellbeing (Mental Health Foundation of England, 2021). These pathways have implications for reaping the connection with nature

outside of the therapy room, as laypersons can practice activities consistent with these five pathways in their daily lives, and in turn, enhance their emotional wellbeing.

Recommendations for Future Research

This study shines light upon five recommendations for future research. The first recommendation involves exploring the increasingly popular approach of virtual reality technology to simulate interactions with nature to support wellbeing. Research thus far has highlighted a host of advantages with using virtual reality in supporting wellbeing. For instance, Bell et al. (2020) discussed how virtual reality can be a worthwhile substitute for people who may experience difficulties having access to the outdoors, such as those with mobility problems or illness. Notably, virtual reality nature-based experiences may successfully navigate many difficulties often faced in natural, in-person settings, such as providing a safe and controlled environment that can mitigate liability factors.

A second direction for future research can explore the ideal duration of nature-based experiences. Literature related to stress-reduction theory (Ulrich, 1991) and the results of this study posit that nature-based experiences don't have to be long to observe significant effects. Finding ideal durations could have implications for informing treatment planning and developing standardized recommendations for nature-based interventions applied in clinical settings.

A third direction for future research could aim to replicate this study to increase sample size, and evaluate other nature-based therapeutic recreation programs, within a controlled framework. Replications could use additional points of data measurement to monitor trends more succinctly within dependent variables, in a similar fashion to a nature-based study conducted by Watkins-Martin and colleagues (2022) that used six time points. Future research of any nature

exploring effects of Time on the Land would not require a large sample size to detect differences with medium-large effect sizes.

Further examination of polyvagal theory in future literature has the potential to discover a new theoretical pathway in explaining the processes of time spent in nature that support emotional wellbeing (Porges, 1995, 2011). Such research could contribute to the evolving literature to better understand how time spent in nature is conducive in supporting humans physical and mental health, and the potential to identify how nature-based experiences can be leveraged within therapeutic settings as a poly-vagal informed therapy.

Lastly, the findings of this study show there is a critical gap in the literature that would greatly benefit from studying the affective benefits experienced by parents observing their children interacting with and learning from nature. This finding was inherent within theme 3 and proposes a potential indirect mechanism for understanding how spent in nature supports emotional wellbeing within adults that is worth exploring.

Strengths and Limitations

The principal strengths of this study include the mixed method of enquiry and large effect sizes. This approach provided meaningful interpretations from two data sets to better understand participants experiences of Time on the Land and provided opportunity to compare quantitative values with qualitative themes. Further, when converging the two data sets the within-samples study design conveniently allowed for comparison of data within the same sample, as Creswell & Plano Clark (2007) note this can be a difficulty that researchers may run into with Triangulation mixed method research designs. Additionally, the researcher was intentional in designing the qualitative items to ensure the quantitative and qualitative items address the same

concepts, key objectives, and research questions of this study. Lastly, the sample is relatively large ($N > 30$), which suggests results are generalizable to a larger population.

Despite the strengths of this study, there are several noteworthy limitations. Upon reflection, the wording of the qualitative item in the baseline survey ("Please describe below what you hope to attain attending your Time on the Land session at Dreamcatcher Nature Assisted Therapy (e.g., stress relief, relaxation, quality time with family, an adventure, etc.)") used leading language which unintentionally guided participants responses towards a desired answer (see Appendix A). For instance, in assessing the responses to this question, many participants responded with "quality time" and/or "stress relief" two of the many examples listed in parentheses. The second limitation involves subjective interpretation of the qualitative research data. Although Braun and Clarke's (2006) structured procedures were followed rigorously, a singular individual assessing a qualitative dataset may differ in comparison to a team approach with at least one or more additional people examining and analyzing the data. The third limitation of this study is the shorter length of participant responses in the qualitative items. Although there were some responses that were longer in length than others, using interviews as the main form of qualitative enquiry likely would have provide increased detail and depth of participants subjective experiences, and provide opportunity to ask follow-up questions for further clarification and elaboration. Lastly, this study happened during the COVID-19 pandemic, therefore the same study done at a different time may reveal different results in terms of effect sizes or descriptions of the experiences.

Conclusion

During the unprecedented and stressful time of COVID-19, uncertainty loomed, stress reactivity was high, and there was a sense of urgency to identify helpful strategies that would

effectively counter negative effects of the pandemic and support the psychological wellbeing of adults. To this end, this study investigated the effect of Dreamcatcher Nature Assisted Therapy's Time on the Land program on perceptions of perceived stress and affect in adults. This study proposes that adult's experiences of emotional wellbeing from nature is multifaceted and may be understood by factors described by biophilia and other traditional theories. Results suggested that participants' emotional wellbeing improved, with statistically significant differences in perceived stress, positive affect, and negative affect after attending Time on the Land. Unique to this study, five key themes are presented that seek to explain the perceived mechanisms that facilitated changes in affect and stress. Interestingly, unanticipated findings were discovered with implications that explores how the human-nature relationship can support learning processes. In considering results, individuals are suggested to strongly consider interacting with nature as an accessible, and cost-effective way to promote emotional wellbeing.

For many, interactions with the natural world are vital for mental health and wellbeing. The findings of this study seek to deepen our understanding of how the human-nature relationship supports emotional wellbeing. Identification of the mechanisms involved highlights pathways that can inform how mental health professionals design, recommend, and apply nature-based interventions to better support adults' emotional wellbeing during the COVID-19 pandemic and beyond.

References

Akat, M., & Karataş, K. (2020). Psychological effects of COVID-19 pandemic on society and its reflections on education. *Electronic Turkish Studies*, *15*(4), 1-13. https://doi.org/10.7827/TurkishStudies.44336

Allen, K., Blascovich, J. & Mendes, W. B. (2002). Cardiovascular reactivity and the presence of pets, friends and spouses: The truth about cats and dogs. *Journal of Psychomatic Medicine*, *64*(5), 727-739. https://doi.org/10.1097/01.psy.0000024236.11538.41

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.

Anderson, W.P., Reid, C.M. & Jennings, G.L. (1992). Pet ownership and risk factors for cardiovascular disease. *The Medical Journal of Australia*, *157*(5), 298-301. https://doi.org/10.5694/j.1326-5377.1992.tb137178.x

Annerstedt, M., & Wahrborg, P. (2011). Nature-assisted therapy: Systematic review of controlled and observational studies. *Scandinavian Journal of Public Health*, *39*(4), 371-388. https://doi.org/10.1177/1403494810396400

Ascione, F. R. (1992). Enhancing children's attitudes about the humane treatment of animals: Generalization to human-directed empathy. *Anthrozoos 5*(3), 176-191. https://doi.org/10.2752/089279392787011421

Augustine, S. M. (2014). Living in a post-coding world: Analysis as assemblage. *Qualitative Inquiry*, *20*(6), 747-753. https://doi.org/10.1177/1077800414530258

Austin, D. R. (1982). *Therapeutic recreation: Processes and techniques*. John Wiley & Sons.

Aydin, C. (2017). How to forget the unforgettable? On collective trauma, cultural identity, and mnemotechnologies, *Identity*, *17*(3), 125-137. https://doi.org/10.1080/15283488.2017.1340160

Backhaus, A., Agha, Z., Maglione, M. L., Repp, A., Ross, B., Zuest, D., Rice-Thorp, N. M., Lohr, J., & Thorp, S. R. (2012). Videoconferencing psychotherapy: A systematic review. *Psychological Services*, *9*(2), 111-131. https://doi.org/10.1037/a0027924

Banerjee, D., & Rai, M. (2020). Social isolation in COVID-19: The impact of loneliness. *International Journal of Social Psychiatry*, *66*(6), 525-527. https://doi.org/10.1177/0020764020922269

Barbisch, D., Koenig, K., and Shih, F. (2015). Is there a case for quarantine? Perspectives from SARS to Ebola. *Disaster Medicine and Public Health Preparedness*, *9*(5), 547-553. https://doi.org/10.1017/dmp.2015.38

Barker, S. B., & Dawson, K. S. (1998). The effects of animal-assisted therapy on anxiety ratings of hospitalized psychiatric patients. *Psychiatric Service*, *49*, 797-801. https://doi.org/10.1176/ps.49.6.797

Barker, S., Pandurangi, A., & Best, A. (2003). Effects of animal-assisted therapy on patients' anxiety, fear, and depression before ECT. *Journal of Electroconvulsive Therapy*, *19*(1), 38-44. https://doi.org/10.1097/00124509-200303000-00008

Barton, J., & Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental Science and Technology*, *44*(10), 3947-3955. https://doi.org/10.1021/es903183r

Battiste, M. A., & Henderson, J. Y. (2000). *Protecting indigenous knowledge and heritage: A global challenge*. Purich Pub.

Békés, V., Aafjes-van Doorn, K., Luo, X., Prout, T. A., & Hoffman, L. (2021). Psychotherapists' challenges with online therapy during COVID-19: Concerns about connectedness predict therapists' negative view of online therapy and its perceived efficacy over time. *Frontiers in Psychology*, *12*, 1-10. https://doi.org/10.3389/fpsyg.2021.705699

Bell, I. H., Nicholas, J., Alvarez-Jimenez, M., Thompson, A., & Valmaggia, L. (2020). Virtual reality as a clinical tool in mental health research and practice. *Dialogues in Clinical Neuroscience*, *22*(2), 169-177. https://doi.org/10.31887/DCNS.2020.22.2/lvalmaggia

Benke, C., Autenrieth, L. K., Asselmann, E., & Pané-Farré, C. A. (2020). Lockdown, quarantine measures, and social distancing: Associations with depression, anxiety and distress at the beginning of the COVID-19 pandemic among adults from Germany. *Psychiatry Research*, *293*, 1-9. https://doi.org/10.1016/j.psychres.2020.113462

Bennett, A. A., Campion, E. D., Keeler, K. R., & Keener, S. K. (2021). Videoconference fatigue? Exploring changes in fatigue after videoconference meetings during COVID-19. *Journal of Applied Psychology*, *106*(3), 330-344. https://doi.org/10.1037/apl0000906

Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science*, *19*(12), 1207-1212. https://doi.org/10.1111/j.1467-9280.2008.02225.x

Berman, M. G., Kross, E. Krpan, K. M., Askren, M. K., Burson, A., Deldin, P. J., Kaplan, S., Sherdell, L., Gotlib, I. H., & Jondies, J. (2012). Interacting with nature improves cognition and affect for individuals with depression. *Journal of Affective Disorders*, *140*(3), 300-305. https://doi.org/10.1016/j.jad.2012.03.012

Berryman, M., & Eley, E. (2019). Student belonging: Critical relationships and responsibilities. *International Journal of Inclusive Education*, *23*(9), 985-1001. https://doi.org/10.1080/13603116.2019.1602365

Best, L. A., Law, M. A., Roach, S., & Wilbiks, J. M. P. (2020). The psychological impact of COVID-19 in Canada: Effects of social isolation during the initial response. *Canadian Psychology/Psychologie Canadienne, 1*, 1-13. https://doi.org/10.1037/cap0000254

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*, *11*(3), 230-241. https://doi.org/10.1093/clipsy.bph077

Blaxton, J., Bergeman, C. S., & Wang, L. (2020). Daily stress reactivity across the life span: Longitudinal and cross-sectional effects of age. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *75*(3), 494-503. https://doi.org/10.1093/geronb/gby046

Blaxton, J. M., Bergeman, C. S., Whitehead, B. R., Braun, M. E., & Payne, J. D. (2015). Relationships among nightly sleep quality, daily stress, and daily affect. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *72*(3), 363-372. https://doi.org/10.1093/geronb/gbv060

Bona, E. (2020). *Caring with critters: Workshop in animal-assisted interventions advanced reading materials*. Unpublished document.

Bolger, N., DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology*, *57*(5), 808-818. https://doi.org/10.1037/0022-3514.57.5.808

Bowen, J., García, E., Darder, P., Argüelles, J., & Fatjó, J. (2020). The effects of the Spanish COVID-19 lockdown on people, their pets, and the human-animal bond. *Journal of Veterinary Behavior*, *40*, 75-91. https://doi.org/10.1016/j.jveb.2020.05.013

Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC Public Health*, *10*(1), 1-10. https://doi.org/10.1186/1471-2458-10-456

Bratman, G. N., Daily, G. C., Levy, B. J., & Gross, J. J. (2015a). The benefits of nature experience: Improved affect and cognition. *Landscape and Urban Planning*, *138*, 41-50. https://doi.org/10.1016/j.landurbplan.2015.02.005

Bratman, G. N., Hamilton, P., Hahn, K. S., Daily, G. C., Gross, J. J. (2015b). Nature experience reduces rumination and subgenal prefrontal cortex activation. *Proceedings of the National Academy of Science*, *112*(28), 8567-8572. https://doi.org/10.1073/pnas.1510459112

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, *395*, 912-920. http://doi.org/10.2139/ssrn .3532534

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822-848. https://doi.org/10.1037/0022-3514.84.4.822

Burgoyne, N., & Cohn, A. S. (2020). Lessons from the transition to relational teletherapy during COVID-19. *Family Process*, *59*(3), 974-988. https://doi.org/10.1111/famp.12589

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

Burns, R. A., Windsor, T., Butterworth, P., & Anstey, K. J. (2022). The protective effects of wellbeing and flourishing on long-term mental health risk. *SSM - Mental Health*, *2*, 1-10. https://doi.org/10.1016/j.ssmmh.2021.100052

Burtscher, J., Burtscher, M., & Millet, G. P. (2020). (Indoor) isolation, stress, and physical inactivity: Vicious circles accelerated by COVID-19? *Scandinavian Journal of Medicine & Science in Sports*, *30*(8), 1544-1545. https://doi.org/10.1111/sms.13706

Butler, G., Fennell, M., Robson, P., & Gelder, M. (1991). Comparison of behavior therapy and cognitive behavior therapy in the treatment of generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*, *59*(1), 167–175. https://doi.org/10.1037/0022-006x.59.1.167

Cable News Network (CNN). (2018, March 23). *A dreamcatcher's journey reveals hope, change and frustration after 19 years of school shootings*. https://www.cnn.com/2018/03/23/us/school-shootings-dreamcatcher/index.html

Canale, N., Marino, C., Lenzi, M., Vieno, A., Griffiths, M. D., Gaboardi, M., Giraldo, M., Cervone, C., & Massimo, S. (2022). How communication technology fosters individual and social wellbeing during the covid-19 pandemic: Preliminary support for a digital interaction model. *Journal of Happiness Studies*, *23*(2), 727-745. https://doi.org/10.1007/s10902-021-00421-1

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, *287*, 1-5. https://doi.org/10.1016/j.psychres.2020.112934

Centre for Addiction and Mental Health. (2021). *Stress.* https://www.camh.ca/en/health-info/mental-illness-and-addiction-index/stress

Chang, C., Cheng, G. J. Y., Nghiem, T. P. L., Song, X. P., Oh, R. R. Y., Richards, D. R., & Carrasco, L. R. (2020). Social media, nature, and life satisfaction: Global evidence of the biophilia hypothesis. *Scientific Reports*, *10*(1), 1-8. https://doi.org/10.1038/s41598-020-60902-

Coakley, A. B., & Mahoney, E. K. (2009). Creating a therapeutic and healing environment with a pet therapy program. *Complementary Therapies in Clinical Practice*, *15*(3), 141-146. https://doi.org/10.1016/j.ctcp.2009.05.004

Cohen J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Routledge Academic.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385-396. https://doi.org/10.2307/2136404

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapam & S. Oskamp (Eds.), *The social psychology of health: Claremont Symposium on applied social psychology.* Sage.

College of Alberta Psychologists. (2018). *Practice guideline: Telepsychology services*.

Collins, S. (1999). Treatment and therapeutic interventions: Psychological approaches. *Tizard Learning Disability Review*, *4*(2), 20-27. https://doi.org/10.1108/13595474199900015

Cook, S. C., Schwartz, A. C., & Kaslow, N. J. (2017). Evidence-based psychotherapy: Advantages and challenges. *Neurotherapeutics*, *14*(3), 537-545. https://doi.org/10.1007/s13311-017-0549-4

Corder, G. W., & Foreman, D. I. (2014). *Nonparametric statistics: A step-by-step approach*. Wiley.

Corey, G. (2017). *Theory and practice of counseling and psychotherapy* (10th ed.) Cengage Learning.

Crawford, E. K., Worsham, N. L., & Swinehart, E. R. (2006). Benefits derived from companion animals, and the use of the term "attachment." *Anthrozoös*, *19*(2), 98-112. https://doi.org/10.2752/089279306785593757

Crawford, J. R., & Henry, J. D. (2004). The positive and negative affect schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *The British Journal of Clinical Psychology / The British Psychological Society*, *43*(3), 245-265. https://doi.org/10.1348/0144665031752934

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Sage Publications.

Cruwys, T., Haslam, S. A., Dingle, G. A., Haslam, C., & Jetten, J. (2014). Depression and social identity: An integrative review. *Personality and Social Psychology Review*, *18*(3), 215-238. https://doi.org/10.1177/1088868314523839

CTV News. (2020, December 3). *'Dealing with a lot:' Suicide crisis calls mount during COVID-19 pandemic*. https://www.ctvnews.ca/health/coronavirus/dealing-with-a-lot-suicide-crisis-calls-mount-during-covid-19-pandemic-1.5215056

Czeisler, M. E., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., Weaver, M. D., Robbins, R., Facer-Childs, E. R., Barger, L. K., Czeisler, C. A., Howard, M. E., & Rajaratnam, S. M. W. (2020). Mental health, substance use, and suicidal ideation during the COVID-19 pandemic – United States, June 24-30, 2020. *Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report*, *68*(32), 1049-1057. http://dx.doi.org/10.15585/mmwr.mm6932a1

Darcy, P. M., Taylor, J., Mackay, L., Ellis, N. J., & Gidlow, C. J. (2022). Understanding the role of nature engagement in supporting health and wellbeing during COVID-19. *International Journal of Environmental Research and Public Health*, *19*(7), 1-27. https://doi.org/10.3390/ijerph19073908

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia*. University of Minnesota Press.

DeLongis, A., & Holtzman, S. (2005). Coping in context: The role of stress, social support, and personality in coping. *Journal of Personality*, *73*(6), 1633-1656. https://doi.org/10.1111/j.1467-6494.2005.00361.x

Densmore, F. (1929). Chippewa customs. *Smithsonian Institution Bureau of American Ethnology Bulletin*, *86*, 1-24.

Depledge, M. H., Stone, R. J., & Bird, W. J. (2011). Can natural and virtual environments be used to promote improved human health and wellbeing? *Environmental Science & Technol*ogy, *45*(11), 1-5. https://doi.org/10.1021/es103907m

Derks, J., Giessen, L., & Winkel, G. (2020). COVID-19-induced visitor boom reveals the importance of forests as critical infrastructure. *Forest Policy and Economics*, *118*, 1-5. https://doi.org/10.1016/j.forpol.2020.102253

Desrochers, J. E., Bell, A. L., Nisbet, E. K., & Zelenski, J. M. (2022). Does spending time in nature help students cope with the COVID-19 pandemic? *Sustainability*, *14*(4), 1-18. https://doi.org/10.3390/su14042401

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, *95*(3), 542-575. https://doi.org/10.1037/0033-2909.95.3.542

Dimitrijevic, I. (2009). Animal-assisted therapy: A new trend in the treatment of children and adults. *Psychiatra Danubina*, *21*(2), 236-241.

Dimmock, J., Krause, A. E., Rebar, A., & Jackson, B. (2021). Relationships between social interactions, basic psychological needs, and wellbeing during the COVID-19 pandemic. *Psychology & Health*, *37*(4), 457-469. https://doi.org/10.1080/08870446.2021.1921178

Domagała-Krecioch, A., & Majerek, B. (2013). The issue of loneliness in the period of "emerging adulthood." *European Scientific Journal*, *1*(2), 534-541.

Dreyfus, G. (2011). Is mindfulness present-centred and non-judgmental? A discussion of the cognitive dimensions of mindfulness. *Contemporary Buddhism*, *12*(1), 41-54. https://doi.org/10.1080/14639947.2011.564815

Ducarme, F., & Couvet, D. (2020). What does 'nature' mean? *Palgrave Communications*, *6*(1), 1-8. https://doi.org/10.1057/s41599-020-0390-y

Duden, G. S., Gersdorf, S., & Stengler, K. (2022). Global impact of the COVID-19 pandemic on mental health services: A systematic review. *Journal of Psychiatric Research*, *154*, 354-377. https://doi.org/10.1016/j.jpsychires.2022.08.013

Elbogen, E. B., Lanier, M., Griffin, S. C., Blakey, S. M., Gluff, J. A., Wagner, H. R., & Tsai, J. (2022). A national study of zoom fatigue and mental health during the COVID-19 pandemic: Implications for future remote work. *Cyberpsychology, Behavior, and Social Networking*, *25*(7), 409-415. https://doi.org/10.1089/cyber.2021.0257

Every-Palmer, S., Jenkins, M., Gendall, P., Hoek, J., Beaglehole, B., Bell, C., Williman, J., Rapsey, C., & Stanley, J. (2020). Psychological distress, anxiety, family violence, suicidality, and wellbeing in New Zealand during the COVID-19 lockdown: A cross-sectional study. *PloS One*, *15*(11), 1-19. https://doi.org/10.1371/journal.pone.0241658

Fine, A. H. (2010). *Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice* (2nd ed.). Elsevier.

Fisher, J. A. (1999). The value of natural sounds. *Journal of Aesthetic Education*, *33*(3), 26-42.

Fiske, S. T. (2004). *Social beings: Core motives in social psychology*. Wiley.

Fancourt, D., Steptoe, A., & Bu, F. (2021). Trajectories of anxiety and depressive symptoms during enforced isolation due to COVID-19 in England: A longitudinal observational study. *The Lancet Psychiatry*, *8*(2), 141-149. https://doi.org/10.1016/S2215-0366(20)30482-X

Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, *13*(2), 172-175. https://doi.org/10.1111/1467-9280.00431

Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn, J., Peter H, Lawler, J. J., Levin, P. S., Tandon, P. S., Varanasi, U., Wolf, K. L., & Wood, S. A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives*, *125*(7), 1-18. https://doi.org/10.1289/EHP1663

Ganson, K. T., Tsai, A. C., Weiser, S. D., Benabou, S. E., & Nagata, J. M. (2020). Job insecurity and symptoms of anxiety and depression among U.S. young adults during COVID-19. *Journal of Adolescent Health*, *1*, 1-4. https://doi.org/10.1016/j.jadohealth.2020.10.008

García-Villamisar, D., Dattilo, J., & Muela, C. (2017). Effects of therapeutic recreation on adults with ASD and ID: A preliminary randomized control trial. *Journal of Intellectual Disability Research*, *61*(4), 325-340. https://doi.org/10.1111/jir.12320

Geirdal, A. Ø., Ruffolo, M., Leung, J., Thygesen, H., Price, D., Bonsaksen, T., & Schoultz, M. (2021). Mental health, quality of life, wellbeing, loneliness and use of social media in a time of social distancing during the COVID-19 outbreak. A cross-country comparative study. *Journal of Mental Health*, *30*(2), 148-155. https://doi.org/10.1080/09638237.2021.1875413

Geschwind, N., Arntz, A., Bannink, F., & Peeters, F. (2019). Positive cognitive behavior therapy in the treatment of depression: A randomized order within-subject comparison with traditional cognitive behavior therapy. *Behaviour Research and Therapy*, *116*, 119-130. https://doi.org/10.1016/j.brat.2019.03.005

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Aldine Pub. Co. https://doi.org/10.4324/9780203793206

Gloster, A. T., Lamnisos, D., Lubenko, J., Presti, G., Squatrito, V., Constantinou, M., Nicolaou, C., Papacostas, S., Aydın, G., Chong, Y. Y., Chien, W. T., Cheng, H. Y., Ruiz, F. J., Garcia-Martin, M. B., Obando-Posada, D. P., Segura-Vargas, M. A., Vasiliou, V. S., McHugh, L., Höfer, S., . . . Karekla, M. (2020). Impact of COVID-19 pandemic on mental health: An international study. *PloS One*, *15*(12), 1-20. https://doi.org/10.1371/journal.pone.0244809

Glowacz, F., & Schmits, E. (2020). Psychological distress during the COVID-19 lockdown: The young adults most at risk. *Psychiatry Research*, *293*, 1-4. https://doi.org/10.1016/j.psychres.2020.113486

Goodwin, R. D. (2002). Anxiety disorders and the onset of depression among adults in the community. *Psychology Medicine*, *32*(6), 1121-1124. https://doi.org/10.1017/s0033291702005482

Goodwin, R. D. (2003). The prevalence of panic attacks in the United States: 1980 to 1995. *Journal of Clinical Epidemiology*, *56*(9), 914-916. https://doi.org/10.1016/s0895-4356(03)00126-4

Goodwin, R. D., Weinberger, A. H., Kim, J. H., Wu, M., & Galea, S. (2020). Trends in anxiety among adults in the United States, 2008–2018: Rapid increases among young adults. *Journal of Psychiatric Research*, *130*, 441–446. https://doi.org/10.1016/j.jpsychires.2020.08.014

Government of Canada. (2020, April 3). Community-based measures to mitigate the spread of coronavirus disease (COVID-19) in Canada. https://www.canada.ca/en/

Grinde, B., & Patil, G. G. (2009). Biophilia: Does visual contact with nature impact on health and well-being? *International Journal of Environmental Research and Public Health*, *6*(9), 2332-2343. https://doi.org/10.3390/ijerph6092332

Hancock, T. (1993). Health, human development and the community ecosystem: Three ecological models. *Health Promotion International*, *8*(1), 41-47. https://doi.org/10.1093/heapro/8.1.41

Hanson, W. E., Creswell, J. W., Plano Clark, V. L., Petska, K. S., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology*, *52*(2), 224-235. https://doi.org/10.1037/0022-0167.52.2.224

Hansson, A., Hilleras, P., & Forsell, Y. (2005). What kind of self-care strategies do people report using and is there an association with well-being? *Social Indicators Research*, *73*(1), 133-139. https://doi.org/10.1007/s11205-004-0995-3

Harper, S. R., & Kuh, G. D. (2007). Myths and misconceptions about using qualitative methods in assessment. *New Directions for Institutional Research*, *2007*(136), 5-14. https://doi.org/10.1002/ir.227

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health*, *35*(1), 207-228. https://doi.org/10.1146/annurev-publhealth-032013-182443

Hawkins, B. L., Townsend, J. A., & Garst, B. A. (2016). Nature-based recreational therapy for military service members. *Therapeutic Recreation Journal*, *50*(1), 55-74. https://doi.org/10.18666/trj-2016-v50-i1-6793

Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infectious Diseases*, *10*(7), 1206-1212. https://doi.org/10.3201/eid1007.030703

Headey, B., Kelley, J., & Wearing, A. (1993). Dimensions of mental health: Life satisfaction, positive affect, anxiety and depression. *Social Indicators Research*, *29*(1), 63-82. https://doi.org/10.1007/BF01136197

Heidinger, T., & Richter, L. (2020). The effect of COVID-19 on loneliness in the elderly. an empirical comparison of pre-and peri-pandemic loneliness in community-dwelling elderly. *Frontiers in Psychology*, *11*, 1-5. https://doi.org/10.3389/fpsyg.2020.585308

Helliwell, J. F., & Statistics Canada. Analytical Studies Branch. (2020). *Life satisfaction in Canada before and during the COVID-19 pandemic*. Statistics Canada.

Helter, T. M., Łaszewska, A., & Simon, J. (2022). Exploring the over-time, multifaceted impacts of three COVID-19 lockdowns on aspects of capability, wellbeing and mental health across vulnerabilities in Austria. *Scientific Reports*, *12*(1), 1-11. https://doi.org/10.1038/s41598-022-20977-z

Heo, S., Lim, C. C., & Bell, M. L. (2020). Relationships between local green space and human mobility patterns during COVID-19 for Maryland and California, USA. *Sustainability*, *12*(22), 1-16. https://doi.org/10.3390/su12229401

Herzog, T. R., Black, A. M., Fountaine, K. A., & Knotts, D. J. (1997). Reflection and attentional recovery as distinctive benefits of restorative environments. *Journal of Environmental Psychology*, *17*(2), 165-170. https://doi.org/10.1006/jevp.1997.0051

Heubeck, B. G., & Wilkinson, R. (2019). Is all fit that glitters gold? Comparisons of two, three and bi-factor models for Watson, Clark & Tellegen's 20-item state and trait PANAS. *Personality and Individual Differences*, *144*, 132-140. https://doi.org/10.1016/j.paid.2019.03.002

Hinds, J., & Sparks, P. (2008). Engaging with the natural environment: The role of affective connection and identity. *Journal of Environmental Psychology*, *28*(2), 109–120. https://doi.org/10.1016/j.jenvp.2007.11.001

Hofmann, S. G., Asnaani, A., Vonk, I. J. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognitive Therapy and Research*, *36*(5), 427-440. https://doi.org/10.1007/s10608-012-9476-1

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, *241*(4865), 540-545. https://doi.org/10.1126/science.3399889

Howell, A. J., Dopko, R. L., Passmore, H. A., & Buro, K. (2011) Nature connectedness: Associations with well-being and mindfulness. *Personality and Individual Differences*, *51*(2), 166-171. https://doi.org/10.1016/j.paid.2011.03.037

Hunter, M. C. R., Gillespie, B. W., & Chen, S. Y. (2019). Urban nature experiences reduce stress in the context of daily life based on salivary biomarkers. *Frontiers in Psychology*, *10*, 1-16. https://doi.org/10.3389/fpsyg.2019.00722

Huppert, F. A. (2009). Psychological well-being: Evidence regarding its causes and consequences. *Applied Psychology: Health and Well-being*, *1*(2), 137-164. https://doi.org/10.1111/j.1758-0854.2009.01008.x

Ives, C. D., Abson, D. J., von Wehrden, H., Dorninger, C., Klaniecki, K., & Fischer, J. (2018). Reconnecting with nature for sustainability. *Sustainability Science*, *13*(5), 1389-1397. https://doi.org/10.1007/s11625-018-0542-9

Janeczko, E., Bielinis, E., Wójcik, R., Woźnicka, M., Kędziora, W., Łukowski, A., Elsadek, M., Szyc, K., & Janeczko, K. (2020). When urban environment is restorative: The effect of walking in suburbs and forests on psychological and physiological relaxation of young polish adults. *Forests*, *11*(5), 1-17. https://doi.org/10.3390/f11050591

Jenkins, P. (1986). *Dream catchers: How mainstream America discovered native spirituality*. Oxford University Press.

Jordan, C., & Chawla, L. (2019). A coordinated research agenda for nature-based learning. *Frontiers in Psychology*, *10*, 1-10. https://doi.org/10.3389/fpsyg.2019.00766

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. Delacourt Press.

Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences - PNAS*, *107*(38), 16489-16493. https://doi.org/10.1073/pnas.1011492107

Kapisi, O., Choate, P. W., & Lindstrom, G. (2022). Reconsidering Maslow and the hierarchy of needs from a first nations' perspective. *Aotearoa New Zealand Social Work, 34*(2), 30-41. https://doi.org/10.11157/anzswj-vol34iss2id959

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, *15*(3), 169-182. https://doi.org/10.1016/0272-4944(95)90001-2

Kaplan, R., & Kaplan, S. (1989). *The Experience of Nature*. Cambridge University Press.

Kashte, S., Gulbake, A., El-Amin Iii, S. F., & Gupta, A. (2021). COVID-19 vaccines: Rapid development, implications, challenges and future prospects. *Human Cell: Official Journal of Human Cell Research Society*, *34*(30), 711-733. https://doi.org/10.1007/s13577-021-00512-4

Kelley, K., & Preacher, K. J. (2012). On effect size. *Psychological Methods*, *17*(2), 137-152. https://doi.org/10.1037/a0028086

Krendl, A. C., & Perry, B. L. (2021). The impact of sheltering in place during the COVID-19 pandemic on older adults' social and mental well-being. *The Journals of Gerontology.*

Series B, Psychological Sciences and Social Sciences, *76*(2), 1-6. https://doi.org/10.1093/geronb/gbaa110

Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating the axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, *73*(3), 539–548. https://doi.org/10.1037/0022-006X.73.3.539

Khan, T. A., Qureshi, M. M., Zahid, M. A., Hussain, E., Ashraf, M., & Channa, A. A. (2020). The burden of quarantine on mental health amidst COVID-19 Pandemic: A cross sectional study. *Pakistan Armed Forces Medical Journal*, *70*(2), 584-589.

Kim, E. J., Kang, H. W., & Park, S. M. (2020). A meta-analysis on the effects of therapeutic recreation programs for the elderly. *International Journal of Environmental Research and Public Health*, *17*(20), 1-13. https://doi.org/10.3390/ijerph17207367

Kim, J. J. H., Betz, N., Helmuth, B., & Coley, J. D. (2023). Conceptualizing human-nature relationships: Implications of human exceptionalist thinking for sustainability and conservation. *Topics in Cognitive Science*, *15*(3), 1-31. https://doi.org/10.1111/tops.12653

Kock, N. (2004). The psychobiological model: Towards a new theory of computer-mediated communication based on Darwinian evolution. *Organization Science*, *15*(3), 327-348. https://doi.org/10.1287/orsc.1040.0071

Kondo, M. C., Jacoby, S. F., & South, E. C. (2018). Does spending time outdoors reduce stress? A review of real-time stress response to outdoor environments. *Health & Place*, *51*, 136-150. https://doi.org/10.1016/j.healthplace.2018.03.001

Koselka, E. P. D., Weidner, L. C., Minasov, A., Berman, M. G., Leonard, W. R., Santoso, M. V., de Brito, J. N., Pope, Z. C., Pereira, M. A., & Horton, T. H. (2019). Walking green: Developing an evidence base for nature prescriptions. *International Journal of Environmental Research and Public Health*, *16*(22), 1-18. https://doi.org/10.3390/ijerph16224338

Kuo, M. (2015). How might contact with nature promote human health? Promising mechanisms and a possible central pathway. *Frontiers in Psychology*, *6*, 1-8. https://doi.org/10.3389/fpsyg.2015.01093

Kuo, M., Barnes, M., & Jordan, C. (2019). Do experiences with nature promote learning? Converging evidence of a cause-and-effect relationship. *Frontiers in Psychology*, *10*, 1-9. https://doi.org/10.3389/fpsyg.2019.00305

Lades, L. K., Laffan, K., Daly, M., & Delaney, L. (2020). Daily emotional well-being during the COVID-19 pandemic. *British Journal of Health Psychology*, *25*(4), 902-911. https://doi.org/10.1111/bjhp.12450

Ladouceur, R., Dugas, M. J., Freeston, M. H., Le´ger, E., Gagnon, F., & Thibodeau, N. (2000). Efficacy of cognitive– behavioral treatment of generalized anxiety disorder: Evaluation in a controlled clinical trial. *Journal of Consulting and Clinical Psychology*, *68*, 957-964. https://doi.org/10.1037/0022-006X.68.6.957

Lalonde, D. (2021). Does cultural appropriation cause harm? *Politics, Groups & Identities*, *9*(2), 329-346. https://doi.org/10.1080/21565503.2019.1674160

La Placa, V., McNaught, A., & Knight, A. (2013). Discourse on wellbeing in research and practice. *International Journal of Wellbeing*, *3*(1), 116-125. https://doi.org/10.5502/ijw.v3i1.7

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.

Lee, P. S. N., Leung, L., Lo, V., Xiong, C., & Wu, T. (2011). Internet communication versus face-to-face interaction in quality of life. *Social Indicators Research*, *100*(3), 375-389. https://doi.org/10.1007/s11205-010-9618-3

Lefkowitz, C., Paharia, I., Prout, M., Debiak, D., and Bleiberg, J. (2005) Animal-assisted prolonged exposure: A treatment for survivors of sexual assault suffering posttraumatic stress disorder. *Society & Animals: Journal of Human-Animal Studies*, *13*(4), 275-296. https://doi.org/10.1163/156853005774653654

Lennon, A. (2022, July 30). *How and why finding meaning in life can improve well-being*. https://www.medicalnewstoday.com/articles/how-and-why-finding-meaning-in-life-can-improve-well-being#Finding-primordial-meaning

Lennox, J. G. (2001). *Aristotle: On the Parts of Animals I-IV*. Oxford University Press. https://doi.org/10.1093/oseo/instance.00262098

Lesser, I. A., & Nienhuis, C. P. (2020). The impact of COVID-19 on physical activity behavior and well-being of Canadians. *International Journal of Environmental Research and Public Health*, *17*(11), 1-12. https://doi.org/10.3390/ijerph17113899

Leung, D. Y. P., Lam, T. H., & Chan, S. S. C. (2010). Three versions of Perceived Stress Scale: Validation in a sample of Chinese cardiac patients who smoke. *BMC Public Health*, *10*(1), 1-7. https://doi.org/10.1186/1471-2458-10-513

Levine, P. A. (1977). *Accumulated stress, reserve capacity and disease* [Doctoral dissertation, University of California, Berkeley].

Levine, P. A. (1997). *Waking the tiger: Healing trauma: The innate capacity to transform overwhelming experiences*. North Atlantic Books.

Levine, P. A. (2010). *In an unspoken voice: How the body releases trauma and restores goodness*. North Atlantic Books.

Lin, B. B., Chang, C., Andersson, E., Astell-Burt, T., Gardner, J., & Feng, X. (2023). Visiting urban green space and orientation to nature is associated with better wellbeing during COVID-19. *International Journal of Environmental Research and Public Health*, *20*(4), 1-12. https://doi.org/10.3390/ijerph20043559

Lotze, M., & Thomson, A. (2010). *Natural killer cells: Basic science and clinical application*. Academic Press. https://doi.org/10.1016/C2009-0-00213-X

Louv, R. (2005). *Last child in the woods: Saving children from nature-deficit disorder*. Agonquin Books.

Lowe, C., Rafiq, M., MacKay, L. J., Letourneau, N., Ng, C. F., Keown-Gerrard, J., Gilbert, T., & Ross, K. M. (2023). Impact of the COVID-19 pandemic on Canadian social connections: A thematic analysis. *Journal of Social and Personal Relationships*, *40*(1), 76-101. https://doi.org/10.1177/02654075221113365

Luchetti, M., Lee, J. H., Aschwanden, D., Sesker, A., Strickhouser, J. E., Terracciano, A., & Sutin, A. R. (2020). The trajectory of loneliness in response to COVID-19. *The American Psychologist*, *75*(7), 897-908. https://doi.org/10.1037/amp0000690

Lumber, R., Richardson, M., & Sheffield, D. (2017). Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection. *PloS One*, *12*(5), 1-24. https://doi.org/10.1371/journal.pone.0177186

Lutz, A., Jha, A. P., Dunne, J. D., & Saron, C. D. (2015). Investigating the phenomenological matrix of mindfulness-related practices from a neurocognitive perspective. *American Psychologist*, 70(7), 632-658. https://doi.org/10.1037/a0039585

MacIntyre, C. M., & Hasanain, S. J. (2020). Community universal face mask use during the COVID 19 pandemic-from households to travellers and public spaces. *Journal of Travel Medicine*, *27*(3), 1-3. https://doi.org/10.1093/jtm/taaa056

Maller, C., Townsend, M., Pryor, A., Brown, P., & St Leger, L. (2005). Healthy nature healthy people: "Contact with nature" as an upstream health promotion intervention for populations. *Health Promotion International*, *21*(1), 45-54. https://doi.org/10.1093/heapro/dai032

Maranzan, K. A., Kowatch, K. R., Mascioli, B. A., McGeown, L., Popowich, A. D., & Spiroiu, F. (2018). Self-care and the Canadian Code of Ethics: Implications for training in professional psychology. *Canadian Psychology/Psychologie Canadienne*, *59*(4), 361-368. https://doi.org/10.1037/cap0000153

Marshall, J. (1981). Making sense as personal process. In P. Reason and J. Rowan (Eds.), *Human inquiry (*pp. 395-399).

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, *50*(4), 370-396. https://doi.apa.org/doi/10.1037/h0054346

Mathias, K., Rawat, M., Philip, S., & Grills, N. (2020). "We've got through hard times before: Acute mental distress and coping among disadvantaged groups during COVID-19 lockdown in north India - a qualitative study". *International Journal for Equity in Health*, *19*(1), 1-12. https://doi.org/10.1186/s12939-020-01345-7

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, *24*(4), 503-515. https://doi.org/10.1016/j.jenvp.2004.10.001

Mayer, F. S., Frantz, C. M., Bruehlman-Senecal, E., & Dolliver, K. (2009). Why is nature beneficial? The role of connectedness to nature. *Environment and Behavior*, *41*(5), 607-643. https://doi.org/10.1177/0013916508319745

Melson, G.F. (1990). *Pet ownership and attachment in young children: Relations to behavior problems and social competence*. Unpublished manuscript.

Mental Health Foundation of England, (2021). Nature: How connecting with nature benefits our mental health. https://www.mentalhealth.org.uk/sites/default/files/2022-06/MHAW21-Nature-research-report.pdf

Merz, E. M., & Huxhold, O. (2010). Wellbeing depends on social relationship characteristics: Comparing different types and providers of support to older adults. *Ageing & Society*, *30*(5), 843-857. https://doi.org/10.1017/s0144686x10000061

Mills, D. J., Petrovic, J., Mettler, J., Hamza, C. A., & Heath, N. L. (2022). The good, the bad, and the mixed: Experiences during COVID-19 among an online sample of adults. *PloS One*, *17*(6), e0269382-e0269382. https://doi.org/10.1371/journal.pone.0269382

Mitte, K. (2005). Meta-analysis of cognitive-behavioral treatments for generalized anxiety disorder: A comparison with pharmacotherapy. *Psychological Bulletin*, *131*(5), 785-795. https://doi.org/10.1037/0033-2909.131.5.785

Miu, A. S., Vo, H. T., Palka, J. M., Glowacki, C. R., & Robinson, R. J. (2020). Teletherapy with serious mental illness populations during COVID-19: Telehealth conversion and engagement. *Counselling Psychology Quarterly*, *34*(3-4), 704-721. https://doi.org/10.1080/09515070.2020.1791800

Moos, R. H., Brennan, P. L., Schutte, K. K., & Moos, B. S. (2006). Older adults' coping with negative life events: Common processes of managing health, interpersonal, and Financial/Work stressors. *International Journal of Aging & Human Development*, *62*(1), 39-59. https://doi.org/10.2190/ENLH-WAA2-AX8J-WRT1

Musich, S., Wang, S. S., Ruiz, J., Hawkins, K., & Wicker, E. (2018). The impact of mobility limitations on health outcomes among older adults. *Geriatric Nursing*, *39*(2), 162-169. https://doi.org/10.1016/j.gerinurse.2017.08.002

Myers, D. G. (2000). The funds, friends, and faith of happy people. *American Psychologist*, *55*(1), 56-67. https://doi.org/10.1037/0003-066X.55.1.56

Myers, S. B., Sweeney, A. C., Popick, V., Wesley, K., Bordfeld, A., & Fingerhut, R. (2012). Self-care practices and perceived stress levels among psychology graduate students. *Training and Education in Professional Psychology*, *6*(1), 55-66. https://doi.org/10.1037/a0026534

National Institutes of Health. (2018). Emotional well-being: High priority research networks (U24, clinical trial optional). https://grants-nih-gov.ezproxy.uleth.ca/grants/guide/rfa-files/rfa-at-20-003.html

Nelson, B. (2020). The positive effects of covid-19. BMJ (Online), 369, m1785-m1785. https://doi.org/10.1136/bmj.m1785

Nicholson, S. (1971). How not to treat children: The theory of loose parts. *Landscape Architecture*, *62*, 30-34.

Nimer, J., & Lundahl, B. (2007). Animal-assisted therapy: A meta-analysis. *Anthrozoos*, *20*(3), 225-238. https://doi.org/10.2752/089279307x224773

Norwood, M. F., Lakhani, A., & Kendall, E. (2021). Teaching traditional indoor school lessons in nature: The effects on student learning and behaviour. *Landscape and Urban Planning*, *206*, 1-10. https://doi.org/10.1016/j.landurbplan.2020.103963

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, *16*(1), 1-13. https://doi.org/10.1177/1609406917733847

Oberholtzer, C. (2012). *Dream catchers: Legend, lore and artifacts*. Firefly.

Okabe-Miyamoto, K., Folk, D., Lyubomirsky, S., & Dunn, E. W. (2021). Changes in social connection during COVID-19 social distancing: It's not (household) size that matters, it's who you're with. *PloS One*, *16*(1), 1-16. https://doi.org/10.1371/journal.pone.0245009

Oomen, D., Nijhof, A. D., & Wiersema, J. R. (2021). The psychological impact of the COVID-19 pandemic on adults with autism: A survey study across three countries. *Molecular Autism*, *12*(1), 1-21. https://doi.org/10.1186/s13229-021-00424-y

O'Shea, B. Q., Finlay, J. M., Kler, J., Joseph, C. A., & Kobayashi, L. C. (2021). Loneliness among US adults aged ≥55 early in the COVID-19 pandemic: Findings from the COVID-

19 coping study. *Public Health Reports*, *136*(6), 754-764. https://doi.org/10.1177/00333549211029965

Ottosson, J., & Grahn, P. (2008). The role of natural settings in crisis rehabilitation: How does the level of crisis influence the response to experiences of nature with regard to measures of rehabilitation? *Landscape Restoration*, *33*(1), 51-70. https://doi.org/10.1080/01426390701773813

Owen, S. (2008). *The appropriation of native American spirituality*. Continuum.

Ozbay, F., Fitterling, H., Charney, D., & Southwick, S. (2008). Social support and resilience to stress across the life span: A neurobiologic framework. *Current Psychiatry Reports*, *10*(4), 304-310. https://doi.org/10.1007/s11920-008-0049-7

Parent, N., Dadgar, K., Xiao, B., Hesse, C., & Shapka, J. D. (2021). Social disconnection during COVID-19: The role of attachment, fear of missing out, and smartphone use. *Journal of Research on Adolescence*, *31*(3), 748-763. https://doi.org/10.1111/jora.12658

Park, C. L., Kubzansky, L. D., Chafouleas, S. M., Davidson, R. J., Keltner, D., Parsafar, P., Conwell, Y., Martin, M. Y., Hanmer, J., & Wang, K. H. (2022). Emotional well-being: What it is and why it matters. *Affective Science*, *4*(1), 10-20. https://doi.org/10.1007/s42761-022-00163-0

Park, B. J., Tsunetsugu, Y., Kasetani, T., Kagawa, T., & Miyazaki, Y. (2010). The physiological effects of 'Shinrin-yoku' (taking in the forest atmosphere or forest bathing): Evidence from field experiments in 24 forests across Japan. *Environmental Health and Preventative Medicine*, *15*(1), 18-26. https://doi.org/10.1007/s12199-009-0086-9

Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, *5*(2), 164-172. https://doi.org/10.1037/1040-3590.5.2.164

Pearson, D. G., & Craig, T. (2014). The great outdoors? Exploring the mental health benefits of natural environments. *Frontiers in Psychology*, *5*, 1-4. https://doi.org/10.3389/fpsyg.2014.01178

Pedersen, I., Ihlebæk, C., & Kirkevold, M. (2012). Important elements in farm animal-assisted interventions for persons with clinical depression: A qualitative interview study. *Disability and Rehabilitation*, *34*(18), 1526-1534. https://doi.org/10.3109/09638288.2011.650309

Peeters, M. J. (2016). Practical significance: Moving beyond statistical significance. *Currents in Pharmacy Teaching and Learning*, *8*(1), 83-89. https://doi.org/10.1016/j.cptl.2015.09.001

Pfefferbaum, B., & North, C. S. (2020). Mental health and the COVID-19 pandemic. *The New England Journal of Medicine*, *383*(6), 510-512. https://doi.org/10.1056/NEJMp2008017

Picton, C., Fernandez, R., Moxham, L., & Patterson, C. F. (2020). Experiences of outdoor nature-based therapeutic recreation programs for persons with a mental illness: A qualitative systematic review. *JBI Evidence Synthesis*, *18*(9), 1820-1869. https://doi.org/10.11124/JBISRIR-D-19-00263

Pinkham, A. E., Ackerman, R. A., Depp, C. A., Harvey, P. D., & Moore, R. C. (2020). A longitudinal investigation of the effects of the COVID-19 pandemic on the mental health of individuals with pre-existing severe mental illnesses. *Psychiatry Research*, *294*(1), 1-6. https://doi.org/10.1016/j.psychres.2020.113493

Porges, S. W. (1995). Orienting in a defensive world: Mammalian modifications of our evolutionary heritage. A polyvagal theory. *Psychophysiology*, *32*(4), 301-318. https://doi.org/10.1111/j.1469-8986.1995.tb01213.x

Porges, S. W. (2011). *The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication, and self-regulation* (1st ed.). W. W. Norton.

Porges, S. W., & Dana, D. (2018). *Clinical applications of the polyvagal theory: The emergence of polyvagal-informed therapies* (1st ed.). W. W. Norton & Company, Inc.

Prati, G., & Mancini, A. D. (2021). The psychological impact of COVID-19 pandemic lockdowns: A review and meta-analysis of longitudinal studies and natural experiments. *Psychological Medicine, 51*(2), 201-211. https://doi.org/10.1017/S0033291721000015

Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. *General Psychiatry*, *33*(2), 1-3. https://doi.org/10.1136/gpsych-2020-100213

Radfar, A., Ferreira, M. M., Sosa, J. P., & Filip, I. (2021). Emergent crisis of COVID-19 pandemic: Mental health challenges and opportunities. *Frontiers in Psychiatry*, *12*, 1-6. https://doi.org/10.3389/fpsyt.2021.631008

Raihan, M. M. H. (2021). Mental health consequences of COVID-19 pandemic on adult population: A systematic review. *Mental Health Review Journal*, *26*(1), 42-54. https://doi.org/10.1108/MHRJ-07-2020-0044

Rakow, D. A., & Eells, G. T. (2019). *Nature Rx: Improving college-student mental health*. Comstock Publishing Associates.

Ratschen, E., Shoesmith, E., Shahab, L., Silva, K., Kale, D., Toner, P., Reeve, C., & Mills, D. S. (2020). Human-animal relationships and interactions during the covid-19 lockdown phase in the UK: Investigating links with mental health and loneliness. *PloS One*, *15*(9), 1-17. https://doi.org/10.1371/journal.pone.0239397

Reid, G. M., Holt, M. K., Bowman, C. E., Espelage, D. L., & Green, J. G. (2016). Perceived social support and mental health among first-year college students with histories of bullying victimization. *Journal of Child and Family Studies*, *25*(11), 3331-3341. https://doi.org/10.1007/s10826-016-0477-7

Reibel, D. K., Greeson, J. M., Brainard, G. C., & Rosenzweig, S. (2001). Mindfulness-based stress reduction and health-related quality of life in a heterogeneous patient population. *General Hospital Psychiatry*, *23*(4), 183-192. https://doi.org/10.1016/S0163-8343(01)00149-9

Remor, E. (2006). Psychometric properties of a European Spanish version of the Perceived Stress Scale (PSS). *Spanish Journal of Psychology*, *9*(1), 86-93. https://doi.org/10.1017/s1138741600006004

Rice, W. L., Mateer, T. J., Reigner, N., Newman, P., Lawhon, B., & Taff, B. D. (2020). Changes in recreational behaviors of outdoor enthusiasts during the COVID-19 pandemic: Analysis across urban and rural communities. *Journal of Urban Ecology*, *6*(1), 1-7. https://doi.org/10.1093/jue/juaa020

Roberts, A. R., & Yeager, K. R. (2004). *Evidence-based practice manual*. Oxford University Press.

Robertson, T., & Long, T. (2008). *Foundations of therapeutic recreation*. Human Kinetics.

Rosen, B. L., & DeMaria, A. L. (2012). Statistical significance vs. practical significance: An exploration through health education. *American Journal of Health Education*, *43*(4), 235-241. https://doi.org/10.1080/19325037.2012.10599241

Rosenzweig, S. (1936). Some implicit common factors in diverse methods of psychotherapy. *American Journal of Orthopsychiatry*, *12*(1), 5-9. https://doi.org/10.1037/1053-0479.12.1.5

Rowan, A. N., & Beck, A. M. (1994). The health benefits of human-animal interaction. *Anthrozoos*, *7*(2), 85-89. https://doi.org/10.2752/089279394787001916

Russell, R., Guerry, A. D., Balvanera, P., Gould, R. K., Basurto, X., Chan, K. M. A., Klain, S., Levine, J., & Tam, J. (2013). Humans and nature: How knowing and experiencing nature affect well-being. *Annual Review of Environment & Resources*, *38*(1), 473-502. https://doi.org/10.1146/annurev-environ-012312-110838

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-78. https://doi.org/10.1037/0003-066X.55.1.68

Sawilowsky, S. S. (2009). New effect size rules of thumb. *Journal of Modern Applied Statistical Methods*, *8*(2), 597-599. https://doi.org/10.22237/jmasm/1257035100

Schmalzl, L., Powers, C., Zanesco, A. P., Yetz, N., Broessl, E. J., & Saron, C. D. (2018). The effect of movement-focused and breath-focused yoga practice on stress parameters and sustained attention: A randomized controlled pilot study. *Consciousness and Cognition*, *65*, 109-125. https://doi.org/10.1016/j.concog.2018.07.012

Schulz, C., König, H.-H., & Hajek, A. (2020). Differences in self-esteem between cat owners, dog owners, and individuals without pets. *Frontiers in Veterinary Science*, *7*, 1-8. https://doi.org/10.3389/fvets.2020.00552

Serpell, J. A. (1996). Evidence for an association between pet behavior and owner attachment levels. *Applied Animal Behaviour Science*, *47*(1–2), 49-60. https://doi.org/10.1016/0168-1591(95)01010-6

Seymour, V. (2016). The human-nature relationship and its impact on health: A critical review. *Frontiers in Public Health*, *4*, 1-12. https://doi.org/10.3389/fpubh.2016.00260

Shapira, S., Cohn-Schwartz, E., Yeshua-Katz, D., Aharonson-Daniel, L., Clarfield, A. M., & Sarid, O. (2021). Teaching and practicing cognitive-behavioral and mindfulness skills in a web-based platform among older adults through the COVID-19 pandemic: A pilot randomized controlled trial. *International Journal of Environmental Research and Public Health*, *18*(20), 1-14. https://doi.org/10.3390/ijerph182010563

Siegel, J. M. (1990). Stressful life events and use of physician services among the elderly: The moderating role of pet ownership. *Journal of Personality and Social Psychology*, *58*(6), 1081-1086. https://doi.org/10.1037/0022-3514.58.6.1081

Simpson, S. G., & Reid, C. L. (2014). Therapeutic alliance in videoconferencing psychotherapy: A review. *The Australian Journal of Rural Health*, *22*(6), 280-299. https://doi.org/10.1111/ajr.12149

Siqueira Reis, R., Hino, F., & Romelio Rodriguez Anez, C. (2010). Perceived stress scale: Reliability and validity study in Brazil. *Journal of Health Psychology*, *15*(1), 107-114. https://doi.org/10.1177/1359105309346343

Slater, S. J., Christiana, R. W., & Gustat, J. (2020). Recommendations for keeping parks and green space accessible for mental and physical health during COVID-19 and other pandemics. *Preventing Chronic Disease*, *17*, 1-5. https://doi.org/10.5888/pcd17.200204

Souter, M. A., & Miller, M. D. (2007). Do animal-assisted activities effectively treat depression? A meta-analysis. *Anthrozoos*, *20*(2), 167-180. https://doi.org/10.2752/175303707x207954

Spencer-Laitt, D., Eustis, E. H., Barlow, D. H., & Farchione, T. J. (2022). The impact of COVID-19 related social distancing on mental health outcomes: A transdiagnostic account. *International Journal of Environmental Research and Public Health*, *19*(11), 1-15. https://doi.org/10.3390/ijerph19116596

Statistics Canada. (2021, March 4). *Alcohol and cannabis use during the pandemic: Canadian perspectives survey series 6*. https://www150.statcan.gc.ca/n1/en/daily-quotidien/210304/dq210304a-eng.pdf?st=vkIIcCoC

Stieger, S., Lewetz, D., & Swami, V. (2021). Emotional well-being under conditions of lockdown: An experience sampling study in Austria during the COVID-19 pandemic. *Journal of Happiness Studies*, *22*(6), 2703-2720. https://doi.org/10.1007/s10902-020-00337-2

Stigsdotter, U. K., Paldottir, A. M., Burls, A., Chermaz, A., Ferrini, F., & Grahn, P. (2011). Nature based therapeutic interventions. In K. Nilsson, et al. (Eds.), *Forests, Trees, and Human Health*. Springer Link. https://doi.org/10.1007/978-90-481-9806-1_11

Stumbo, N. J., & Peterson, C. A. (2018). *Therapeutic recreation program design: Principles and procedures* (5th ed.). Urbana, Ill.

Sullivan, G. M., & Feinn, R. (2012). Using effect size-or why the P value is not enough. *Journal of Graduate Medical Education*, *4*(3), 279-282. https://doi.org/10.4300/JGME-D-12-00156.1

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd

Taylor, A. F., Kuo, F. E., & Sullivan, W. C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior, 33*(1), 54-77. https://doi.org/10.1177/00139160121972864

Terry, G., Hayfield, N., Clarke, V., & Braun, V. (2017). Thematic analysis. In Willig, C., & Stainton Rogers, W. (Eds.), *The SAGE handbook of qualitative research in psychology* (2nd ed., pp. 17-37). SAGE Publications.

Thompson, M. J. (2009). Animal-assisted play therapy: Canines as co-therapists. In G. R. Walz, J. C. Bleuer, & R. K. Yep (Eds.), *Compelling counseling interventions* (pp. 199-209). American Counseling Association.

Tian, H., Liu, Y., Li, Y., Wu, C., Chen, B., Kraemer, M. U. G., Li, B., Cai, J., Xu, B., Yang, Q., Wang, B., Yang, P., Cui, Y., Song, Y., Zheng, P., Wang, Q., Bjornstad, O. N., Yang, R., Grenfell, B. T., . . . Dye, C. (2020). An investigation of transmission control measures during the first 50 days of the COVID-19 epidemic in China. *Science (American Association for the Advancement of Science)*, *368*(6491), 638-642. https://doi.org/10.1126/science.abb6105

Tindle, J., & Tadi, P. (2020). Neuroanatomy, parasympathetic nervous system. Stat Pearls.

Toon, P. D. (2002). Using telephones in primary care. *BMJ*, *324*(7348), 1230-1231. https://doi.org/10.1136/bmj.324.7348.1230

Torales, J., O'Higgins, M., Castaldelli-Maia, J. M., & Ventriglio, A. (2020). The outbreak of COVID-19 coronavirus and its impact on global mental health. *International Journal of Social Psychiatry, 66*(4) 317-320. https://doi.org/10.1177/0020764020915212

Trick, L., Watkins, E., Windeatt, S., & Dickens, C. (2016). The association of perseverative negative thinking with depression, anxiety and emotional distress in people with long term conditions: A systematic review. *Journal of Psychosomatic Research, 91*, 89-101. https://doi.org/10.1016/j.jpsychores.2016.11.004

Tull, M. T., Edmonds, K. A., Scamaldo, K. M., Richmond, J. R., Rose, J. P., & Gratz, K. L. (2020). Psychological outcomes associated with stay-at-home orders and the perceived impact of COVID-19 on daily life. *Psychiatry Research, 289*, 1-6. https://doi.org/10.1016/j.psychres.2020.113098

Tyson, L., Hardeman, W., Stratton, G., Wilson, A. M., & Semlyen, J. (2022). The effects of social distancing and self-isolation during the COVID-19 pandemic on adults diagnosed with asthma: A qualitative study. *Journal of Health Psychology*, *27*(6), 1408-1420. https://doi.org/10.1177/13591053211012766

Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoić, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D., & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban Forestry & Urban Greening*, *56*, 1-9. https://doi.org/10.1016/j.ufug.2020.126888

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, *11*(3), 201-230. https://doi.org/10.1016/s0272-4944(05)80184-7

Vacha-Haase, T., Nilsson, J. E., Reetz, D. R., Lance, T. S., & Thompson, B. (2000). Reporting practices and APA editorial policies regarding statistical significance and effect size. *Theory & Psychology, 10*(3), 413-425. https://doi.org/10.1177/0959354300103006

Vagnini, D., Grassi, M. M., & Saita, E. (2023). Evaluating somatic experiencing to heal cancer trauma: First evidence with breast cancer survivors. *International Journal of Environmental Research and Public Health*, *20*(14), 1-19. https://doi.org/10.3390/ijerph20146412

Venter, Z. S., Barton, D. N., Gundersen, V., Figari, H., & Nowell, M. (2020). Urban nature in a time of crisis: Recreational use of green space increases during the COVID-19 outbreak in Oslo, Norway. *Environmental Research Letters*, *15*(10), 1-12. https://doi.org/10.1088/1748-9326/abb396

Wahba, M. A., & Bridwell, L. G. (1976). Maslow reconsidered: A review of research on the need hierarchy theory. *Organizational Behavior & Human Performance, 15*(2), 212–240. https://doi.org/10.1016/0030-5073(76)90038-6

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, *19*(1), 52-90. https://doi.org/10.1177/009365092019001003

Wampold, B. E. (2015). How important are the common factors in psychotherapy? An update. *World Psychiatry*, *14*(3), 270-277. https://doi.org/10.1002/wps.20238

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., McIntyre, R. S., Choo, F. N., Tran, B., Ho, R., & Sharma, V. K. (2020). A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain, Behavior, and Immunity*, *87*, 40-48. https://doi.org/10.1016/j.bbi.2020.04.028

Watkins-Martin, K., Bolanis, D., Richard-Devantoy, S., Pennestri, M., Malboeuf-Hurtubise, C., Philippe, F., Guindon, J., Gouin, J., Ouellet-Morin, I., & Geoffroy, M. (2022). The effects of walking in nature on negative and positive affect in adult psychiatric outpatients with major depressive disorder: A randomized-controlled study. *Journal of Affective Disorders*, *318*, 291-298. https://doi.org/10.1016/j.jad.2022.08.121

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063-1070. https://doi.org/10.1037/0022-3514.54.6.1063

Webber, S. C., Porter, M. M., & Menec, V. H. (2010). Mobility in older adults: a comprehensive framework. *The Gerontologist*, *50*(4), 443-450. https://doi.org/10.1093/geront/gnq013

Wertz, F. J., Charmaz, K., McMullen, L. M., Josselson, R., Anderson, R., & McSpadden, E. (2011). *Five ways of doing qualitative analysis: Phenomenological psychology, grounded theory, discourse analysis, narrative research, and intuitive inquiry* (1st ed.). Guilford Publications.

Wheaton, M. G., Abramowitz, J. S., Berman, N. C., Fabricant, L. E., & Olatunji, B. O. (2012). Psychological predictors of anxiety in response to the H1N1 (swine flu) pandemic. *Cognitive Therapy and Research*, *36*, 210-218. https://doi.org/10.1007/s10608-011-9353-3

White, M. P., Alcock, I., Grellier, J., Wheeler, B. W., Hartig, T., Warber, S. L., Bone, A., Depledge, M. H., & Fleming, L. E. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Scientific Reports*, *9*(1), 1-11. https://doi.org/10.1038/s41598-019-44097-3

White-Lewis, S. (2020). Equine-assisted therapies using horses as healers: A concept analysis. *Nursing Open*, *7*(1), 58-67. https://doi.org/10.1002/nop2.377

Wiederhold, B. K. (2020). Connecting through technology during the Coronavirus Disease 2019 pandemic: Avoiding "zoom fatigue". *Cyberpsychology, Behavior, and Social Networking*, *23*(7), 437-438. https://doi.org/10.1089/cyber.2020.29188.bkw

Williams, L., Rollins, L., Young, D., Fleming, L., Grealy, M., Janssen, X., Kirk, A., MacDonald, B., & Flowers, P. (2021). What have we learned about positive changes experienced during COVID-19 lockdown? Evidence of the social patterning of change. *PloS One*, *16*(1), 1-10. https://doi.org/10.1371/journal.pone.0244873

Wilson, E. O. (1984). *Biophilia*. Harvard University Press.

Wilson, C. C., & Turner, D. C. (1998). *Companion animals in human health*. Sage publications. http://dx.doi.org/10.4135/9781452232959

Whitehead, B. R. (2021). COVID-19 as a stressor: Pandemic expectations, perceived stress, and negative affect in older adults. *The Journals of Gerontology*, *76*(2), 59-64. https://doi.org/10.1093/geronb/gbaa153

Whitehead, B. R., & Bergeman, C. S. (2013). Ups and downs of daily life: Age effects on the impact of daily appraisal variability on depressive symptoms. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *69*(3), 387-396. https://doi.org/10.1093/geronb/gbt019

Whitehead, B. R., & Torossian, E. (2021). Older adults' experience of the COVID-19 pandemic: A mixed-methods analysis of stresses and joys. *The Gerontologist*, *61*(1), 36-47. https://doi.org/10.1093/geront/gnaa12

Wilkinson, L. (1999). Statistical methods in psychology journals: Guidelines and explanations. *The American Psychologist*, *54*(8), 594-604. https://doi.org/10.1037/0003-066X.54.8.594

World Health Organization. (2003). Investing in mental health. https://www.who.int/mental_health/media/investing_mnh.pdf

World Health Organization. (2020a). *Policy brief: COVID-19 and the need for action on mental health*. https://unsdg-un-org.ezproxy.macewan.ca/sites/default/files/2020-05/UN-Policy-Brief-COVID-19-and-mental-health.pdf

World Health Organization. (2020b, March 18). Mental health and psychosocial considerations during the COVID-19 outbreak. https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf

World Health Organization. (2020c, October 5). The impact of COVID-19 on mental, neurological and substance use services. https://www.who.int/publications/i/item/978924012455

World Health Organization. (2020d, December 1). Coronavirus disease (COVID-19) advice for the public. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

World Health Organization. (2021). *Mental disorders*. https://www.who.int/news-room/fact-sheets/detail/mental-disorders

World Wildlife Fund. (2021). Our forests, rivers and oceans are worth so much to us. https://www.wwf.org.uk/what-we-do/valuing-nature

Wright, J. H., Brown, G. K., Thase, M. E., & Basco, M. R. (2017). *Learning cognitive behavior therapy: An illustrated guide.* American Psychiatric Publishing, Inc.

Wu, P., Fang, Y., Guan, Z., Fan, B., Kong, J., Yao, Z., Liu, X., Fuller, C. J., Susser, E., & Lu, J. (2009). The psychological impact of the SARS epidemic on hospital employees in China: Exposure, risk perception, and altruistic acceptance of risk. *The Canadian Journal of Psychiatry*, *54*(5), 302-311. https://doi.org/10.1177/070674370905400504

Young, M. E. (2021). *Learning the art of helping: Building blocks and techniques* (7th ed.). Pearson Education Inc

Zajacova, A., Jehn, A., Stackhouse, M., Choi, K. H., Denice, P., Haan, M., & Ramos, H. (2020). Mental health and economic concerns from March to May during the COVID-19 pandemic in Canada: Insights from an analysis of repeated cross-sectional surveys. *SSM - Population Health*, *12*, 1-7. https://doi.org/10.1016/j.ssmph.2020.100704

Zhu, J. L., Schülke, R., Vatansever, D., Xi, D., Yan, J., Zhao, H., Xie, X., Feng, J., Chen, M. Y., Sahakian, B. J., & Wang, S. (2021a). Mindfulness practice for protecting mental health during the COVID-19 pandemic. *Translational Psychiatry*, *11*(1), 329-329. https://doi.org/10.1038/s41398-021-01459-8

Zhu, Y., Zhang, L., Zhou, X., Li, C., & Yang, D. (2021b). The impact of social distancing during COVID-19: A conditional process model of negative emotions, alienation, affective disorders, and post-traumatic stress disorder. *Journal of Affective Disorders*, *281*, 131-137. https://doi.org/10.1016/j.jad.2020.12.004

Tables

Table 1

Sociodemographic Characteristics of Participants at Baseline

Baseline characteristic	*n*	*%*
Age*		
	43	N/A
Gender		
Male	14	29.2
Female	34	70.8

Note: N = 48. Participants were on average 38.12 years old (*SD* = 11.2).
*Reflects the number and percentage of participants answering "yes" to this question.

Table 2

Tests of Normality on Differences of Dependent Variables

Dependent Variable	Kolmogorov-Smirnov			Shapiro Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Diffference_PSS10	.121	48	.076	0.949	48	.036
Difference_PosAffect	.094	48	.200	.975	48	.382
Difference_NegAffect	.184	48	<.001	.870	48	<.001

Note: Shapiro-Wilk and Kolmogorov-Smirnov tests were conducted to determine whether the dependent variables of perceived stress, positive affect, and negative affect met assumption of normality. The Perceived Stress Scale-10 (PSS-10) assessed participants perceived stress before and after attending Time on the Land, and the Positive and Negative Affect Schedule assessed participants positive (PosAffect) and negative affect (NegAffect) before and after attending Time on the Land. A sig. score < 0.05 is not normal.

Table 3

Paired Samples T-test of Differences of Perceived Stress and Positive Affect

Dependent Variable	t	df	*p*
PSS-10	4.290	47	<.001
Positive Affect	-7.637	47	<.001

Note: The differences of the dependent variables of perceived stress measured by the Perceived Stress Scale-10 (PSS-10) and positive affect measured by the Positive and Negative Affect Schedule were assessed using a parametric paired samples test. A p-value score <0.05 is significant (p = <.001<.005).

Table 4

Effect Sizes of Differences of Dependent Variables

Dependent Variable	Cohen's *d*	Pearson's *r*
PSS-10	.619	-
Positive Affect	-1.102	-
Negative Affect	-	0.49

Note: The difference of participants perceived stress measured by the Perceived Stress Scale-10 before and after attending Time on the Land (PSS-10) suggests a medium-large effect size (*d* = .619). The difference of participants positive affect measured by the Positive and Negative Affect Schedule before and after Time on the Land suggests a large-very large effect size (*d* = 1.102), as suggested by Sawilowsky (2009), and difference of participants negative affect as a large effect size according to Cohen (1988).

Table 5

Parametric Statistics of Perceived Stress Scores at Baseline and Post-Session

	M	*SD*
Perceived Stress (Baseline Survey)	15.79	6.75
Perceived Stress (Post-Session Survey)	11.25	5.77

Note: Mean and standard deviation of differences of participants perceived stress measured at baseline and post-session with the 10 item Perceived Stress Scale (Cohen et al., 1983). Scores range from 0-40, with higher scores representing higher perceived stress, see Appendix C for further details (Cohen et al., 1983).

Table 6

Parametric Statistics of Positive Affect Scores at Baseline and Post-Session

	M	*SD*
Positive Affect (Baseline Survey)	29.54	7.99
Positive Affect (Post-Session Survey)	35.79	8.44

Note: Mean and standard deviation of differences of participants positive affect measured at baseline and post-session with the Positive and Negative Affect Schedule (Watson et al., 1998). Higher scores represent higher levels of positive affect, and vice versa. The range of scores is between 10-50 (Watson et al., 1998).

Table 7

Non-Parametric Statistics of Negative Affect Scores at Baseline and Post-Session

	M	*Mdn*	*SD*
Negative Affect (Baseline Survey)	17.833	15.0	7.41859
Negative Affect (Post-Survey)	13.4792	12.0	5.20634

Note: Mean, median, and standard deviation of differences of participants negative affect measured at baseline and post-session with the Positive and Negative Affect Schedule (Watson et al., 1998). Higher scores represent higher levels of negative affect, and vice versa. The range of scores is between 10-50 (Watson et al., 1998).

Table 8

Example of Thematic Analysis from Sections of Participant Responses

Transcription	Coding	Category	Theme
Calmer, able to have perspective for life and what can be managed and overcome. (Participant 18)	⊃ Broader perspective on concerns	⊃ Change in perspective	⊃ Gained broader perspective
Change of pace. When I'm in town with the kids it feels so hectic. Being outside at this farm was a new and fun environment compared to being at home. (Participant 5)	⊃ Change from urban to natural environment	⊃ Sanctuary from psychological stressors	⊃ A psychological sanctuary
I feel calmer and more connected to the wider world, especially nature and animals. (Participant 22)	⊃ Increased connection to things beyond self	⊃ Oneness	⊃ Gained broader perspective
Watching my daughter have courage and respect in approaching and feeding the animals was also peace generating for me. (Participant 15)	⊃ Peaceful	⊃ Positive emotional impact from human-animal interactions	⊃ Human-nature relationship
	⊃ Observing children's experience	⊃ Sense of belonging	⊃ A greater sense of purpose
We lead a busy life and taking intentional time to have an experience at the farm together helped to decrease that feeling of "producing". (Participant 24)	⊃ Reduced sense of urgency	⊃ Sanctuary from psychological stressors	⊃ A psychological sanctuary
The animals give off a very calm demeanour and I feel like that transferred over to me. (Participant 34)	⊃ Calming	⊃ Positive emotions from human- animal interactions	⊃ Human-nature relationship
That feeling of connection, calm, and presence. (Participant 20)	⊃ Parasympathetic engagement	⊃ Present-centered awareness	⊃ Being immersed in the moment
I will hold on to the memory of my 3-year old's excitement and witnessing her growing personality and characteristics, such as making sure all the goats who wanted a treat was able to have one. I learned about how she is understanding "fairness". (Participant 24)	⊃ Observing children's experience	⊃ Sense of belonging	⊃ A greater sense of purpose
	⊃ Impacts on learning	⊃ Nature as teacher	⊃ Human-nature relationship

Figures

Figure 1

Triangulation Convergence Design Model (adapted from Creswell & Plano Clark, 2007)

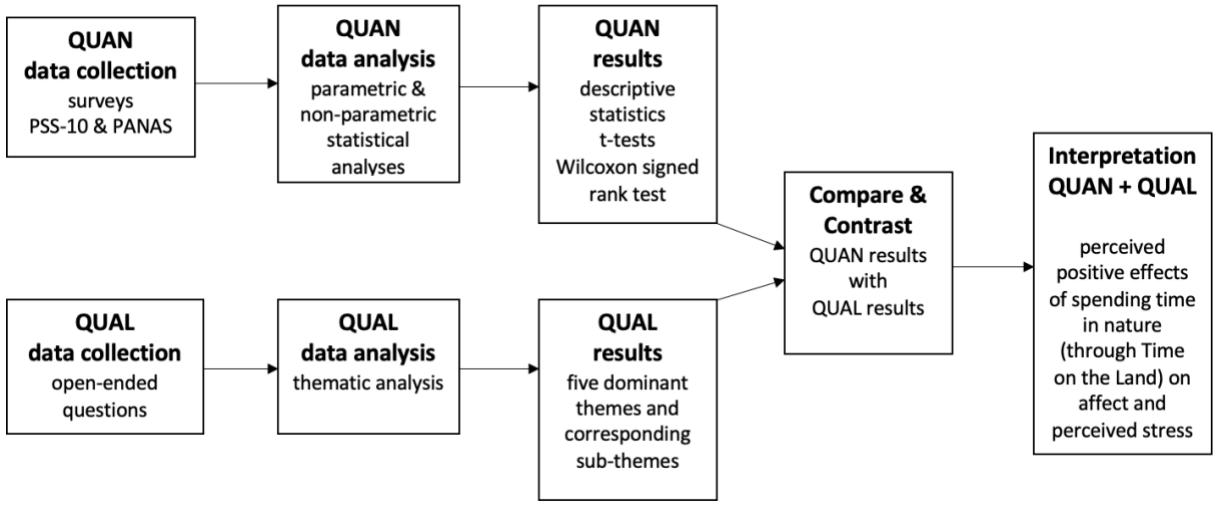
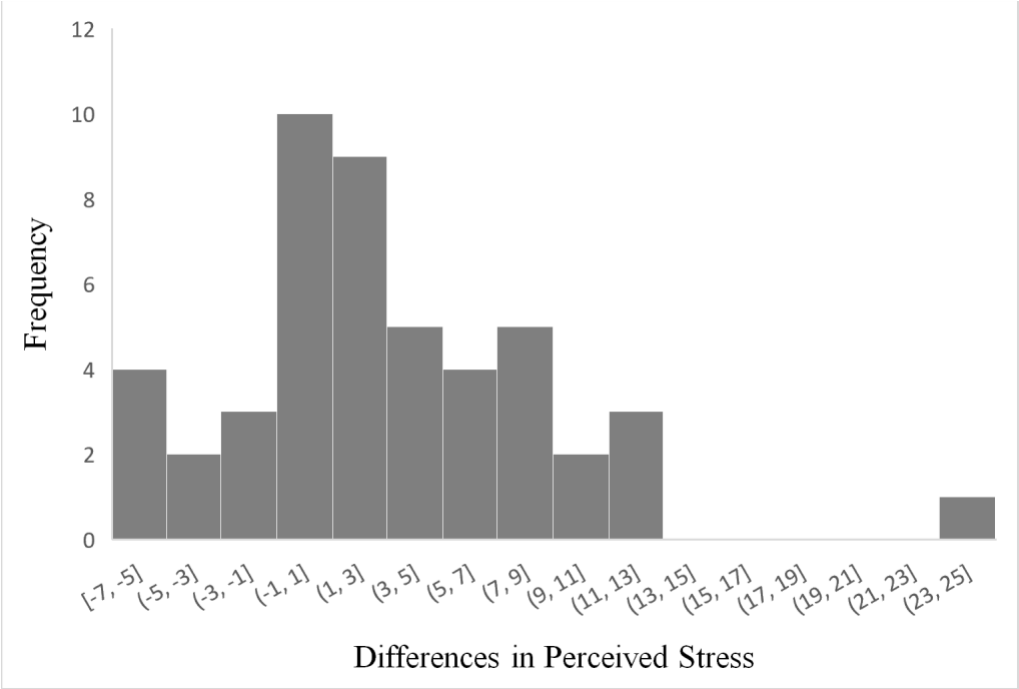


Figure 2

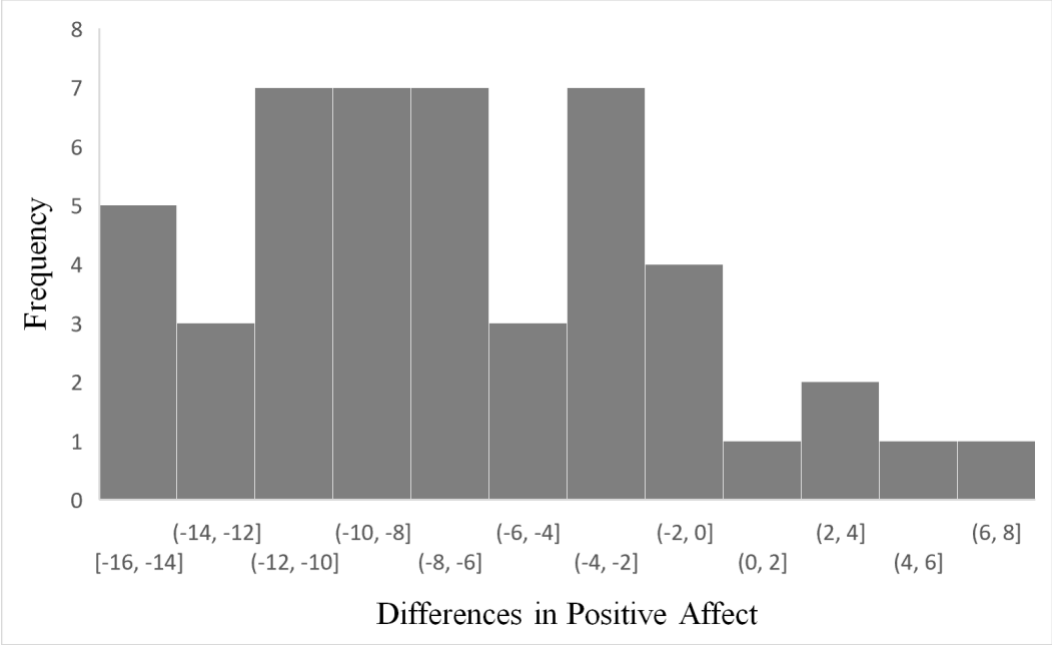
Histogram of Differences (Pre-Post) in Participants Scores of Perceived Stress from PSS-10



Note: The Perceived Stress Scale -10 (PSS-10) was used to assess participants perceived stress before and after attending Time on the Land. Histogram of the differences represents a normal distribution, with exception of single outlier, which suggests the normality assumption is met.

Figure 3

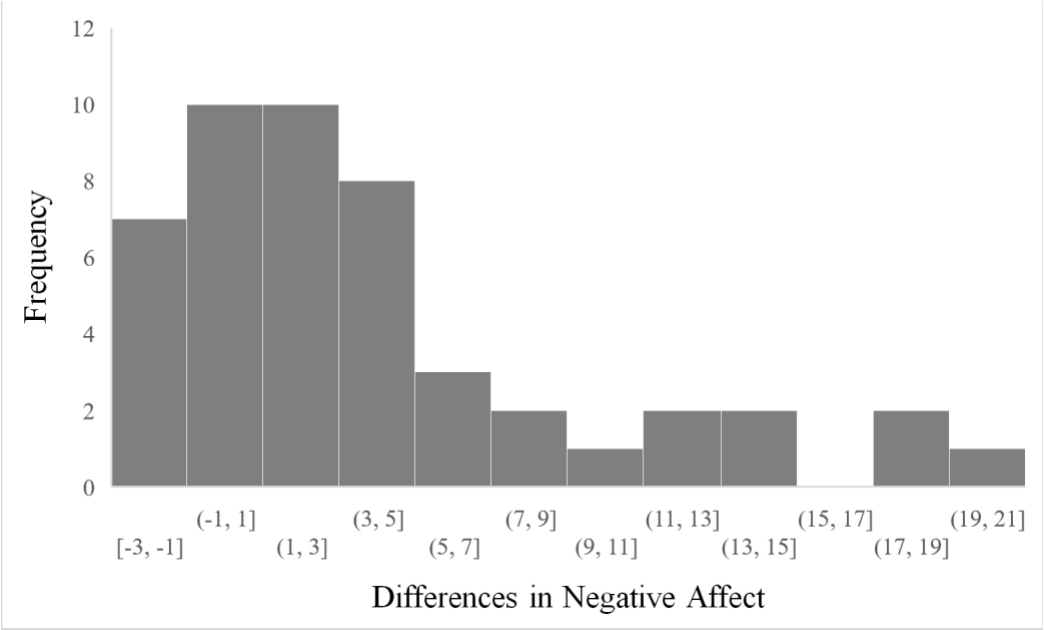
Histogram of Differences (Pre-Post) in Participants Scores of Positive Affect from PANAS



Note: The Positive and Negative Affect Schedule (PANAS) was used to assess positive affect. Histogram represents normal distribution, which suggests the normality assumption is met. Differences of positive affect from baseline (pre) and post-session (post) are represented.

Figure 4

Histogram of Differences (Pre-Post) in Participants Scores of Negative Affect from PANAS



Note: The Positive and Negative Affect Schedule (PANAS) was used to assess negative affect. Histogram represents a right skewed distribution, suggesting the normality assumption is not met. Differences of negative affect from baseline (pre) and post-session (post) are represented.

Figure 5

Initial Thematic Map

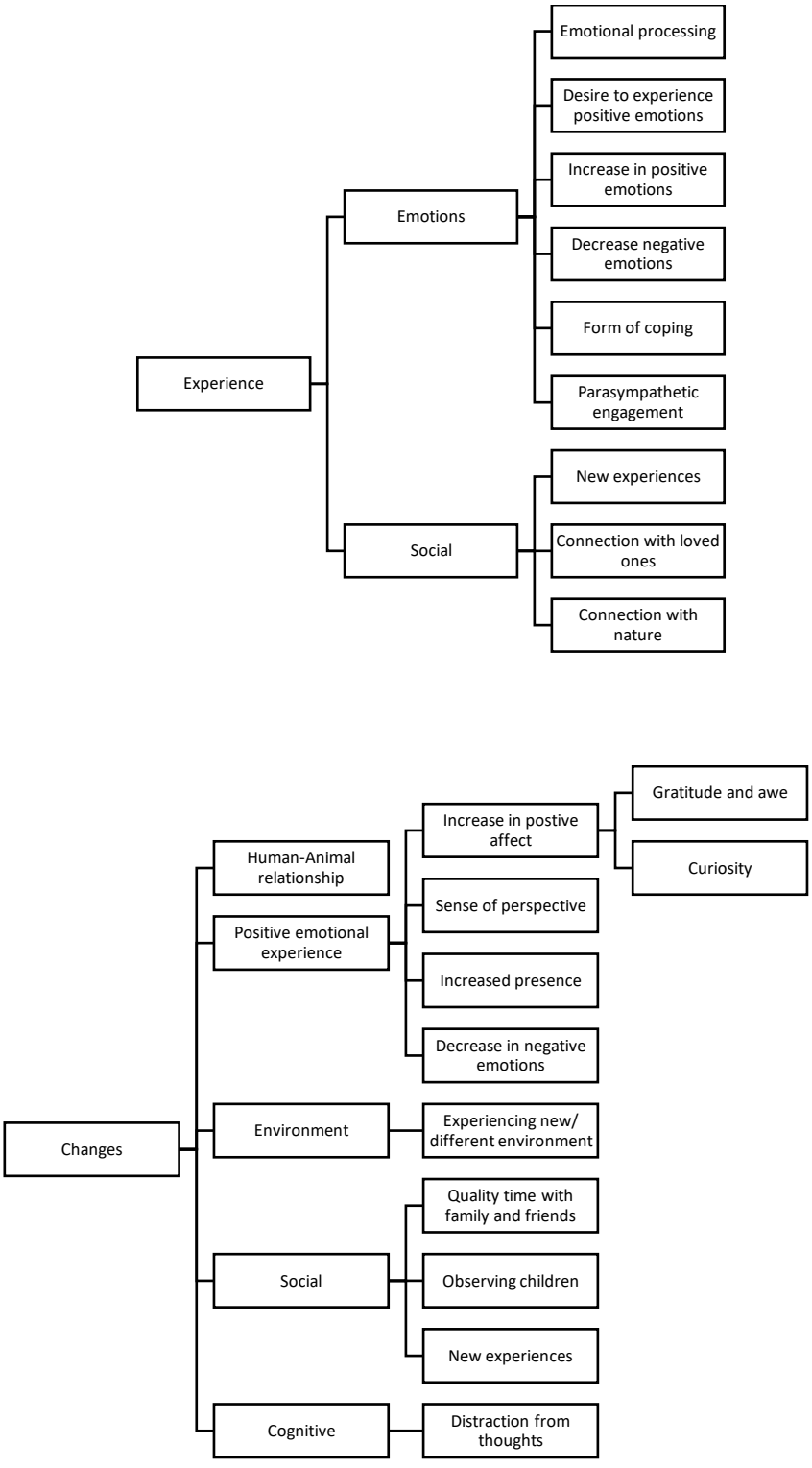
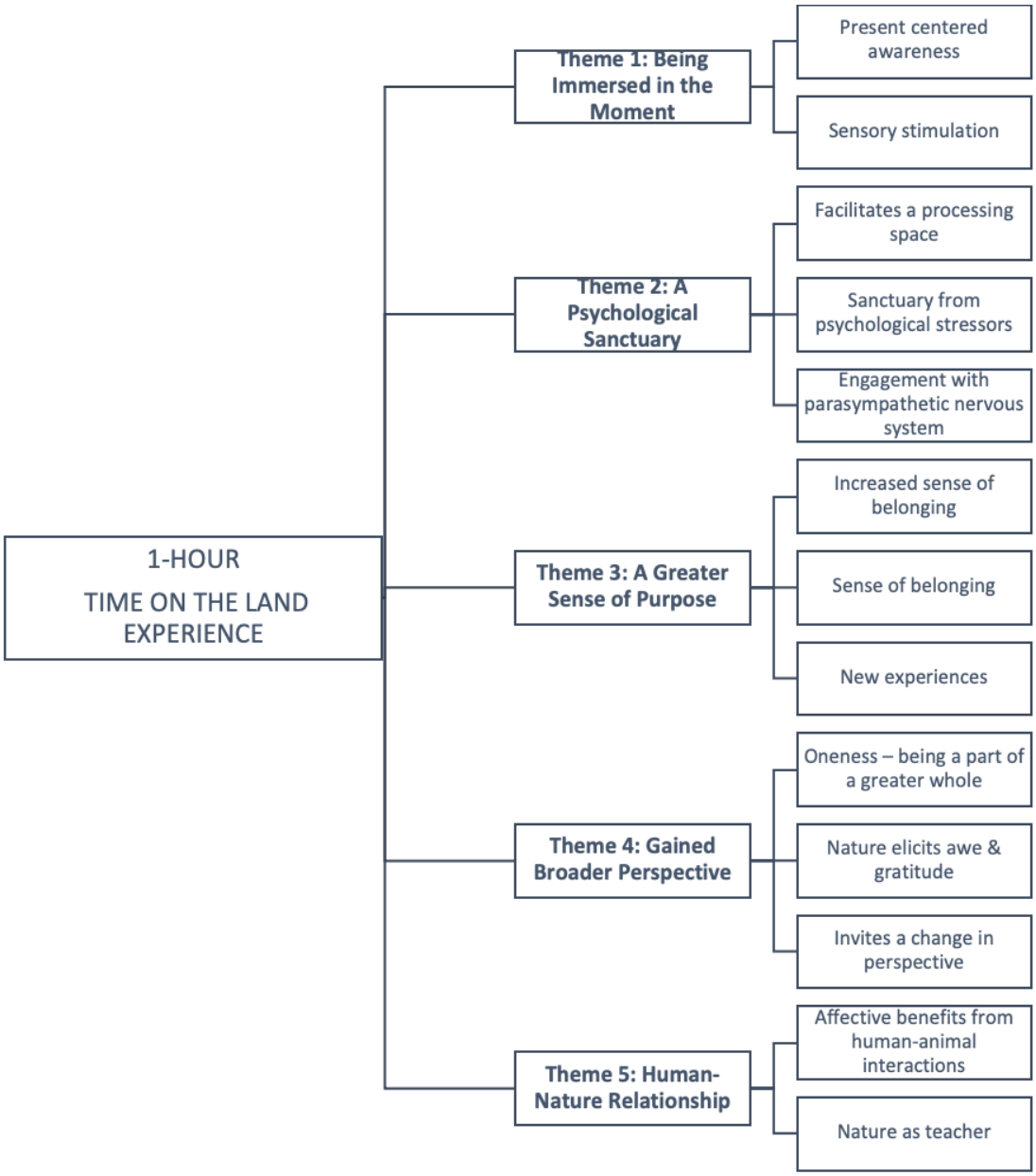


Figure 6

Revised Thematic Map



Appendix A
Baseline Survey

INFORMED CONSENT

Please read the following information carefully before beginning the survey:

Q1 INFORMED CONSENT

COVID-19: THE EFFECT OF "TIME ON THE LAND" ON PERCEPTIONS OF EXPERIENCES OF AFFECT AND STRESS IN ADULTS

You are invited to participate in a research project conducted by master's student, Brooke Greenwood, of the Education department at the University of Lethbridge. In this study, we are interested in examining the effect of spending time in nature on perceived stress and adults amidst the global COVID-19 pandemic. Specifically, through examining the effect on individuals participating in Dreamcatcher Nature Assisted Therapy's Time on the Land Program. Through your participation, I hope to better understand the effect of spending time in nature on mental health, by examining differences in perceived stress, affect (emotions), and capture the subjective perceptions of elements of the Time on the Land experience that are most beneficial.

RESPONSES WILL BE KEPT CONFIDENTIAL, WITH ALL DATA BEING AGGREGATED

About the Surveys

This study encompasses two surveys that will be completed at two different periods of time. Each survey should take approximately 15 to 20 minutes to complete. The first survey will be completed before participants arrive at their scheduled Time on the Land session at Dreamcatcher Nature Assisted Therapy. The second survey will be completed immediately after the participants scheduled Time on the Land session. The second survey will be completed before participants leave the facility. Please only complete the surveys once, at each time listed above. There are no potential risks or discomforts associated with participation in this study. Benefits include the opportunity to participate in and understand the processes involved in a research study. The scientific community will benefit from the proposed study, as the research is novel in nature.

This survey closes December 20, 2021.

ALL RESPONSES WILL BE CONFIDENTIAL.

Research Survey Participation

Your participation in this study is completely voluntary; you may decline to participate or skip some of the questions without penalty. All responses are anonymous and confidential.

Additionally, only aggregate data will be reported (i.e., tallies and open-ended response themes). You are free to withdraw from the study at any point up until the submission of your responses for the final, post-session survey. If you choose to discontinue participation after you have submitted your responses for the second survey, randomized study ID numbers will be

assigned to your responses that the primary researcher (Brooke Greenwood) will utilize to remove the information collected to the point of withdrawal.

If at any point in time during the study you would like to evoke your right to withdraw, notify the main researcher, Brooke Greenwood via email or in person. The researcher will then provide you with a debrief form explaining the purposes and intentions of the study.

Privacy Protection

The researchers acknowledge that the host of the online survey (e.g., Qualtrics) may automatically collect participant data without their knowledge (i.e., IP addresses). Please note that confidentiality of data cannot be entirely guaranteed while in transit over the Internet. Although this information may be provided or made accessible, the researchers will not use or save this information. The privacy policy for Qualtrics can be accessed at https://www.qualtrics.com/privacy-statement/.

The collected information will be stored confidentially on a password protected computer in a locked office, with access restricted to the primary researcher Brooke Greenwood, and thesis supervisor Dr. Elaine Greidanus in the Faculty of Education at the University of Lethbridge. Responses will be deleted two years after data collection has been completed. The results will appear in a written thesis document. They may also be presented at conferences and published in peer-reviewed journals.

If you have questions at any time about the study or the procedures, you may contact the primary researcher Brooke Greenwood, email brooke.greenwood@uleth,ca. This project has been reviewed and approved by the University of Lethbridge Human Subject Research Committee. If you feel you have not been treated per the descriptions in this form, or your rights as a participant in research have been violated during this project, you may contact Susan Entz, ethics officer, Office of Research Ethics, University of Lethbridge, (403) 329-2747, or susan.entz@uleth.ca.

If you wish to participate in the survey, please check "I agree to participate in this study and have my data used" and then proceed to the questions. Submission of your responses will be accepted as implied consent to participate.

Thank you in advance for your participation.

BASELINE SURVEY

Consent

Q1

I agree to participate in this study and have my data used
I do not agree to participate in this study or have my data used

Demographics

Q2 Please indicate your age

_____

Q3 Please indicate which gender you most identify with

- Male (1)
- Female (2)
- Transgender (3)
- Other (4)
- Prefer not to say (5)

Q4 Please indicate the range that best represents your personal yearly income,

- Under $5,000 a year (1)
- $5,000 to $19,999 a year (2)
- $20,000 to $34,999 a year (3)
- $35,000 to $99,999 a year (4)
- $100,000 to $249,999 a year (5)
- More than $250,000 a year (6)
- Don't know, or prefer not to say (7)

Q5 Please indicate your working status

- Employed full time (1)
- Employed part time (2)
- Unemployed (3)
- Student (4)
- Retired (5)
- Prefer not to say (6)

Q6 Please indicate the level of education you have completed so far

- Elementary school level or less (1)
- High school diploma (2)
- College diploma (3)
- Undergraduate degree (4)
- Masters degree (5)
- Doctorate degree (6)

Perceived Stress Scale (PSS-10)
Questions 7 – 16 in this survey will ask you about your feelings and thoughts **today.** In each case, you will be asked to indicate how often you felt or thought a certain way.

Q7 Today, how often have you been upset because of something that happened unexpectedly?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q8 Today, how often have you felt that you were unable to control the important things in your life?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q9 Today, how often have you felt nervous and "stressed"?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q10 Today, how often have you felt confident about your ability to handle your personal problems?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q11 Today, how often have you felt that things were going your way?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q12 Today, how often have you found that you could not cope with all the things that you had to do?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q13 Today, how often have you been able to control irritations in your life?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q14 Today, how often have you felt that you were on top of things?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q15 Today, how often have you been angered because of things that happened that were outside of your control?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q16 Today, how often have you felt difficulties were piling up so high that you could not overcome them?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Positive and Negative Affect Schedule (PANAS)
Questions 17—36 of this survey consists of a number of words that describe different feelings and emotions. Reach each item and then choose the number that corresponds with each item. Please indicate to what extent **you have felt this way today**.

Q17 Interested
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q18 Distressed
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q19 Excited
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q20 Upset
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q21 Strong
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q22 Guilty
- Very slightly or not at all (1)
- A little (2)

- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q23 Scared
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q24 Hostile
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q25 Enthusiastic
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q26 Proud
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q27 Irritable
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q28 Alert

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q29 Ashamed

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q30 Inspired

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q31 Nervous

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q32 Determined

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q33 Attentive

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q34 Jittery

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q35 Active

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q36 Afraid

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Qualitative Open-Ended Question

Baseline Survey

Q37 Please describe below what you hope to attain attending your Time on the Land session at Dreamcatcher Nature Assisted Therapy (e.g., stress relief, relaxation, quality time with family, an adventure, etc.)

_____

_____

_____

Appendix B

Post-Session Survey

INFORMED CONSENT

Please read the following information carefully before beginning the survey:

Q1 INFORMED CONSENT

CONNECTING WITH NATURE DURING COVID-19: THE EFFECT OF "TIME ON THE LAND" ON PERCEPTIONS OF EXPERIENCES OF AFFECT AND STRESS IN ADULTS

You are invited to participate in a research project conducted by master's student, Brooke Greenwood, of the Education department at the University of Lethbridge. In this study, we are interested in examining the effect of spending time in nature on perceived stress and adults amidst the global COVID-19 pandemic. Specifically, through examining the effect on individuals participating in Dreamcatcher Nature Assisted Therapy's Time on the Land Program. Through your participation, I hope to better understand the effect of spending time in nature on mental health, by examining differences in perceived stress, affect (emotions), and capture the subjective perceptions of elements of the Time on the Land experience that are most beneficial.

RESPONSES WILL BE KEPT CONFIDENTIAL, WITH ALL DATA BEING AGGREGATED

About the Surveys

This study encompasses two surveys that will be completed at two different periods of time. Each survey should take approximately 15 to 20 minutes to complete. The first survey will be completed before participants arrive to their scheduled Time on the Land session at Dreamcatcher Nature Assisted Therapy. The second survey will be completed immediately after the participants scheduled Time on the Land session. The second survey will be completed before participants leave the facility. Please only complete the surveys once, at each time listed above. There are no potential risks or discomforts associated with participation in this study. Benefits include the opportunity to participate in and understand the processes involved in a research study. The scientific community will benefit from the proposed study, as the research is novel in nature.

ALL RESPONSES WILL BE CONFIDENTIAL.

This survey closes December 20, 2021.

Research Survey Participation

Your participation in this study is completely voluntary; you may decline to participate or skip some of the questions without penalty. All responses are anonymous and confidential.

Additionally, only aggregate data will be reported (i.e., tallies and open-ended response themes). You are free to withdraw from the study at any point up until the submission of your responses for the final, post-session survey. If you choose to discontinue participation after you

have submitted your responses for the second survey, randomized study ID numbers will be assigned to your responses that the primary researcher (Brooke Greenwood) will utilize to remove the information collected to the point of withdrawal.

If at any point in time during the study you would like to evoke your right to withdraw, notify the main researcher, Brooke Greenwood via email or in person. The researcher will then provide you with a debrief form explaining the purposes and intentions of the study.

Privacy Protection

The researchers acknowledge that the host of the online survey (e.g., Qualtrics) may automatically collect participant data without their knowledge (i.e., IP addresses). Please note that confidentiality of data cannot be entirely guaranteed while in transit over the Internet. Although this information may be provided or made accessible, the researchers will not use or save this information. The privacy policy for Qualtrics can be accessed at https://www.qualtrics.com/privacy-statement/.

The collected information will be stored confidentially on a password protected computer in a locked office, with access restricted to the primary researcher Brooke Greenwood, and thesis supervisor Dr. Elaine Greidanus in the Faculty of Education at the University of Lethbridge. Responses will be deleted two years after data collection has been completed. The results will appear in a written thesis document. They may also be presented at conferences and published in peer-reviewed journals.

If you have questions at any time about the study or the procedures, you may contact the primary researcher Brooke Greenwood, email brooke.greenwood@uleth,ca. This project has been reviewed and approved by the University of Lethbridge Human Subject Research Committee. If you feel you have not been treated per the descriptions in this form, or your rights as a participant in research have been violated during this project, you may contact Susan Entz, ethics officer, Office of Research Ethics, University of Lethbridge, (403) 329-2747, or susan.entz@uleth.ca.

If you wish to participate in the survey, please check "I agree to participate in this study and have my data used" and then proceed to the questions. Submission of your responses will be accepted as implied consent to participate.

Thank you in advance for your participation.

POST-SESSION SURVEY

Perceived Stress Scale (PSS-10)
Questions 1 – 10 in this survey will ask you about your feelings and thoughts **today.** In each case, you will be asked to indicate how often you felt or thought a certain way.

Q1 Today, how often have you been upset because of something that happened unexpectedly?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q2 Today, how often have you felt that you were unable to control the important things in your life?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q3 Today, how often have you felt nervous and "stressed"?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q4 Today, how often have you felt confident about your ability to handle your personal problems?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q5 Today, how often have you felt that things were going your way?
- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q6 Today, how often have you found that you could not cope with all the things that you had to do?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q7 Today, how often have you been able to control irritations in your life?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q8 Today, how often have you felt that you were on top of things?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q9 Today, how often have you been angered because of things that happened that were outside of your control?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Q10 Today, how often have you felt difficulties were piling up so high that you could not overcome them?

- Never (0)
- Almost never (1)
- Sometimes (2)
- Fairly often (3)
- Very often (4)

Positive and Negative Affect Schedule (PANAS)
Questions 11—30 of this survey consists of a number of words that describe different feelings and emotions. Reach each item and then choose the number that corresponds with each item. Please indicate to what extent **you have felt this way today**.

Q11 Interested
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q12 Distressed
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q13 Excited
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q14 Upset
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q15 Strong
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q16 Guilty
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q17 Scared
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q18 Hostile
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q19 Enthusiastic
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q20 Proud
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q21 Irritable
- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q22 Alert

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q23 Ashamed

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q24 Inspired

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q25 Nervous

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q26 Determined

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q27 Attentive

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q28 Jittery

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q29 Active

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Q30 Afraid

- Very slightly or not at all (1)
- A little (2)
- Moderately (3)
- Quite a bit (4)
- Extremely (5)

Qualitative Open-Ended Questions

Post-Session Survey

The following questions will ask you reflect on your experience with Time on the Land at Dreamcatcher Nature Assisted Therapy. Please describe your answers in as much detail as possible!

Q31 How were you feeling when you first arrived at Dreamcatcher? Please describe.

_____
_____
_____

Q32 After your 1-hour experience with Time on the Land, please describe how you are feeling right now.

_____
_____
_____

Q33 What happened since you got here that lead to changes in your feelings?

_____
_____
_____

Q34 What about your experience at Dreamcatcher today would you like to hold on to?

_____
_____
_____

You have now successfully completed the second survey of this research study.

In appreciation for your time, you now have the option to enter yourself into a draw to win one of four $100 prepaid Visa cards!

If you are interested in entering the draw, please leave your contact information below:

5. **To ensure confidentiality, this information will be kept separate from the data collected in this survey**

Name: Phone number:

Q35
DEBRIEFING
UNIVERSITY OF LETHBRIDGE, FACULTY OF EDUCATION
PROJECT SUMMARY (REB#)

Connecting with Nature During COVID-19: The Effect of "Time on the Land" on Perceptions of Experiences of Affect and Stress in Adults

Student Researcher: Brooke Greenwood (Master's Student)
Supervisor: Dr. Elaine Greidanus

Thank you for participating in our study! We hope that you found your experience informative and enjoyable. At the beginning of the study, we told you that more information about our research would be provided to you at the end of your Time on the Land visit.

This is a gentle reminder that there are a total of two surveys total within this study. You just completed the second, and last, survey! The completion and submission of this survey will automatically enter you into a draw to win one of four $100.00 prepaid Visa cards! The primary researcher (Brooke Greenwood) will email the winners of these prizes via email by December 20, 2021.

Please take the time to read the information in this form to find out more about our goals and objectives.

Please print this form or save a copy of it for your reference.

Amidst the COVID-19 pandemic, stringent public health measures are necessary to prevent the spread of disease, yet the unintended effects on the psychological wellbeing of adults have been significant. Prior to COVID-19, rates of stress were highly prevalent amongst adult populations. However, current research suggests rates have increased substantially, as new concerns develop, and pre-existing conditions are exacerbated. Thus, research is needed to identify effective psychotherapeutic interventions that minimize the negative psychological consequences of the COVID-19 pandemic and promote human wellbeing.

A growing body of literature suggests the benefits of spending time in natural environments. Beliefs about the benefits of nature has been positively influencing human health for centuries. The biophilia hypothesis identifies humans' deeply rooted affiliation for all living things, which ultimately serves as the foundational basis of the beneficial effects of nature. Spending time in nature has gone from an activity assumed to be good for us, to one with multiple identified biopsychosocial benefits, regardless of one's mental or physical health. Additionally, benefits can be detected in as little as five to ten minutes. Adults can take advantage of multiple, easily accessible green oases to reduce their stress levels, and improve memory and cognition. Furthermore, the role of human-animal interactions within green spaces may serve to fulfill the basic human need of connection. Thus, amidst the current circumstances of the COVID-19 pandemic, interacting with nature may be a unique medium to decrease adults' stress, enhance positive affect, and in turn, improve wellbeing.

Given the urgency of deterring the negative psychological effects of the COVID-19 pandemic, it seems the use of nature as a therapeutic medium warrants serious consideration. However, limited research has been conducted regarding its use, especially within the current context of the COVID-19 pandemic. Therefore, this study aims to address this gap in the literature.

Overall, this study aimed to investigate the effect of a Time on the Land program on adult participants levels of perceived stress and positive/negative affect amidst the COVID-19 pandemic. The surveys were devised to measure perceived stress, positive and negative affect, and capture subjective experiences of participants attending the Time on the Land Program at Dreamcatcher Nature Assisted Therapy. Results may provide evidence to indicate that spending time in nature is a cost effective, accessible way to alleviate adults' psychological distress associated with the COVID-19 pandemic. During this unprecedented time of COVID-19, connecting with nature can be highlighted as a cost-effective and easily accessible intervention to promote human health and wellbeing.

The **purpose** of the present study was to address the above stated gap in the literature, by investigating the effect of a Time on the Land Program at Dreamcatcher Nature Assisted Therapy on adults perceived stress and positive/negative affect amidst the COVID-19 pandemic. Thus, this study has **four** major research questions:

6. (**RQ1**) What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on perceived stress levels in adults?
7. (**RQ2**) What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on positive and negative affect levels in adults?
8. (**RQ3**) How do participants describe their experience with Time on the Land?
9. (**RQ4**) How do the themes mentioned by the participants' help to explain changes in levels of perceived stress? Positive and negative affect?

The **hypothesis** of this study was as follows: If spending time in nature has beneficial effects on adults' emotional wellbeing, then we predict that participants will report lower levels of perceived stress, lower levels of negative affect, and higher levels of positive affect after attending a Time on the Land session.

Risks: Compared to traditional forms of psychotherapy, nature assisted activities, have inherent dangers, hazards, and risks. This study utilizes a Time on the Land program, which is categorized under "Animal and Nature Activities". Risks of such nature-assisted activities includes but is not limited to, interacting with large animals (fence bound), and being in a farm environment, as provided by the "host" (i.e., Dreamcatcher Nature Assisted Therapy) to the participant.

The risks of animal and nature activities mean those dangerous conditions which are an integral part of animal and nature activities. Risks included; a) the propensity of any equine, ruminant, canine, feline or fowl to behave in ways that may result in injury, harm or death to persons on or around them and to potentially collide with, bite or kick other animals, people or objects; (b) the unpredictability of an equine, ruminant, canine, feline or fowl's reaction to such things as sounds, sudden movement, tremors, vibrations, unfamiliar objects, persons or other animals and hazards such as subsurface objects; (c) the potential for other participants to behave in a

negligent manner that may contribute to injury to themselves or others, including failing to act within their abilities to maintain control over an equine, ruminant, canine, feline or fowl; and (d) the potential for participants to fall over or from obstacles, from equines, or from moving vehicles that may be found in a nature setting; (e) the potential to be at greater risk of illness or infection while working in an outdoor setting or with any equine, ruminant, canine, feline, or fowl, particularly for person with auto-immune deficiencies.; (f) the potential to be at greater risk of illness or infection while working with animals while pregnant.; (g) the potential for wildlife encounters and the unpredictable nature of such animals.

Thus, in the development of the design of this research project, and with adherence to Dreamcatcher Nature Assisted Therapy's (host) policies, steps were purposefully implemented to reduce the risks and increase the safety of the "Animal and Nature Activities". More specifically, safety was enhanced through a comprehensive introduction to the farm/facility, and safe, correct interactions with animals were demonstrated. However, it was not possible for the host to make the animal and nature activities completely safe. Therefore, **adult waiver** forms (and if applicable, **dependent waiver** forms for individuals under 18 years old), and a Time on the Land Code of Conduct form will be signed and submitted to Cheryl Posein (administrator of Time on the Land) prior to participants starting their scheduled Time on the Land session. Within these waiver forms, included the above information relative to the risk associated with participating in a Time on the Land session. Lastly, participants will adhere to COVID-19 safety guidelines, by wearing a face masks at all times on the property.

If for any reason participants feel distressed or in need of counselling services during or after the completion of this study, please feel free to call the 24-hour mental health hotline, Hope for Wellness Help Line, at 1 (855) 242-3310, or call the 24-hour Hope line at 1(855) 298-2659.

This project has been reviewed and approved by the University of Lethbridge Human Subject Research Committee (REB #). If you feel you have not been treated per the descriptions in the consent form, or your rights as a participant in research have been violated during this project, you may contact the Office of Research Ethics, University of Lethbridge (Phone: 403-329-2747 or Email: research.services@uleth.ca).

If you found your experience with the Time on the Land program to be intriguing, and you wish to know more information, ask questions, and/or book future sessions, please contact:

Eileen Bona at Dreamcatcher Nature Assisted Therapy
(phone: 780-809-1047; email: eileen@dreamcatcherassociation.com)

If you have questions at any time about the study or the procedures (or you experience adverse effects because of participating in this study), you may contact the primary researcher (Brooke Greenwood: brooke.greenwood@uleth.ca)

Thank you again for participating in our study! ☺

Appendix C

Scoring of Quantitative Measures

Perceived Stress Scale (PSS-10)

First, reverse scores for questions 4, 5, 7, and 8 (i.e., 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0). Then, the total score is calculated by finding the sum of the 10 items. The following table indicates the relationship between total score and level of perceived stress according to the PSS (Cohen et al., 1983).

Total Score	Levels of Perceived Stress
0-13	Low stress
14-26	Moderate stress
27-40	High perceived stress

Positive and Negative Affect Schedule (PANAS)

Total scores pertaining to positive and negative affect are calculated by finding the sum of their respective items. To determine the positive affect score, add the score on items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19 (Watson et al., 1988). Higher scores represent higher levels of positive affect, and vice versa. Then, to determine the negative affect score, add the score on items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20 (Watson et al., 1988). Lower scores represent lower levels of negative affect, and vice versa. The range of scores for this scale is anything between 10-50.

University of Lethbridge

Appendix D

Letter of Agreement

Use of Facility, Staff, and Related Services

Project Title: Connecting with Nature During COVID-19: The Effect of "Time on the Land" on Perceptions of Experiences of Affect and Stress in Adults

Researcher(s): Master of Education Student Researcher – Brooke Greenwood
Supervisor – Dr. Elaine Greidanus

Location of Research: Dreamcatcher Nature Assisted Therapy, 53044 Range Road 213, Ardrossan, Alberta, T8G 2C4

Owner of Facility & Animals: Eileen Bona

Purpose of the Research: Amidst the COVID-19 pandemic, stringent public health measures are necessary to prevent the spread of disease, yet the unintended effects on the psychological wellbeing of adults have been significant. Prior to COVID-19, rates of stress were highly prevalent amongst adult populations. However, current research suggests rates have increased substantially, as new concerns develop, and pre-existing conditions are exacerbated. Thus, research is needed to identify effective psychotherapeutic interventions that minimize the negative psychological consequences of the COVID-19 pandemic and promote human wellbeing.

A growing body of literature suggests the benefits of spending time in natural environments. Beliefs about the benefits of nature has been positively influencing human health for centuries. The biophilia hypothesis identifies humans' deeply rooted affiliation for all living things, which ultimately serves as the foundational basis of the beneficial effects of nature. Spending time in nature has gone from an activity assumed to be good for us, to one with multiple identified biopsychosocial benefits, regardless of one's mental or physical health. Additionally, benefits can be detected in as little as five to ten minutes. Adults can take advantage of multiple, easily accessible green oases to reduce their stress levels, and improve memory and cognition. Furthermore, the role of human-animal interactions within green spaces may serve to fulfill the basic human need of connection. Thus, amidst the current circumstances of the COVID-19 pandemic, interacting with nature may be a unique medium to decrease adults' stress, enhance positive affect, and in turn, improve wellbeing.

Given the urgency of deterring the negative psychological effects of the COVID-19 pandemic, it seems the use of nature as a therapeutic medium warrant serious consideration. However, limited research has been conducted regarding its use, especially within the current context of the COVID-19 pandemic. Therefore, this study aims to address this gap in the literature.

Overall, this study aimed to investigate the effect of a Time on the Land program on adult participants levels of perceived stress and positive/negative affect amidst the COVID-19 pandemic. The surveys were devised to measure perceived stress, positive and negative affect, and capture subjective experiences of participants attending the Time on the Land Program at Dreamcatcher Nature Assisted Therapy. Results may provide evidence to indicate that spending time in nature is a cost effective, accessible way to promote adults' wellbeing and minimize the negative psychological consequences associated with the COVID-19 pandemic.

The **purpose** of the present study was to address the above stated gap in the literature, by investigating the effect of a Time on the Land Program at Dreamcatcher Nature Assisted Therapy on adults perceived stress and positive/negative affect amidst the COVID-19 pandemic. Thus, this study has **four** major research questions:

- (**RQ1**) What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on perceived stress levels in adults?
- (**RQ2**) What is the effect of connecting with nature via Dreamcatcher Nature Assisted Therapy's Time on the Land Program on positive and negative affect levels in adults?
- (**RQ3**) How do participants describe their experience with Time on the Land?
- (**RQ4**) How do the themes mentioned by the participants' help to explain changes in levels of perceived stress? Positive and negative affect?

The **hypothesis** of this study was as follows: If spending time in nature has beneficial effects on adults' emotional wellbeing, then we predict that participants will report lower levels of perceived stress, lower levels of negative affect, and higher levels of positive affect after attending a Time on the Land session.

Methodology:

Inclusion/Exclusion Criteria

For this study, participants will be acquired using criterion sampling. Although families (adults and dependent children) are allowed to participate within the Time on the Land Program, only adults will be assessed for the purposes of this study. Thus, individuals must meet the specific criterion of being 18 years of age or older. Additionally, to adequately address ethical concerns regarding conflict of interest, participants cannot be existing Dreamcatcher Nature Assisted Therapy clientele. In other words, individuals must not be an existing or former client of Dreamcatcher Nature Assisted Therapy, and they must be at least 18 years of age or older to participate. Individuals who do not meet these two criteria will be excluded from study results. Lastly, with regard to inclusivity, individuals from all gender identifications will be eligible for participation.

In addition to criterion sampling, participants will also be recruited using convenience sampling with an advertisement marketed to Dreamcatcher Nature Assisted Therapy's accessible population, and through advertisements posted to the primary researcher's (Brooke Greenwood) social media platforms.

Participants

This study will aim to recruit a minimum of 40 adult participants or more. Participants will have the option to sign up for the Time on the Land program as an individual, or as a group with the members of their immediate household. The program will be administered so each "group" (either one individual or a group of family members) has their own unique time slot. Each group will be supported by two Dreamcatcher Nature Assisted Therapy staff; one facilitator who will provide a tour of the facility, and another that will supervise each session and be available to answer participants questions. However, it is important to note that the group formats may be subject to change, in order to ensure the study adheres to the COVID-19 social safety and restriction protocol, at that point in time. In addition, to ensure the health and safety of everyone involved, masks will be mandatory (Government of Canada, 2020; WHO, 2020b). With regard to inclusivity, individuals from all gender identifications will be eligible for participation, as this study does not focus on this particular element as a factor of this study.

Surveys

The study consists of two surveys (baseline and post-session). The baseline survey has 37 questions, and the post-session survey has 34 questions The baseline survey will have six questions to assess demographics. Both surveys will consist of 10 items from the Perceived Stress Scale, and 20 items from the Positive and Negative Affect Schedule. In addition to these scales, there are a total of five qualitative open-ended questions. The baseline survey has one qualitative question asking participants to describe what they hope to attain by attending Dreamcatcher Nature Assisted Therapy's Time on the Land session. Lastly, the post-session survey has four open ended questions assessing participants experience with Time on the Land, investigating for changes in stress and affect.

Procedure

After individuals express their interest in participating in the study through Dreamcatcher Nature Assisted Therapy personnel, or the primary researcher (i.e., Brooke Greenwood), participants will be directed to the facilities website to book their 1-hour time slot. The Time on the Land program will be available to participants of this study over the course of Summer 2021. Sessions will be available Saturday-Sunday, starting July 2021 and ending November 30th, 2021. Specific, allocated time slots will be determined at a later date. Adult and dependent waiver forms, a Time on the Land conduct form, and the baseline survey will be administered via email by Dreamcatcher Nature Assisted Therapy staff, immediately after participants have booked their time slot online. Each of these respective documents will need to be completed by the participant(s) prior to their arrival at the facility. Follow up reminder emails will be sent by the primary researcher, one week before participants 1-hour time slot.

At the main office located on the property, the informed consent of participants will be obtained upon arrival by the primary researcher (Brooke Greenwood) and the post-session survey will be administered immediately following the end of each session. During this time, the primary researcher will remind participants that completion of both surveys will automatically enter them into a draw to win one of four $100.00 prepaid Visa cards.

In accordance with the above, participants will come to Dreamcatcher Nature Assisted Therapy for their scheduled, one-hour Time on the Land session. The group formats will include

the participant(s), the primary researcher (sometimes), and two Dreamcatcher staff (one facilitator and one supervisor). After the primary researcher has ensured appropriate documentation has been collected, one of two Dreamcatcher Nature Assisted Therapy employees will welcome participants and provide a tour of the facility. The tour will be a walkthrough of the facility, showing where certain animals are located, how to safely interact with animals (discussed in greater detail below), the muster point, and where participants will go when their session is over. This tour will be approximately 5-10 minutes. Once the tour is completed, the group of participant(s) will be free to roam the facility for the remaining duration of the session. In addition to the facilitator, the other Dreamcatcher Nature Assisted Therapy employee will stay outside to supervise each group and to answer any questions participants may have. After the one-hour mark, participants will be asked to meet the facilitators (and at times, the primary researcher) back at the main office, where they will be provided with a space to sit down and complete the post-session survey through a Qualtrics link accessible to mobile devices. Upon completion of the post-session survey, participants will be provided with a printed version of the debrief form they can take home with them, which will highlight the purpose of the study, and the researchers contact information for any further questions they may have.

In the event that a participant wishes to withdraw from the study, the participant is asked to notify the researcher (Brooke Greenwood) via email, phone, or in person. Participants will then be provided with a debrief form that explains the purposes and intentions of the research study in great detail and lists local mental health resources participants can reach out to if needed.

At the end of the study (approximately October 30, 2021), the primary researcher will input participant names into a randomized generator to choose four winners for the four $100.00 gift cards. Winners will be notified via email by XX/XX/2021.

Participants will be assigned random digitized study ID numbers that will be utilized to withdraw data. In the event that a participant has withdrawn from the study, the main researcher will use the study ID # that pertains to the specific participant in order to remove and erase the information collected to the point of withdrawal. The primary researcher Brooke Greenwood and thesis supervisor Dr. Elaine Greidanus will be the only individuals to have access to the list of names and study ID numbers utilized in the study.

Facilitators

The group(s) of participants will be co-facilitated by two Dreamcatcher Nature Assisted Therapy personnel, appointed by Eileen Bona. Often times these roles will either be fulfilled by Eileen Bona herself, or one of her many qualified employees. The roles of each facilitator are outlined above.

Compensation

Participants

This study has two online surveys that participants will be required to complete (baseline, and post-session). To motivate participants to complete and submit both surveys back to the primary researcher, an incentive will be offered. Particularly, participants that have submitted the

baseline and post-session surveys, will automatically be entered into a draw to win one of four $100.00 prepaid Visa cards.

Potential Benefits: Thus far, research has indicated the negative impact of the COVID-19 pandemic on mental health. Individuals have reported pervasive feelings of hopelessness, uncertainty, and a loss of connection. However, more research is needed to investigate appropriate methods of intervention that will help alleviate such psychological distress. As an alternative to traditional forms of therapy, nature assisted activities have unique benefits, in terms of leveraging spending time in natural environments as an agent of change to decrease stress, enhance mindfulness, and promote a sense of connection with oneself, others, and all that is nature. By examining the effect of a Time on the Land program on adult participants affect and perceived stress levels, we can begin to understand how this approach may fulfill mental health needs amidst the everchanging climate of the COVID-19 pandemic.

Questions or Concerns about Ethical Conduct: This project is pending review from the University of Lethbridge Ethics Board. Any questions regarding your rights as an animal owner, and thus participation in this study may be addressed to Brooke Greenwood; brooke.greenwood@uleth.ca

My signature below indicates that I have read and understand the description provided. I have had an opportunity to ask questions and my questions have been answered. I consent for my facility, staff, and related services to participate in the research project and to provide the Time on the Land sessions. A copy of this Consent Form has been given to me for my records.

Eileen Bona		Jul 12/21
Name of Facility Owner	*Signature*	*Date*
DocuSigned by: Brooke Greenwood BD43CB325599469...		
Researcher's Signature	July 12, 2021 *Date*	

A copy of this consent will be left with you, and a copy will be taken by the researcher

Appendix E

Participant Recruitment Advertisements

Brooke Greenwood
Master of Education in
Counselling Psychology Student

University of Lethbridge

Connecting with Nature During COVID-19

Do you love animals? Looking to spend time in nature with your family? Interested in winning a $100 prepaid Visa card?

Participate in my Master's thesis by

- Booking a 1-hour "Time on the Land" visit with Dreamcatcher™ ($35)
- Completing two online surveys (20-25 minutes each)

For more information and to book your visit, press the link below:

https://www.dreamcatcherassociation.com/time-on-the-land.html

Appendix F

15-Point Checklist of Braun and Clarke's (2006) Criteria for Thematic Analysis

Process	Criteria
Transcription	1. The data have been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for 'accuracy'.
Coding	2. Each data item has been given equal attention in the coding process. 3. Themes have not been generated from a few vivid examples (an anecdotal approach), but instead the coding process has been thorough, inclusive and comprehensive. 4. All relevant extracts for all each theme have been collated. 5. Themes are internally coherent, consistent, and distinctive. 6. Themes are internally coherent, consistent, and distinctive.
Analysis	7. Data have been analysed – interpreted, made sense of – rather than just paraphrased or described. 8. Analysis and data match each other – the extracts illustrate analytic claims. 9. Analysis tells a convincing and well-organised story about the data and topic. 10. A good balance between analytic narrative and illustrative extracts is provided.
Overall	11. Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it a once-over-lightly.
Written report	12. The assumptions about, and specific approach to, thematic analysis are clearly explicated. 13. There is a good fit between what you claim you do, and what you show you have done – i.e., described method and reported analysis are consistent. 14. The language and concepts used in the report are consistent with the epistemological position of the analysis. 15. The researcher is positioned as active in the research process; themes do not just 'emerge'.

Appendix G

Disclaimer: Meaning Behind the Name of Dreamcatcher Nature Assisted Therapy

In relation to this research study, it is important to note that Dreamcatcher Nature Assisted Therapy, is not affiliated nor connected to Indigenous culture, traditions, or practices. Dream catchers are widely viewed as a sacred symbol of oneness in Native American identity and spirituality (Oberholtzer, 2012). A traditional *dream catcher* is a handmade willow hoop woven with weblike netting, that is often decorated with beads and feathers (Oberholtzer, 2012). Produced in a range of sizes, from tiny examples less than one inch in diameter to some as large as eight feet, dream catchers are also incorporated into jewelry and recreated as images on clothing and other forms of art (Oberholtzer, 2012). Traditionally, Oberholtzer (2012) noted mothers and grandmothers made dream catchers and suspended them above cradles or beds as a form of armor and protection. Such that the netting of a dream catcher serves to trap bad dreams and keep them from entering the mind of those it protected. Additionally, the dreamcatcher has many physical components, all of which have a significant meaning. For instance, the traditional circular shape of a dream catcher represents the earth's spherical character (Oberholtzer, 2012), and the circle of life (Densmore, 1929). The feathers represent a soft path for good dreams to filter down, and beads symbolize good dreams caught (Oberholtzer, 2012). In sum, the spiritual ideology, symbolism, and physical presence of the dream catcher is significant and must be respected, protected, and valued as such.

Across time, components of native American spirituality, such as dream catchers, have begun to become over-commercialized, inauthentically produced, offensively misappropriated, and misused by non-natives (Jenkins, 1986; Oberholtzer, 2012; Owen, 2008). While becoming so popular outside of the Indian nation, many varieties of dream catchers bear little resemblance

to traditional style and are utilized in ways that do not serve their intended purpose, resulting in misappropriation of spiritual traditions (Oberholtzer, 2012; Owen, 2008). In other words, an exploitative and disrespectful display of cultural appropriation that causes undue harm (Lalonde, 2021).

More recently, dream catchers have represented a shared symbol of hope and healing. For instance, Cable News Network (2018) reported that a dream catcher was gifted across multiple American communities impacted by school shootings (e.g., Red Lake, Columbine, Sandy Hook) as a symbol of hope, healing, and change. Similarly, this was the intention of Eileen Bona, the owner and founder of Dreamcatcher Nature Assisted Therapy, when she named her clinical practice. “Here at Dreamcatcher, we hold the bad stuff for people while supporting them to take away the good things about themselves and their process” (E. Bona, personal communication, June 30, 2022). In other words, the meaning behind choosing the name of Dreamcatcher Nature Assisted Therapy was to reflect the provision of psychological support services that symbolize and facilitate hope and healing, and that are respectfully not affiliated with the traditional origins, meanings, nor applications of dream catchers within Native American culture. Therefore, this disclaimer is a respectful acknowledgement of how the name of Dreamcatcher Nature Assisted Therapy may be ethically misleading, while simultaneously noting the absence of intention to cause harm, nor diminish the dream catcher as a sacred symbol of Indigenous culture.