2022

Project H.O.M.E: A Novel Nature-based Therapy Approach for the Treatment of Veterans with Trauma

Jenny L. Laverdure
Eastern Kentucky University, jenny_laverdure@mymail.eku.edu

Project H.O.M.E: A Novel Nature-based Therapy Approach for the Treatment of Veterans with Trauma

Jenny L. Laverdure

A Doctoral Project Presented to the Graduate School in Partial Fulfillment of the Requirements for the Degree of Doctor of Psychology

Eastern Kentucky University

2021

Acknowledgments

I would first like to thank my family for their incredible support and understanding through this program. My husband and children, sister, parents, and friends have provided encouragement and tough love when needed to assist in this long process. I also want to say thanks to my cohort for all their support and encouragement over the past several years, and I am grateful to be associate with such a talented group of people. I would like to thank the faculty of the Psychology department at Eastern Kentucky University whose incredible insight, mentorship, and supervision guided me through this doctoral program. Special thanks go out to my DSP committee: Dr. Theresa Botts, Dr. Melinda Moore, Dr. Dustin Wygant, and Mr. Timothy McGill for their time and expertise in providing feedback and reviewing this document.

Abstract

Around the world, trauma disorders such as post-traumatic stress disorder (PTSD) are on the rise. Evidence-based treatment protocols, such as cognitive processing therapy (CPT) and prolonged exposure (PE) are effective in treatment. However, high dropout rates, stigma, and other barriers to treatment are driving the exploration of alternative treatment options. Nature-based interventions, such as wilderness or adventure therapy, forest bathing, and horticulture therapy, have been utilized for a variety of medical and psychological disorders for several years. There are limited formal programs, but research generally supports positive outcomes with specified interventions. However, there are several challenges to studying the effectiveness of these types of treatments. Moreover, although often called "therapy," psychologists are rarely involved in the development or implementation of such programs. This could lead to increased risk and poor outcomes, particularly for individuals with trauma disorders. This paper will discuss types of nature-based interventions, theories behind these treatments, summarize research on current nature-based therapy programs, and discuss how these types of interventions are beneficial for veterans. Lastly, this paper will present a novel program called Project H.O.M.E. (Healing Outdoors through Mindful Experiences), which utilizes a variety of nature-based interventions along with skills from dialectical behavior therapy (DBT) to treat PTSD in veterans.

Keywords: trauma, nature-based therapy, veterans, ptsd, nature-based interventions

Table of Contents

Section I: Introduction

Definitions of Nature-Based Therapy

Nature-Based Therapy (NBT) has been around in some fashion for many years. It could be argued that NBT could go back to ancient times when Shamans used nature to assist in healing ailments (Berger & McLeod, 2006), a practice that is continued in many tribal societies today. In fact, these societies define the terms "sanity" and "madness" by how their relationship aligns with nature (Chavaly & Naachimuthu, 2020). This premise of co-existing with nature or viewing nature as a partner fit in well with the principles of Ecopsychology or Ecotherapy. Ecopsychology can broadly be defined as a way to "understand human nature in the broader context of our relationship with nature" and the way we manage this fit impacts our physical and mental health (Burns, 2000, p. 185). Researchers in Ecotherapy or Ecopsychology argue that human relationships with nature are critical, and our values, meaning, and purpose are defined by our relationships and experience with nature (Adams, 2006). Further, our relationship with nature is cyclical such that the more nature is destroyed and the emptier we feel, the more we try and fill the emptiness with stuff (Adams, 2006). Environmental psychology is another term that is used in the literature as a root of Nature-Based Therapy and is based on the idea that the relationship between humans and the environment is symbiotic (Grieder & Chanmugam, 2013).

This idea of Ecotherapy serves as the premise for how some researchers define Nature-Based Therapy. Jordan and Helms (2016) argue there is a form of healing in the relationship between nature and humans, and that Nature Therapy incorporates elements of rituals and art therapy. However, the literature is conflicted and shows a plethora of different definitions for Nature-Based Therapy (NBT). NBT is sometimes called Nature Assisted Therapy, Nature-Based Activity, Nature-based interventions, and Ecotherapy. Nature Therapy is multifaceted and can

incorporate several modalities. One researcher defined Nature Therapy as integration of "elements of art and drama therapy, gestalt, the narrative approach, eco-psychology, transpersonal therapy, adventure therapy, shamanism, and body-mind practices" (Berger, 2008, p. 316). Some researchers have broken down NBT into key parts including talk therapy using aspects of Mindfulness-Based Cognitive Therapy, physical and mental awareness exercises such as meditations and body scans, garden activities, and personal time in the natural environment (Poulsen, Lygum, Djernis, & Stigsdotter, 2020). Another researcher described Nature Assisted Therapy (NAT) as "an intervention with the aim to treat, hasten recovery, and/or rehabilitate patients with a disease or condition of ill health, with the fundamental principle that the therapy involves plants, natural materials, and/or outdoor environment, without any therapeutic involvement of extra human, mammals, or other living creatures" (Annerstedt & Warborg, 2011, p. 372). Still other researchers view NBT as a type of Art Therapy that uses nature as are a partner (Berger & Tiry, 2012) and others describe nature therapy as an "innovative experiential therapeutic framework that takes place in nature" (Berger & Lahad, 2010, pg 892).

Countries such as Denmark and Sweden have developed more formal programs for NBT, and have defined it as "a therapeutic intervention targeting the need of a special population, where the natural environment is specially designed or specially chosen for the particular therapy activity" (Corazon S. S., Stigsdotter, Jensen, & Nilsson, 2010, p. 36). With such a variety of definitions and different kinds of NBT, some researchers suggest there is not a universal definition that is widely accepted (Sahlin, Matuszczyk, Jr., & Grahn, 2012). There is some conflict in the literature about what role nature plays in NBT. Some researchers posit the for true NBT, nature has to play a role in the therapy and not just a setting and argued the therapeutic changes lies in the interaction between the client and nature (Poulsen, Lygum, Djernis, &

Stigsdotter, 2020). Moreover, NBT is different from outdoor activities in that NBT is designed to lead to recovery and healing and be lasting compared to a short moment (Poulsen D. V., 2017). Other researchers argue that NBT can incorporate "levels" where a 'level 1' therapy could be construed as using nature as a tool to facilitate human change whereas a 'level 2' therapy could be viewed as nature being viewed as a critical partner in the process for change (Jordan & Hinds, 2016). Still other researchers argue that NBT can be viewed as a continuum, with therapists bring in as much or as little of nature into the therapy session as needed, depending on the client and client concerns. This can vary from something as simple as using nature-based imagery to having nature "props" which serve as talking points for clients, to sitting in nature while conducting traditional therapy, to doing "full" NBT by being in nature and using it as a "co-therapist" in the session (Jordan & Hinds, 2016).

NBT is practiced in a variety of places in Europe, and some researchers have attempted to quantify how practitioners view what NBT or Ecotherapy is. Kamitsis & Simmonds (2017) polled clinical practitioners who are practicing NBT to obtain their perspectives. The authors found that the practitioners had mixed feedback. Some practitioners viewed it as a person-centered nondirective approach, others viewed it as a spiritual relationship, and still others viewed it as a way to incorporate indigenous healing practices into what would be considered Western Psychology (2017). All interviewees in the study suggested that the premise of ecopsychology is about enhancing human health through sensory contact with the natural world (2017). NBT programs in Sweden typically include two parts, a medical rehab process including aspects like conversation therapy and body awareness and either being or doing activities in nature (Sahlin, Matuszczyk, Jr., & Grahn, 2012).

Types of Nature-Based Therapy

Some researchers view the term, Nature-Based Therapy, as more of an "umbrella term" for several types of therapy, including ecotherapy, and horticulture therapy (Poulsen, 2017; Poulson et al, 2018). NBT utilizes horticulture and body-awareness activities to supplement individual therapeutic talks (Poulson et al, 2018). Nature-based therapy (NBT) can be broken down into several different types. Some authors argue that Nature Therapy can include up to 11 different subdisciplines including Wilderness Immersion, Adventure Therapy (AT), Forest Bathing, Green Exercise, Ecotherapy, Blue Care, Care Forms, Horticulture Therapy (HT), nature meditations, nutrition, and Animal Assisted Psychotherapy (AAT) (La Puma, 2019). For this paper, the primary emphasis will be on Adventure Therapy, Forest Bathing, and Horticulture Therapy.

Adventure Therapy

Adventure therapy can be broadly defined as "any intentional, facilitated use of adventure tools and techniques to guide personal change toward desired therapeutic goals" (Alvarez & Stauffer, 2001, p. 87). Examples of adventure therapy can include activities such as white water rafting, ropes courses, camping, wilderness activities, sailing, etc. Key components of Adventure Therapy (AT) or Wilderness Therapy typically involve a novel challenge in a group context followed by a group debriefing or processing. Previous research on Adventure Therapy included the term Outdoor Behavioral Health (OBH), which was initially regarded as "an emerging intervention and treatment in mental health practice to help adolescents overcome emotional, adjustment, addiction, and psychological problems" (Russel & Hendee, 2000, p. 3). A more recent definition in the literature for OBH is using traditional counseling in the outdoors (Roberts, Stroud, Hoag, & Massey, 2017) and involves supplementing traditional therapy

elements with elements found in healthy ecosystems to provide a richer experience (Gass, et al., 2019). Still other researchers use the term Natural Environment Therapies as a term to encompass wilderness therapy and outdoor adventure therapy which is geographically typically in the United States and Australia (Annerstedt & Warborg, 2011). Other researchers have used the term Nature Adventure Rehabilitation (NAR) in the literature (Gelkopf, Hasson-Ohayon, Bikman, & Kravetz, 2013). Researchers posit that NAR includes a strong Cognitive Behavioral component by overcoming challenges to challenge self-worth, and includes repeated cycles of rest and action to help mimic emotion regulation as a way to help regulate their symptoms (2013). There is an emphasis in the literature on distinguishing AT compared to other wilderness or nature activities. Alvarez and Stauffer (2001) argue that there has to be an element of facilitation and emphasis on personal change or growth. Other researchers have criticized Adventure Therapy programs for ignoring the role of nature and allowing it to become outdoor education (Beringer & Martin, 2003).

Forest Bathing

Forest Bathing, also called “Shinrin-yoku” is broadly defined as a way of taking in the atmosphere of a forest (Park et.al 2009) and can involve walking or breathing in the atmosphere (Morita, et al., 2007). Much of the research that has been done on Forest Bathing, or Forest Therapy, has been centered on reducing stress and other psychological constructs. Research has been conducted on examining urban vs non-urban forests (Lee, Son, Kim, & Lee, 2019), depression (Browning, Lee, & Wolf, 2019), anxiety (Zhou, et al., 2019), seasonal forests (Bielinis, Takayama, Boiko, Omelan, & Bielinis, 2018), and individuals with schizophrenia and affective disorders (Bielinis, Jaroszewska, Lukowski, & Takayama, 2019), to name but a few.

Horticulture Therapy

Horticulture Therapy has been around since World War II and is considered a form of Occupational Therapy (Detweiler, et al., 2015). Horticulture Therapy broadly "applies the art and science of growing plants to improve physical, mental, and spiritual well-being" (Detweiler, et al., 2015, p. 36). Other researchers broaden the definition to include "plants and garden-related activities" and further explain that Horticulture Therapy allows clients to develop new ways to provide self-expression, stimulate creativity, and develop focus while still allowing for the acquisition of new knowledge and skills (Baker, 2009, p. 94). Horticulture Therapy practices can be very broad, and including anything from planting seeds, growing or weeding plants and flowers, making planter boxes, utilizing specific therapeutic gardens, and sitting in a therapeutic garden. Horticulture Therapy can also include such terms as horticultural therapy gardens, therapeutic gardens, and rehabilitations gardens (Annerstedt & Warborg, 2011). Horticulture Therapy can be used by occupational therapists, teachers, nurses, and physiotherapists to name but a few professions (Baker, 2009).

Theoretical Basis

There are three main theories based on the literature that serves as the foundation for all types of NBT. Kaplan and Kaplan (1989) developed what they called the Attention Restoration Theory (ART). This theory argues that humans have two types of attention, directed attention and soft fascination. ART posits that directed attention is when an individual has to use conscious effort to focus attention on important matters, and this causes fatigue overtime (Poulsen, Stigsdotter, & Davidsen, 2018). Soft fascination is regarded as an unconscious process that captures attention through an effortless method and is regarded as restorative in nature. Kaplan

(1995) goes on to further elaborate that a restorative environment requires four things 1) being away from everyday routines or demands 2) the ability to effortlessly hold attention, 3) the capacity to remain engaged, and 4) compatibility or a match between what the individual wants to do and what the environment supports.

Ulrich (1981) created the psychoevolutionary or stress reduction theory. He posited that nature can help reduce stress levels. He posited that non-threatening environments (i.e. environments that have important survival elements) require reduced processing and thus arousal levels are reduced (Ulrich, 1979). This is supported by emerging research concerning Forest Bathing. Some researchers suggest that our bodies are designed to be attuned to nature and by living in an artificial world we are living in a constant state of stress with chronic sympathetic nervous system arousal that is alleviated by contact with nature (Lee, et al., 2012).

The third theory is E.O. Wilson's (1984) Biophilia theory. His idea is that humans have an inherent need to affiliate with life and lifelike processes and was expanded to suggest that humans have an innate bond with nature (Zhou, et al., 2019).

Purpose

The objective of this doctoral project is to conduct a comprehensive review of the literature on nature-based therapy practices to better design a measurable nature-based therapy program for the treatment of veterans with trauma disorders. While empirical talk therapy treatments exist, these treatments do not work for all veterans due to a variety of barriers including high dropout rates, cultural stigma, and access to care. Much of the research focuses on one type of nature-based therapy, most of which do not involve the use of any traditional talk therapy. It was determined there was a gap in current research with combining different types of nature-based therapies into a framework concurrently with a traditional talk therapy element.

Due to the amount of identified barriers in the literature for gathering empirical data on these types of therapies, this proposed programming will provide a framework for testing to allow more comparisons in the research. There are significant challenges in creating a nature-based therapy program due to limited research and a wide range of variables. This project will identify challenges ending with a proposed plan of developing a framework for a program to manage the challenges.

Statement of Significance

While the literature on various NBT programs exists, as of this article limited research has been completed using a structured NBT framework that encompasses multiple facets of NBT. While there are evidence-based treatments on treating trauma for veterans and other individuals, barriers to effective treatment, particularly for rural and minority veterans demand additional treatments. Research supports that not only do typical top-down talk therapy approaches not work for every veteran, and are not often sought out, but there is increasing demand to look for alternative treatments. New laws, including the Accelerating Veterans Recovery Outdoors Act, requires the VA to investigate the benefits of outdoor recreation therapy for veterans (Jones, 2021). Future research combining nature interventions with typical therapeutic interventions with clinical populations, particularly those affected by trauma and stress is needed (Ameli, et al., 2021; Duvall & Kaplan, 2014). Additionally, given the barriers to research on these types of programs, a systematic way to control some barriers could allow additional comparisons in the research (Duvall & Kaplan, 2014).

Section II: Literature Review

Methods for Literature Review Search

The literature review search was conducted primarily through the Eastern Kentucky University library website, 'EKU Libraries', to understand the previous research completed on both Nature-Based Therapy and Family Therapy using all available databases, and how that relates to trauma. The search was initially broadened to search all terms related to Nature-Based Therapy, including Nature-Based Activity, Nature Assisted Therapy, and Ecotherapy. After reading the research, subsequent searches included specific types of Nature-Based Therapies including Forest Bathing, Adventure Therapy, Wilderness Therapy, Horticulture Therapy and reviewing afore-mentioned therapies and keywords such as Trauma and Posttraumatic Stress Disorder. Some of the journals utilized included *Journal of Clinical Psychology, Journal of Therapeutic Horticulture, Journal of Systemic Therapies, Journal of Adventure Education and Learning, European Journal of Psychotherapy and Counselling, Psychiatry Research, Journal of Aggression, Maltreatment, and Trauma, International Journal of Advanced Counseling, Journal of Public Mental Health, and Urban Forestry and Urban Greening.*

Nature-based Therapy and Trauma

As a society, there is an increasing movement to become more trauma-informed and much of the current research on trauma and NBT has been conducted on veterans. Research has increasingly shown the chronic mental and physical impact that trauma has on individuals throughout their life. In the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-V) the definition of Posttraumatic Stress Disorder (PTSD) has grown more complex when it was revised from the DSM-IV to the DSM-V (American Psychological Association, 2013). For PTSD, a criterion A trauma has to be witnessed, experienced, have repeated exposure to traumatic events, or an individual has to learn of a violent or accidental traumatic event of a close friend or family member (2013). In addition to the traumatic event, an individual must

experience intrusive symptoms, avoidance of stimuli associated with the event, negative cognitions or mood, and marked levels of arousal or reactivity (2013). In addition to combat-related trauma, criterion A traumas can include events like natural disasters, car accidents, physical or sexual abuse or assault, the suicide of a loved one, kidnapping, sex trafficking, or significant medical incidents (2013).

The National Center for PTSD estimates that 6% of the population, or approximately 12 million people, will experience PTSD at some point in their life (How Common is PTSD in Adults?, n.d.). For military populations, it is estimated that for the most recent conflicts between 11-20% of veterans have PTSD from Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF), 12% of Desert Storm veterans, and up to 30% of Vietnam veterans had PTSD in their lifetime (How Common is PTSD in Veterans?, n.d.). There have been several studies linking diagnoses such as PTSD with increased physical health issues, substance abuse, and unemployment (Poulsen D. V., 2017). With such a high rate of PTSD, much research has been done on evidence-based treatments. Some of the most researched treatments for trauma and PTSD are Cognitive Processing Therapy (CPT), Prolonged Exposure (PE), Trauma-Focused CBT (TF-CBT), and Eye Movement Desensitization and Reprocessing (EMDR). In the U.S. Department of Veterans Affairs, CPT and PE are both widely empiracle treatments used across the country. While treatments such as CPT and PE are largely successful, they do not work for every case. In addition to other treatment barriers, this has driven researchers to find other forms of trauma treatment. Recently, more attention is being paid to what are considered “bottom-up” techniques or alternative therapies for trauma treatment. Integrative health approaches for veterans and military populations include treatments such as mind-body medicine, and manipulative and body-based practices to name but a few (Cukor, Spitalnick, Difede, Rizzo, &

Rothbaum, 2009). Treatments such as CPT and PE are very cognitive or "frontal lobe" based forms of talk therapy. Bottom-up therapies and techniques, such as Somatic Experiencing and Yoga, are being used to help individuals who are so dysregulated they are not able to access their frontal lobe. Nature-based Therapy (NBT) is particularly well-suited to this area. In fact, some researchers have posited that individuals with great distress will have greater change with NBT's such as Outdoor Behavioral Health (OBH) programs and that OBH is well suited to individuals who don't respond to traditional outpatient therapy (Roberts, Stroud, Hoag, & Massey, 2017).

For individuals who experience significant trauma, deficits in the frontal lobe and executive functioning tasks are impacted. Tasks that require significant planning, thinking, and reasoning as well as the ability to concentrate will be impaired. In addition, these individuals typically have increased sympathetic nervous system activation. For individuals who have PTSD caused by chronic combat, their nervous system may be chronically heightened (Bird, 2015).

There is extensive qualitative research suggesting that experiencing nature helps to stabilize the autonomic nervous system (Detweiler, et al., 2015). The "stress" part of PTSD has been studied heavily with research on results of forest bathing and monitoring physiological symptoms, such as cortisol levels and blood pressure. Multiple studies have been conducted looking at blood pressure and urinal adrenaline output with forest bathing. The studies have shown that, compared to walking in an urban environment, blood pressure and sympathetic nervous activity decreased while parasympathetic activity increased (Li, et al., 2011; Park, et al., 2009).

Further studies on forest bathing have gone so far as to suggest that forest bathing, in addition to decreasing stress levels and sympathetic nervous activity, promotes increase immune function by increasing Natural Killer (NK) cells which have important implication in medical

and cancer research (Lee, et al., 2012). Additional studies have found that even views of nature, and not just physical activity, have helped shift individuals out of “fight or flight” states (Browning, Lee, & Wolf, 2019). These views have shown a positive impact on psychological factors such as mood, affect, and vitality after 15 minutes of viewing a forest environment compared to an urban environment (Bielinis, Takayama, Boiko, Omelan, & Bielinis, 2018). Forest Bathing's research has shown that the decreased arousal levels have facilitated increased individual's mental state and short-term attentional capacity when compared to traditional Cognitive Behavioral Rehabilitation therapy (Sonntag-Ostrom, et al., 2015). Other studies on Horticulture Therapy have examined cortisol levels and found positive results. One study compared individuals who received a combination of therapies both with and without plant involvement and found the group who engaged in plant activities had a significant reduction in stress levels (Vujcic, Tomicevic-Dubljevic, Grbic, & Lecic-Tosevski, 2017).

Other studies have examined NBT with veterans and found, in addition to lower cortisol spikes, reduced symptoms of PTSD. Dustin and colleagues (2011) discussed the results of a 4-day river rafting trip pilot program, which was comprised of the wilderness activity experience and journaling but no formal therapy. After 4 days the themes in the journals showed a decrease in PTSD symptoms, including symptoms of hyperarousal, sleep disturbance, re-experiencing, and avoidance and numbing (2011). They also found increased feelings of mindfulness, coping skills, self-efficacy, and a sense of relaxation (2011). The veterans were able to use metaphors from the river experience, such as a continuous current and river hazards, and how that related to their struggles and life experiences (2011). The authors identified several themes from the research including promoting social camaraderie, using a novel context to provide perspective on veterans lives, using a non-judgemental setting for processing sensitive topics, increased coping

skills and self-confidence, reduction in PTSD symptoms, promotion of normalcy, and experiences of joy, and providing a different context for family members to observe the veteran in a different way (2011).

A recent pilot study was conduted with veterans in the U.S. Pacific Northwest, and compared groups of veterans who hiked on nature trails versus urban trails (Littman, et al., 2021). The authors found that on the PCL-5, PTSD symptoms decreased in the nature hiking group and stayed at the final level when retested 12 weeks later (2021). In comparison, the urban hiking group had a decrease in PTSD symptoms after the initial hikes, but the PCL-5 scores went almost back to baseline when retested 12 weeks later (2021). Morever, the participants in the hikes reported percieved benefits related to increased connection to others and reduced stress overall (2021).

Besides neurophysiological research on factors such as cortisol, additional studies have focused on brain functions concerning psychological states. Depression is another part of PTSD that is frequently associated with traits such as rumination. Bratman et all (2015) researched prefrontal brain activation. The authors found that individuals who completed a 90-minute walk in nature, as opposed to an urban setting, showed decreased rumination and neural activity in the associated brain areas (2015).

Along with dysregulation, some individuals have such significant trauma they then become dissociative and “numb” to physical sensations. Qualitative data from a study on fly-fishing helped the veteran “recognize the signs of emotional numbing and helped him remember what it meant to feel good again” (Craig, Alger, Bennett, & Martin, 2020, p. 161). NBT can play an important role in helping these individuals relearn what physical sensations feel like through sensory exploration, and these experiences can help establish relationships with other humans

(Poulsen, Stigsdotter, & Davidsen, 2018). For individuals who participate in Forest Bathing, this might be feeling the wind or the bark of a tree, for Horticulture Therapy this might be feeling the soil or the sunlight on the plants, and for Adventure Therapy this might include feeling the water or the rocks or smelling the salt in the air. These physical sensations can be powerful triggers for memories and help prime an individual for positive memories. In addition, these physical and sensory sensations can enhance experiences with mindfulness by helping the individual stay focused or grounded in the present and relearn body-awareness (Corazon S. S., Stigsdotter, Jensen, & Nilsson, 2010; Sidenius, Stigsdotter, Poulsen, & Bondas, 2017). Research themes and feedback from participants also suggest using sensory information to stimulate relaxation allowed for increased responsiveness and ability to practice self-acceptance (Sidenius, Stigsdotter, Poulsen, & Bondas, 2017).

Nature-based Therapy (NBT) has a unique element of connection to it, which can be critical for individuals with trauma. Individuals with severe trauma have difficulty forming or maintaining connections with other individuals. Research suggests that not only does disconnection from nature increase pathology, such as anxiety and depression, but a reconnection to nature will decrease pathological feelings and self-alienation, and increase overall health, joy, self-esteem, and social connection (Chalquist, 2009). When looking at overall psychopathology from a dimensional perspective, many DSM-5 disorders have an adverse impact on social skills. Feeling connected is especially important for individuals who have severe trauma and are suicidal. Joiner's (2005) Interpersonal Theory of Suicide posits that suicide is likely when an individual has states of perceived burdensomeness and thwarted belongingness combined with an acquired capacity for lethal self-harm. This can be especially important when considering the needs of active duty and veteran military populations. A protective factor for individuals with

suicidal ideation is looking for future talk, and one study on a group of veterans showed that future talk was minimal before the NBT while after the intervention it was increased (Poulsen, Stigsdotter, & Davidsen, 2018).

A common theme among NBT with veteran and other populations based on qualitative research is a theme of safety, nonjudgementalness, self and other acceptance, and a sense of belonging (Kreski, 2016; Dybvik, Sundsford, Wang, & Nivison, 2018; Jordan & Hinds, 2016, Dustin et all, 2011; Sahlin, Matuszczyk, Jr., & Grahn, 2012; Sidenius, Stigsdotter, Poulsen, & Bondas, 2017; Poulsen D. V., Stigsdotter, Djernis, & Sidenius, 2016). Nature is viewed as a sanctuary for healing as it can receive all raw pent-up emotions (Dustin et all, 2011).

Some NBT programs are focused on recreational activities, such as fly-fishing, with the idea that such leisure activities can help veterans find new meaning and foster post-traumatic growth (Craig, Alger, Bennett, & Martin, 2020). In a program examining veterans as part of a therapeutic fly-fishing program, 67 veteran letters were examined and themes of camaraderie, regrets, reflections, and outdoor benefits were present (Mowatt & Bennett, 2011). Another study was conducted with veterans with a therapeutic fly fishing program (Bennett, Puymbroeck, Piatt, & Rydell, 2014). The research was conducted using focus groups with a group of 28 veterans who participated in a 4 day fly fishing program which also incorporated yoga and breathing techniques (2014). The authors found that overall the themes of reconnection and successful experience, with participants able to reconnect with their military experiences, with other people, and with nature (2014). Additionally, veterans were able to develop a new skill, gained confidence, had a more positive outlook on life, learned how to better cope with their symptoms, and overall felt “normal” again (2014). The veterans in this study identified the beautiful setting, the atmosphere and “family-like” environment, and staff trained in military culture had a positive

effect on their treatment (2014). Another study on a group of 9 veterans in a fly-fishing program found that fly-fishing helped to increase positive mood and provide a buffer for PTSD symptoms, sustains coping and commitment to the program, helps increase momentum towards post-traumatic growth, and promotes healing through increasing a sense of control, creating connections, and promoting hope (Craig, Alger, Bennett, & Martin, 2020). One part of military culture is the idea of always having a mission or a challenge, which the authors argue is often lost when a military member leaves the military, and an NBT such as using fly-fishing can help a veteran refind that challenge again (2020). In addition, many participants in the study were able to verbalize and name their distress, and the calming nature of the fly-fishing activity helped to buffer their negative symptoms (2020). In addition to fly-fishing, other veteran programs are focused on other outdoor leisure activities such as surfing. A study on 15 combat veterans from England showed that surfing provided a sense of respite from their symptoms of PTSD and it helped the participants stay focused in the present instead of on the past (Caddick, Smith, & Phoenix, 2015). Consistent with other research, the participants also reported a sense of connection with the other veterans in the program, which helped combat their typical isolation (2015).

For veterans, the element of safety and security could be especially important. Veterans who experience PTSD may have flash-backs, and the sensory experiences and sense of safety in nature may help decrease the constant feelings of threat and hypervigilance (Westlund, 2015). Some veterans qualitatively reported being outdoors decreased PTSD decreased his symptoms while participating in indoor therapy increased feelings of anger and agitation (Westlund, 2015). Other soldiers have reported a feeling of loneliness upon returned from deployment and

increased desire for isolation, and completing an NBT allowed for calming and increased abilities to discuss feelings with friends and family (Poulson et al, 2018).

Many veteran NBT programs have an active element to them, which research supports helping with decreasing PTSD symptoms (Leardmann, et al., 2011). Some researchers argue that the challenge of wilderness or adventure therapy programs are especially effective for veterans at increasing social connection, sense of self efficacy, and sense of social connection while decreasing PTSD symptoms, depressive symptoms, and anxiety symptoms (Bettmann, Anstadt, & Kolaski, 2020). In a study examining NBT regarding veterans, the researchers found increased bodily awareness and usage of nature as a safe place to lower alertness and facilitate connections to other people (Poulsen D. V., Stigsdotter, Djernis, & Sidenius, 2016). The researchers also found themes of acceptance and veterans focusing on the "enduring" qualities of nature, which facilitated increased self-efficacy and a fascination with nature that persisted after a year post-treatment (2016). Additional researchers showed that when veterans feel unsafe around people, the "secure base" that nature provides through plants and animals around them provides grounding to allow them to be comfortable associating with others (Westlund, 2015). The element of connection to nature is important regarding attachment theory. Some researchers have suggested that, for individuals with insecure attachment, nature can serve as a replacement model and teacher for how to form appropriate attachments (Jordan & Hinds, 2016).

In a more recent study, Dybvik et al (2018) examined the qualitative data of a group of 12 individuals with disorders including anxiety, depression, and PTSD. The study took place at a residential treatment center in Norway whose main focus is incorporating nature into treatment, and the authors found similar themes as other studies. The authors found a running sense of belonging and being an equal part of nature, a sense that nature was stable and trustworthy while

still dynamic and evolving, nature was viewed as altruistic and not demanding of anything, and the 'sense of social belonging was stronger' in a group in nature compared to traditional groups (2018). The clients reported increases in focus and attention, increases in sensory experiences and feelings of being present, decreases in negative thoughts and rumination, and an easier ability to regulate challenging emotions when outdoors compared to indoors (2018). The participants viewed nature as more restorative than prescription drugs and less restrictive compared to indoor therapy (2018).

Another common theme for NBT is a frequent sense of being part of something larger than one's self or a spiritual element to the programs (Sahlin, Matuszczyk, Jr., & Grahn, 2012; (Berger & Tiry, 2012). Moreover, individuals who participated in a Nature-Based Rehabilitation program (NBR) found that nature helped to "find and develop spiritual growth" (Jordan & Hinds, 2016, p. 103). This could play an important role when working with individuals, such as veterans, in processing moral injuries. This type of existential view is often regarded as a positive event however for some it can be scary (Dybvik, Sundsford, Wang, & Nivison, 2018). Participants have reported this sense of being part of a larger whole allowed for the focus to be taken off themselves and their ailments (Jordan & Hinds, 2016). Further, this existential view in nature allowed individuals to find or refind values or meaning or one's place or role in life (2016).

A large component of most NBT programs is they tend to be heavy on being experiential in nature. Participants who do experiential activities in NBT can help support behavioral change outside of therapy sessions (Corazon S. S., Stigsdotter, Moeller, & Rasmussen, 2012). The authors posit that using a permaculture approach also helps to foster increased connectedness, supportive change processes, and sustainability (2012). In addition, qualitative research has

shown that participants in NBT bring out a sense of "joy" and almost "playfulness" among participants, as well as a sense of fascination and wonder. This can be important with regards to working with individuals who have trauma, as a common therapy interfering behavior is experiential avoidance. This sense of "playfulness" is observed in both children and adult clients. A program in Israel called the "Safe Place" program was developed to work with kindergarten students (Berger & Lahad, 2010). The program is comprised of an overarching story about forest rangers helping animals after a big forest fire, and used metaphors to help children deal with war and evacuation (2010). The program was run by kindergarten staff and staff from the Nature Therapy Center and consisted of the overarching story, acting out characters, building a camp from local materials, being and observing in nature, and ceremonies throughout the program (2010). The authors program yielded more group cohesion, decreased anxiety, decreased violence, and increased resiliency and self-confidence (2010).

Another study was piloted in Israel examining adults who were diagnosed with diabetes as children and as such were not allowed to experience typical childhood play (Berger, 2010). The author found the adults were able to connect to a part of nature that metaphorically symbolized their illness, and used it to process their issues as well as experience play in nature for the first time (2010).

The use of NBT in practice can provide flexibility. In fact, some researchers argue that "it is the personality of the therapist as well as the specific interventions and actions that he or she takes in relation to the surroundings and the client that will enliven the framework and hopefully help the magic of "therapy" crystalize" (Berger, 2010, pg 67). Research supports that is more than one way to do NBT and the environment where it takes place dictates different experiences based on therapist creativity (Berger, 2010). Berger (2010) argues that a hallmark of NBT is the

experiential process that helps cause change by connection to the more "emotional" or imaginary right side of the brain rather than traditional talk therapy which is more cognitive in nature. The flexibility in NBT can be viewed as a continuum, depending on the level of involvement with nature. NBT can involve using nature-based imagery or metaphors in talk therapy sessions, to having clients pick out nature objects to illustrate meanings, to assigning time in nature as homework, to doing a traditional talk therapy session in nature where nature serves as a vessel or witness to the experience, to doing talk therapy in nature with nature playing an active role (Jordan & Hinds, 2016).

NBT, while encompassing many active approaches, can also incorporate several different types of "talk therapy" as well. Studies in Denmark with the Nacadia Therapy Garden have been developed using a combination of Acceptance and Commitment Therapy (ACT) and Mindfulness-Based Cognitive Therapy (MBCT) as part of their NBT program (Stigsdotter, et al., 2018; Corazon S. S., Stigsdotter, Jensen, & Nilsson, 2010). Some researchers suggest that in NBT, nature can serve either an active or passive role which can then shift based on the client, the problem and the goal. Several researchers argue that conducting Nature Based Therapy is often like a "triangle" where, nature becomes a co-therapist in the session (Berger & McLeod, 2006; Jordan & Hinds, 2016).

In traditional talk-therapy in an office, there is often a power differential which can be challenging when working with some individuals who have trauma. NBT addresses these concerns in two different ways. One way is the concept of having a "neutral ground" where the setting where therapy is conducted does not strictly "belong" to the therapist or the client. Berger and McCloud (2006) suggest that "nature is a live and dynamic environment that is not under the control or ownership of either therapist or client" (Berger & McLeod, 2006, pg 82). As such this

helps to eliminate some therapy interfering behaviors, such as client no-shows or stigma of being seen in a certain area. This can be especially important in more rural areas, where limited physical space and fear around being seen talking with a therapist can limit access to therapy. Another way in which NBT can address differences in power is through therapist participation. For example, in Horticulture Therapy programs, at times the therapist is an active participant in planting plants or pulling weeds. Qualitative data from these types of experiences show clients respond positively and feel more inclined to participate in therapy (Baker, 2009). When working with multiple clients of varying levels of power, such as in a family, this neutrality could play an important role.

With any kind of therapy, it is important to consider the role that culture plays. With NBT, programs have been conducted around the world in places like Australia, Israel, Copenhagen, Poland, Japan, England, Norway, and some programs in the United States. For some cultures in particular, such as Native Americans or First Nations, connection with nature can play an important role in the cultural identity of the individual.

In addition to a variety of cultures, NBT has been conducted with individuals and groups, and in a variety of public and private settings. NBT has primarily been researched on stress and stress-related disorders, such as anxiety. However, NBT has also been conducted with individuals who have severe mental illness (SMI) such as schizophrenia and schizoaffective disorders, as well as individuals who have eating disorders, psychotic episodes, borderline personality disorder, anxiety, OCD, grief/loss, ADHD, depression, PTSD, obesity, dementia, cancer, physical disabilities, and Substance Use Disorders (Annerstedt & Warborg, 2011; Berger & Tiry, 2012; Roberts, Stroud, Hoag, & Massey, 2017; Bielinis, Jaroszewska, Lukowski, & Takayama, 2019; Jordan & Hinds, 2016). Research suggests that nature-based interventions can

both improve mental health outcomes in both individuals with and without mental illness (including SMI), as well as serve as a preventative measure to help keep people well (Coventry, et al., 2021).

Nature-Based Therapy and Veterans

While NBT can play an important tool for many individuals who have trauma, NBT has been shown to have positive outcomes and play an important role for veteran and military populations. Veteran and Active-duty service members often have a history of abuse or neglect and then are subsequently subjected to chronic autonomic arousal in theater while deployed and mixed messages of support from military and mainstream media causing a questioning of the legitimacy of the cause (Creamer & Forbes, 2004). As a result, individuals may be prone to mistrust of civilians and clinicians, have a strong ability to "shut down affective states", and have a strong threat-arousal and stress/anger pairing that can make forming a therapeutic alliance and conducting traditional talk therapy difficult (2004). This arousal pairing may cause veterans to use strategies such as numbing and dissociation to avoid anger towards loved ones (Bird, 2014). Additional studies on brain imaging have shown pre-frontal cortex damage and an increase in memory and attention errors following deployment (not caused by blasts) that appear to normalize after 1.5 years with no additional trauma (vanWingen, et al., 2012). Thus, with frequent deployments, neurological recovery may be limited (Bird, 2014). While there are strong evidence-based talk therapies, such as CPT and PE, the natural reluctance to process traumatic memories leads to a high drop-out rate in traditional therapy (Ready, et al., 2012) or not attending at all and leaving the families to figure out how to deal with PTSD symptoms in their lives (Poulson, 2017). Research suggests that dropout rates for traditional talk therapies can range from between 30 and 54% (Bisson, et al., 2007), and can be higher for younger veterans

from the OEF/OIF conflicts (Kehle-Forbes, Meis, Spoont, & Polusny, 2016). For veterans, these symptoms then affect the service member at all levels, physical, emotional, and relational (Poulsen, Stigsdotter, & Davidsen, 2018). The stigma and high drop-out rates have led some to argue that additional therapies are needed to target veterans who either don't want to go to a VA health facility or are not helped through traditional talk therapy (Bettmann, Anstadt, & Kolaski, 2020). Some researchers argue that VA services can be difficult to access and may not be comprehensive enough to address the variety of conditions veterans face (Joshi & Goldman, 2019). Additional research suggests that veterans don't receive adequate mental and physical care due to barriers of access to a VA and the complexity of their military injuries (Hawkins, Townsend, & Garst, 2016). In addition to the overall stigma regarding mental health, some individuals won't go to a VA center because they are disillusioned by the government and no longer want to receive government services (Gelkopf, Hasson-Ohayon, Bikman, & Kravetz, 2013) and so many veterans seek services outside a VA setting (Hawkins, Townsend, & Garst, 2016).

Nature-based interventions are growing particularly in the area of Recreation Therapy (RT) and researchers posit this is due to the strength-based approach of Nature-based interventions compared to the traditional medical model (Hawkins, Townsend, & Garst, 2016). Some studies on veterans and NBT have found that veterans prefer the therapy garden compared to an office (Poulsen D. V., Stigsdotter, Djernis, & Sidenius, 2016). Several studies have documented the importance of peer support when working with the veteran community (Bird, 2014). Peer-influenced programs are perceived to be more accessible, can promote therapeutic change and retention, and encourage mental health support (Bird, 2014). Feedback from veterans who have participated in various NBT programs has commented on how much the "peer

support" and connection with fellow veterans has helped them to heal (Mowatt & Bennett, 2011; Ewart, 2014). One of the common complaints from veterans who leave the service is that "no one understands them" or "no one has seen" the things they have. In military culture, there is a unique bond between military members of all branches of the service that lends instant credibility and trust between group members. Indeed, feedback from veterans has stated doing NBT with other veterans has allowed them to "feel connected" again to other individuals, and has given them the confidence to express their feelings and interact with other people including their family members (Poulsen, Stigsdotter, & Davidsen, 2018).

In addition to the strong bonding that takes place in combat and basic training, other researchers have posited that NBT provides the sense of ritual that is often lacking in veterans' lives. Indeed Berger and McLeod (2006) posit that the element of ritual in nature therapy is a central principle and rituals "were extremely important in giving people a sense of order and security, fostering a feeling of togetherness and providing a sense of control over the uncertainties of life" (pg 85). In the military, there is a strong sense of order and routine that lends a sense of predictability and comfort, while in the civilian world this is often not present. Several types of NBT programs suggest that the sense of ritual in an NBT program is important not only for predictability but a sense of ritual harkens back to the "warrior culture" and ancient "coming of age" ceremonies that were present and are still practiced today in some cultures.

In addition to the rediscovered sense of wonder or being connected to something larger than themselves, NBT programs can also provide a much-needed task or "mission" for veterans who are lacking a focus. The Swamp Apes/Volunteer Wilderness Alliance (SA/VWA) is a program located in the Everglades National Park in Florida and recruits veterans to be a part of their team (Joshi & Goldman, 2019). The logic behind the program is that it helps to simulate

some of the harsh conditions that veterans and other first responders are familiar with while still being novel and allowing their job training to kick in (2019). Anecdotal evidence from the program supports decreases in intrusive thoughts, dissociation, and other intrusive thoughts (2019). Some Nature Assisted Therapy programs are geared more for rehabilitation or retraining, such as training veterans to be a farmer. The Outward Bound program's goal is to use skills taught in their program to situations in later life (Ewart, 2014). The Swamp Apes program (2019) serves as a model for other programs to help regain a level of functioning, building skills, and training, providing a service, and ultimately having a sense of purpose.

Some authors posit that being in nature also helps to "validate the reasons they served in the military to maintain the freedom associated with nature" (Hawkins, Townsend, & Garst, 2016, p. 61). This may especially resonate with veterans whose homes are in rural areas. According to the U.S. Department of Veterans Affairs, almost 4.7 million veterans return to living in a rural area after their active duty contracts are up (U.S. Department of Veterans Affairs - Office of Rural Health, n.d.). In particular, almost 8 million Vietnam-era veterans are living or working in rural America (Heady, 2011). Rural individuals, in particular individuals from minority groups, are more likely to serve in the military at a much higher rate than the general population (Heady, 2011). Veterans in rural areas face additional obstacles, including being uninsured, elderly age group, decreased internet broadband access, reduced healthcare due to hospital closures, decreased mental health care access, limited housing, education, employment, and transportation opportunities, higher mortality rates, be in poorer health with likely increased rates of chronic disease (U.S. Department of Veterans Affairs - Office of Rural Health, n.d.; Heady, 2011). Some researchers argue that rural veterans are the largest underserved population group, and suggest that the dualities of rural and military culture increase the challenges these

veterans face (Heady, 2011). Women veterans who live in rural areas face additional challenges, with the increased difficulties related to military sexual trauma. Researchers examined perceptions of mental health services by rural veterans and found that women veterans often do not feel they qualify as a veteran and thus will not seek services (Ingelse & Messecar, 2016). The authors also found that women, in particular, required peers to engage in mental health service, and frequently reported gender bias in the quality of their care, and felt double stigmatized due to their gender and military service (2016).

Due to the significant treatment barriers and the high numbers of rural veterans, the Department of Veterans Affairs (VA) has tried to increase access through the use of the Community Based Outpatient Clinics (CBOCS). However, the quality of care may still be impacted. A study on 132 veterans with PTSD was completed with veterans from both small and large CBOCS (Grubbs, et al., 2017). The authors found that of the participants only about 12% of veterans received evidence-based psychotherapy treatments for PTSD, and the rural veterans are much more likely to receive medication management instead (2017). This is consistent with other research suggesting medication management was the most common form of treatment, with 34% of the veterans' response (Teich, Ali, Lynch, & Mutter, 2017).

Research on rural veterans has focused on looking at the cultural makeup of some rural veterans. Research conducted on Native American veterans found that this population was almost 3 times as likely to live in a highly rural area compared to other veterans (Kaufman, et al., 2013). In addition to being younger, this population was more likely to be female and show fewer diagnoses than their non-native counterparts yet they had higher levels of combat service and service-connected disabilities (2013).

Additional research has been completed looking at usage rates or rural vs urban veterans. Brooks et al (2012) found that rural and highly rural veterans had anywhere from 22% to 33% fewer visits to PTSD specialty clinics compared to their urban counterparts. The authors found that over one year, rural and highly rural veterans would have experienced an additional 194,000 visits if they had equal rates of care (2012). The authors also found that usage was greatly influenced by a veteran's proximity to care (2012). Another study showed that approximately 2/3 of the rural veterans in the study with a mental health condition did not receive treatment, yet only 11% of veterans reported an unmet need (Teich, Ali, Lynch, & Mutter, 2017). This led the authors to posit that rural veterans may resist seeking mental health treatment (2017). This is consistent with research on some of the common characteristics of rural veterans. As a whole, this population generally encourages valuing qualities such as self-reliance and stoicism, combined with a general distrust of the VA system and not wanting services due to the stigma associated with mental health (Fischer, et al., 2016). However, some research has shown improvement in rural veterans seeking healthcare. Researchers examined the data from Fiscal years 2007 to 2010 and found that while rural veterans were still less likely to receive psychotherapy services, compared to their urban counterparts, the gap between the groups had decreased significantly (Mott, Grubbs, Sansgiry, Fortney, & Cully, 2015). To address these common barriers for veterans, research has suggested that support from other veterans, a perceived need for services, trust in VA mental health care providers, and the perceived effectiveness of services were regarded as crucial to service delivery (Fischer, et al., 2016). It is often this need to increase service delivery and utilization of services that can influence the development of many of the current NBT programs in the United States and other countries.

Nature-Based Therapy Programs and Outcomes

Several meta-analyses have been conducted on NBT. Coventry et al (2021) found several important results in their meta-analysis. The authors found that forest therapies and wilderness therapies showed significant reductions in overall negative affect and anxious and depressive symptoms as well as increasing positive affect (2021). Moreover, the authors found that the improvements found using nature-based interventions showed improvements above and beyond control groups, including groups with exposure to green spaces (2021). Blaschke (2017) conducted a metaanalysis on cancer-patients with nature-based therapy. The author found 7 key themes including connecting with values, safe and home, symbolism, communication, exploration, being elsewhere, inner and outer excursions, physical activities, and aesthetic experiences (2017). The authors found that every study had a self-report on nature facilitating connections and individuals overall connected with what they valued. In several studies, the authors found that individuals used symbolism and metaphors found in nature to help understand and communicate about how cancer affected their lives (2017). The authors also found some individuals saw their situation mirrored or reflected in nature, which has been echoed in other programs (2017; Sahlin, Matuszczyk, Jr., & Grahn, 2012). Sahlin and colleagues found this mirroring of processes illustrated parallels and provided a model to explain the patient's own life (2012). As a whole, Blaske (2017) found participants valued the nature connection and used it to ease the strain of cancer, facilitated connections, motivated physical activity, provided a safe space, and allowed for a metaphorical understanding of changes (2017, pg 10). Similar to individuals with trauma, the notion of using nature as a "secure base" or safe place played out with individuals who had cancer, and they were able to use the secure base to form new connections with themselves, others, the past, and the future (2017).

Poulsen et al. (2015) conducted a review of the literature and found several themes from the qualitative literature including the type of intervention, duration of the intervention, specific health outcome measures, participants perceptions and emotions in the environment, nature therapy as a way back to the workforce, changes in physical health, transparency, and relationships through teamwork.

Annerstedt and colleagues (2011) completed a literature review and examined several areas. The authors described the horticulture therapy results as mixed, with the most promising results using horticulture therapy in combination with other forms of therapy (2011). The researcher regarding adventure therapy was regarded as typically significant (2011). The authors examined NAT on specific psychopathologies, such as Schizophrenia, and found that most showed significant improvement in symptoms (2011). Studies were examined looking at dementia and showed 4 out of 5 studies showed improvement (2011). Significant improvement was noted with Substance Abuse disorders, mood and anxiety disorders, behavioral disorders, acquired brain injury, personality disorders, hearing impairment, mental retardation, and delinquency (2011). The authors further elaborate that in 26 out of 29 cases the results were generally positive and health improvements were noted (2011). Interestingly, the authors reported that the act of simply moving the therapy outside, compared to traditional indoor treatment, showed a large effect in the literature (2011). Overall, the authors posited that the research findings show nature is an important resource for the treatment of mental and physical health (2011).

Research has been completed on forest bathing regarding the effects of cortisol, and 14 studies reported a significant difference in cortisol levels after intervention for the forested groups (Antonelli, Barbieri, & Donelli, 2019). The authors found significant results even in

walking groups, urban versus forest walking, and suggested that phytoncides can play a role in stress relief and relaxation and needs further research (Antonelli, Barbieri, & Donelli, 2019).

Duvall and Kaplan (2014) researched 98 veterans who participated in NBT programs as part of the Sierra Club's Military Families and Veterans Initiative and partner organizations. The programs all had a recreational component but most programs did not include formal counseling or therapy, though most had psychologists onsite (2014). The authors found that participants found improvements in attentional focusing, positive affect, and decreases in negative affect after 1 week of an outdoor intervention (2014). Positive affect was sustained even after 1 month, and significant improvements in social functioning and life outlook were observed (2014). The participants experienced greater social connectedness and overall more optimism about life (2014). Additionally, participants who were experienced more severe health problems reported the most significant impacts across the three dimensions, with as much as 1.5 times that of participants with decrease severity of health problems (2014).

Many early studies on NBT have come from the medical community. Research on health outcomes suggests that nature provides "regulation of immunological and physiological (stress) responses, enhancement of psychological states such as mood, self-esteem, vitality, and attention and facilitation of health-promoting behaviors such as exercises and social contacts" (Van den Berg, 2017). With the current emphasis in psychology on health-psychology trends, this can be an important implication for providing the reason for continued research in this area. As a result, some countries have increased active work towards implementing nature-based interventions using green space as a preventative and therapeutic space (2017).

Limited RCTs have been completed on NBT's. Some researchers suggest that RCTs do not work well with NBT because individuals are not "blinded" to the idea they are in nature and

could thus be biased in their responses (Van den Berg, 2017). Despite this, some RCTs have been completed. Stiggsdotter and colleagues (2018) completed an RCT with the Nacadia NBT program compared to a cognitive behavioral therapy program for stress disorders on 84 participants. The authors found no significant difference in outcomes between the two types of programs that were sustained even 12 months after treatment ended (2018). Significant effects were noted for both treatments in regards to increased well-being and decreased burnout (2018).

As more research has been completed, research has started to look at conducting NBT in various environments, including military bases. A recent study was completed on Walter Reed Army Medical Center and National Naval Medical Center (NSA/B/Walter Reed) to examine the effect of walking in an intentional natural environment compared to a busy campus street (Ameli, et al., 2021). The study was conducted to measure both qualitative and quantitative data and measure 12 individuals' experiences in randomized walking on both “Green Road” (a wild-type healing garden) or the Urban road for 20 minutes (2021). The results of the quantitative data showed strong effect levels for increased mindfulness and decreased distress levels for the Green Road compared to the Urban road (2021). Qualitative data showed themes of feelings of safety, privacy, increased physical sensations of relaxation, increased appreciation and gratitude, present moment orientation, and references to a higher power for the Green Road, while data showed mixed results for the Urban road, with frequent reports of dislike of crowds, safety concern, and expressions of stress (2021).

Barriers to practice

“There is a complexity in ecotherapeutic process that defies reductionism” (Dustin, Bricker, Arave, Wall, & Wendt, 2011). In developing a Nature-Based Therapy program (NBT) for individuals with trauma, several barriers have been discussed in the literature. Caddick and

Smith (2014) stated that "exact nature of "nature's healing power" be understood" and how disabled veterans could access nature activities should be addressed (Caddick & Smith, 2014, pg 17). Another concern with NBT, specifically Wilderness Therapy, is that the unstructured nature of it can be difficult for individuals with trauma (even in programs not designed to target trauma), and therapists are not often utilized in such settings (Berman & Davis-Berman, 2005). The authors claim that for this reason, mental health therapists should be critical but this idea is not always realistic and can be regarded as controversial (2005).

Additional barriers reviewed included no common set of measurement tools, understanding of the "mechanism" for change, the appropriate "dosage" for interventions, limited RCT's and large scale studies, limited description as to what elements of therapy, role, which skills were successful, consistency among programs, lack of control groups, determining sustained improvement and well-being, and a description of a veterans level of PTSD and perception of activities (Poulsen, Stigsdotter, & Refshage, 2015; Duvall & Kaplan, 2014; Frumkin, et al., 2017). Additional researchers noted problems with treatment integrity due to the broadness of what is defined as an NBT program (Annerstedt & Warborg, 2011), while others described concerns related to unreliable measures, no follow up evaluation, different treatment lengths, and no control groups (Hyer, Boyd, Scurfield, Smith, & Burke, 1996). Performing traditional talk therapy in nature also raises logistical concerns regarding confidentiality, scheduling challenges, weather challenges, mobility concerns, and proximity to an appropriate setting (Jordan & Hinds, 2016). More strenuous NBT, such as Wilderness Therapy, can involve additional logistical concerns such as the health and safety of the client and avoiding harm (2016).

Despite the barriers presented, formal NBT programs have been developed. In Copenhagen, for example, there is the Nacadia Healing Garden. Nacadia has a private clinic associated with the garden to provide medical supervision (Corazon S. S., Stigsdotter, Jensen, & Nilsson, 2010). The program is designed for 8 people lasting about 10 weeks. Individual time in the program varies depending on the phase, with as few as 3 hours a day 2 times per week at the beginning and end phase and 3 hours a day 4 times per week during the middle phase (2010). The parts of the program consist of conversation therapy using MBCT and ACT principles, physical and mental awareness body scans, garden activities, personal time, and homework (Sidenius, Stigsdotter, Poulsen, & Bondas, 2017). The goal of the garden is to "improve the quality of life, restore impaired resources, and increase capacity to deal with future strain" (Corazon S. S., Stigsdotter, Moeller, & Rasmussen, 2012, p. ?).

The Nacadia Healing Garden was in part based on the Swedish Healing Garden "Alnarp". Alnarp has been in operation for several years and data showed an increase in patients' physical condition, social functioning, self-mastery, and decrease in overall pain levels and depression and anxiety (Corazon S. S., Stigsdotter, Jensen, & Nilsson, 2010).

Outward Bound for Vets (OB4V) is a program that is based in the United States and involves a frequently cited model for adventure education (Ewart, 2014). Two clinical studies evaluated the Outward Bound for Veterans Program examined chronic-PTSD and showed that outdoor therapy camps were equivalent for reducing PTSD (Bird, 2015). In reviews of the Outward Bound program, researchers noted improvements with improved trust, belief that lives can change for the better, increased engagement in positive reinforcement activities, and reawakening to the effects of nature and physical activity and practiced learning real skills (Ewart, 2014).

Similar to Outward Bound, a program called "Trojans Trek" in Australia was evaluated. The results showed decreased anxiety, improved self-efficacy, and improved life satisfaction (Bird, 2015). Similar to other programs, the authors found themes of connection, self-awareness, ideas for future change, an increased ability to discuss their issues, and self-realization of their thoughts and actions (2015).

Section III: Original Contribution to Practice

Program Overview

Project H.O.M.E stands for "Healing Outdoors through Mindful Experiences" and is a program that combines elements of both "top down" talk therapy using components of skills-based Dialectical Behavior Therapy (DBt) and "bottom up" therapies both nature-based activities and nature-based therapy modalities. The program is designed to consist of 12 weeks of services that will meet 3 days over the weekend for 6-8 hours per day. The group will consist of approximately 6-8 individuals along with 3 mental health specialists. The 12 weeks will incorporate three of the main NBT modalities (adventure therapy, horticulture therapy, and forest bathing, with animal-assisted therapy as an optional modality) along with individual psychotherapy "check-in" sessions that last approximately 20-30 minutes each day. There will be 1.5 hours of skill-building using elements from Dialectical Behavioral Therapy (DBT) and ACT modalities as the weekly "mission."

Each weekend will incorporate elements of ritual, with a set opening and closing of the program. Each weekend will start with opening and closing sessions, with the opening session providing the "mission" of the day and a mindfulness exercise to include grounding, guided imagery, paced breathing etc. for 30 minutes. The next part of the day will include 1.5 hours of skill-building as a group. To maximize the use of nature as a healing place, the group will be

allowed to break and have 1 hour of self-reflection time individually in nature. During this individual time, the participants will be encouraged to journal about their experiences so far. Individuals will then come together as a group to participate in the nature-based activities to go along with the theme of the week. At the end of the day, the emphasis will revolve around coming back around the campfire to provide the "mission debrief," which will include breaking into individual 20-30 minute check-in sessions with the therapist using the PCOMS. Since the ratio of therapists to participants is 2 to 1, while one individual is participating in the check-in with the therapist, the other individual assigned to that therapist will work on completing their post-treatment measures and switch off when it is their turn for the check-in. After the individual therapy time is completed, the group will gather together for the closing ceremony to the day. To provide as much flexibility as possible, the activities will fall within a general structure to be tailored to the specific group and location of the program being run.

Proposed Treatment Framework

Module one: Weeks one through three

Weeks one through three the mission will include combining mindfulness skills training with the emphasis on the NBT of forest bathing. Mindfulness is considered a core skill with this program, and as such it is important to create a strong foundational skill in practicing mindfulness in the first module and to continue the practice daily as part of the opening "ritual" to increase the likelihood of creating a new habit. Week one will include working on DBT skills such as "States of Mind" and "Wise Mind." Weeks 2 through 3 will focus on the "what" and "how" skills from the mindfulness module. Nature-based activities will focus around provide choices from yoga, breathing, and walking meditations.

Module two: Weeks four through six

Weeks four through six will be focusing on the NBT of horticulture therapy with the module of distress tolerance from DBT. Skills to be trained will include Self-soothing, Distracting with ACCEPTS, TIP skills, Crisis Survival skills, Radical Acceptance, and Willingness from the DBT modules. Nature-based activities will focus around a menu of horticulture activities from gardening, to cleaning up the natural setting, to planting flowers or seeds, harvesting fruits or vegetables, etc.

Module three: Weeks seven through nine

Weeks seven through 9 will be focusing on the NBT of Animal-Assisted Psychotherapy (AAT) if available, or another Module of Forest Bathing. Regardless of the NBT modality, the skills training will focus on ACT defusion exercises, labeling emotions, and learning the DBT skills of Opposite Action and ABC PLEASE which focus on valued living and taking care of your whole body to help prevent dysregulation.

Module four: Weeks 10 - 12

Weeks ten through twelve will focus on the NBT of Adventure or Wilderness therapy concurrently with skills from the DBT module of Interpersonal Effectiveness. The skills training will focus on learning key DBT skills of interpersonal effectiveness to include DEAR MAN, GIVE, FAST skills, along with learning how to evaluate options and make decisions.

Program materials, staffing, and costs

The program would require having a large space in nature, preferably one with trees and/or plants and a water element. Trees or plants will be critical for providing the NBT of Forest Bathing. While research trying to determine what elements of nature are most important, water elements are a component of most current NBT's or NBI, and ecopsychology has identified

water as an important element possible due to an evolutionary predisposition. A potential benefit of conducting NBT is the relative low cost of the location, and this could be adapted to different states, regions, urban, and rural areas. Many states have city, state, or national parks that would allow clinicians to obtain special use permits to conduct NBT. Some states, like Kentucky, have already developed Arboretums that are allowed public access and so would incur limited costs and would address barriers related to accessing the environment. Since this NBT is intended to treat veterans with trauma, this program could be utilized in spaces already designated and designed for veterans, such as a VA hospital or U.S. Military base. Indeed, as mentioned earlier some research is already in progress utilizing military bases' "green space" to implement similar programs (Ameli, et al., 2021). Moreover, this program could also be implemented using a variety of camps or other outdoor specialty locations who already have appropriately trained and certified staff, particularly for wilderness/adventure activities. Many summer camps are seasonal in nature, and utilizing the space during the off-season could be beneficial.

A specialized informed consent would have to be developed to address concerns related to confidentiality which would then be discussed with any clients. An agreed-upon method for handling weather complications, including alternate locations, and how to handle other non-participant's human contact would be among the areas to be addressed.

The cost would change relative to the required nature space and nature-based activities desired. For example, elements of yoga would involve purchasing yoga mats for individuals. Horticulture-type activities would require materials such as seeds, planter boxes, etc.

Clinician and Participant Characteristics

The clinicians and/or other program staff would have to be Red Cross certified in basic first aid, CPR, and AED training to help handle medical emergencies. Additional certifications for staff members could be required dependent upon the therapeutic modality. For example, specific adventure therapy activities may require certifications in wilderness survival and first aid. Participants would be required to obtain medical clearance to participate in some activities. Clinicians conducting the treatment and participating in these activities would have to be experienced in trauma treatment to recognize when someone is in crisis and to be able to have to skills needed to help a person de-escalate and ground if inadvertently triggered. In addition, the clinicians would have to be comfortable with using elements of ACT (Acceptance and Commitment Therapy) and DBT (Dialectical Behavior Therapy) in order to conduct the skills training portion of the day. Participants would be required to have documented trauma and or affective disorders related to a criterion A trauma. Posttraumatic Stress Disorder is the most likely diagnosis, but other diagnoses would not be excluded. Suicidal ideation would be assessed before the program beginning but only those in acute crisis would be excluded until stabilized. Individuals in active psychosis would be excluded from the program.

Treatment Outcome and Evaluation

All individuals would be given several self-report measures pre and post-treatment, including the PCL-5 (PTSD Checklist for DSM-5), Perceived Stress Scale (PSS), and Post traumatic Growth Inventory (PTGI). In addition, the PCOMS (Partners for Change Outcome Management System) would be used during check-in time with the therapist to measure individual differences.

PCOMS would be assessed daily during the check-in portion with a therapist. Additional measures would be assessed prior to the 12 weeks, at the end of each 3-week module, and after the program ended. Follow-up measures would be conducted using all measures except PCOMS at 3-, 6-, and 12-month follow-up periods to gain long-term data measures. In addition to the quantitative data, qualitative data would be collected by making copies of journal entries to analyze for themes related to progress.

References

Adams, W. W. (2006). The ivory-billed woodpecker, ecopsychology, and the crisis of extinction: On annihilating and nurturing other beings, relationships, and ourselves. *The Humanistic Psychologist, 34*(2), 111-133.

Alvarez, A. G., & Stauffer, G. A. (2001). Musings on adventure therapy. *The Journal of Experiential Education, 24*(2), 85-91.

Ameli, R., Skeath, P., Abraham, P. A., Panahi, S., Kazman, J. B., Foote, F., . . . Berger, A. (2021). A nature-based health intervention at a military healthcare center: A randomized controlled, cross-over study. *PeerJ*. doi:10.7717/peerj.10519

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

Antonelli, M., Barbieri, G., & Donelli, D. (2019). Effects of forest bathing (shinrin-yoku) on levels of cortisol as a stress biomarker: A systematic review and meta-analysis. *International Journal of Biometerology*, 1117-1134.

Association, A. P. (2013). *Diagnostic and Statistical Manual of Mental Disorders - Fifth Edition.* Arlington, VA: American Psychiatric Publishing.

Baker, L. M. (2009). Nature's pervading influence: A therapy of growth. *International Journal of Disability, Development, and Education*, 93-96.

Bedics, B. C., Rappe, P. T., & Sansone, F. A. (n.d.). Trauma of children in a residential wilderness treatment program.

Bennett, J. L., Puymbroeck, M. V., Piatt, J. A., & Rydell, R. J. (2014). Veterans' perceptions of benefits and important program components of a therapeutic fly-fishing program. *Therapeutic Recreation Journal, 48*(2), 169-187.

Berger, R. (2008). Going on a journey: a case study of nature therapy with children with a learning difficulty. *Emotional and Behavioral Difficulties, 13*(4), 315-326.

Berger, R. (2010). Nature therapy: Thoughts about the limitations of practice. *Journal of Humanistic Psychology, 50*(1), 65-76.

Berger, R., & Lahad, M. (2010). A safe place: ways in which nature therapy, play and creativity can help children cope with stress and crisis - establishing the kindergarten as a safe haven where children can develop resiliency. *Early Child Development and Care, 7*, 889-900.

Berger, R., & McLeod, J. (2006). Incorporating nature into therapy: A framework for practice. *Journal of Systemic Therapies, 25*(2), 80-94.

Berger, R., & Tiry, M. (2012). The enchanting forest and the healing sand- Nature therapy with people coping with psychiatric difficulties. *The Arts in Psychology*, 412-416.

Beringer, A., & Martin, P. (2003). On adventure therapy and the natural worlds: Respect nature's healing. *Journal of Adventure Education and Outdoor Learning*, 29-39.

Berman, D. S., & Davis-Berman, J. (2005). Reconsidering post-traumatic stress. *Journal of Experiential Education, 28*(2), 97-105.

Bettmann, J. E., Anstadt, G., & Kolaski, A. Z. (2020). Therapeutic adventure for military veterans with mental illness: A conceptual argument. *Ecopsychology, 12*(4), 277-284.

Bielinis, E., Jaroszewska, A., Lukowski, A., & Takayama, N. (2019). The effect of a forest therapy programme on mental hospital patients with affective and psychotic disorders. *International Journal of Environmental Research and Public Health, 17*.

Bielinis, E., Takayama, N., Boiko, S., Omelan, A., & Bielinis, L. (2018). The effect of winter forest bathing on psychological relaxation of young polish adults. *Urban Forestry & Urban Greening*, 276-283.

Bird, K. (2014). Peer outdoor support therapy (post) for austrailian contemporary veterans: A review of literature. *Journal of Military and Veterans' Health, 22*(1).

Bird, K. (2015). Research evaluation of an australian peer outdoor support therapy program for conetemporary veterans' wellbeing. *International Journal of Mental Health, 44*, 46-79.

Bisson, J., Ehlers, A., Matthews, R., Pilling, S. Richards, D., & Turner, S. (2007). Psychological treatments for chronic post-traumatic stress disorder: Systematic review and analysis. *British Journal of Psychiatry, 190*, 97-104.

Blaschke, S. (2017). The role of nature in cancer patients' lives: A systematic review and qualitative meta-synthesis. *BMC Cancer, 17*(370).

Bratman, G. N., Hamilton, J. P., Hahn, K. S., Daily, G., & Gross, J. J. (2015). Nature experience reduces rumination and subgenual prefrontal cortex activation. *PNAS, 112*(28), 8567-8572.

Brooks, E., Novins, D. K., Thomas, D., Jiang, L., Nagamoto, h. T., Dailey, N., . . . Shore, J. H. (2012). Personal characteristics affecting veterans' use of services for posttraumatic stress disorder. *Psychiatric Services, 63*(9), 862-867.

Browning, M., Lee, K., & Wolf, K. (2019). Tree cover shows an inverse relationship with depressive symptoms in elderly residents living in U.S. nursing homes. *Urban Forestry and Urban Greening*, 23-32.

Burls, A. (2007). People and green spaces: Promoting public health and mental well-being through ecotherapy. *Journal of Public Mental Health, 6*(3), 24-39.

Burns, G. (2000). When watching a sunset can help a relationship dawn anew: Nature-guided therapy for couples and families. *A.N.Z.J. Family Therapy*, 184-190.

Butterfield, A. (2014). *Resilent places? Healthcare gardens and the maggie's centres.* Falmouth University.

Caddick, N., & Smith, B. (2014). The impact of sport and physical activity on the well-being of combat veterans: A systematic review. *Psychology of Sport and Exercise*, 9-18.

Caddick, N., Smith, B., & Phoenix, C. (2015). The effects of surfing and the natural environment on the well-being of combat veterans. *Qualitative Health Research, 25*(1), 76-86.

Chalquist, C. (2009). A look at ecotherapy research evidence. *Ecopsychology*, 64-74.

Chavaly, D., & Naachimuthu, K. (2020). Human nature connection and mental health: What do we know so far? *Indian Journal of Health and Well-being*, 84-92.

Corazon, S. S., Stigsdotter, U. K., Jensen, A. G., & Nilsson, K. (2010). Development of the nature-based therapy concept for patients with stress-related illness at the danish healing forest garden nacadia. *Journal of Therapeutic Horticulture*, 33-51.

Corazon, S. S., Stigsdotter, U. K., Moeller, M. S., & Rasmussen, S. M. (2012). Nature as therapist: Integrating permaculture with mindfulness-and acceptance-based therapy in the danish healing forest garden nacadia. *European Journal of Psychotherapy and Counselling, 14*(4), 335-347.

Coventry, P. A., Brown, J. V., Pervin, J., Brabyn, S., Pateman, R., Breedvelt, J., . . . White, P. C. (2021). Nature-based outdoor activities for mental and physical health: Systematic review and meta-analysis. *SSM Population Health*. doi:10.1016/j.ssmph.2021.100934

Craig, P. J., Alger, D. M., Bennett, J. L., & Martin, T. P. (2020). The transformative nature of fly-fishing for veterans and military personnel with posttraumatic stress disorder. *Therapeutic Recreation Journal, 54*(2), 150-172.

Creamer, M., & Forbes, D. (2004). Treatment of posttraumatic stress disorder in military and veteran populations. *Psychotherapy: Theory, Research, Practice, Training, 41*(4), 388-398.

Cukor, J., Spitalnick, J., Difede, J., Rizzo, A., & Rothbaum, B. (2009). Emerging treatments for PTSD. *Clinical Psychology Review, 29*, 715-726.

D'Aniello, C., Marek, L., & Moore, L. (2017). A systemic perspective on military service members' and their partners perception of ptsd and reintegration stress: A dyadic analysis. *Journal of Systemic Therapies, 36*(2), 39-53.

Detweiler, M. B., Self, J. A., Lane, S., Spencer, L., Lutgens, B., Kim, D.-Y., . . . Lehmann, L. (2015). Horticultural therapy: A pilot study on modulating cortisol levels and indices of substance craving, posttraumatic stress disorder, depression, and quality of life in veterans. *Alternative Therapies, 21*(4), 36-41.

Dustin, D., Bricker, N., Arave, J., Wall, W., & Wendt, G. (2011). The promise of river running as a therapeutic medium for veterans coping iwth post-traumatic stress disorder. *Therapeutic Recreation Journal, 45*(4), 326-340.

Duvall, J., & Kaplan, R. (2014). Enhancing the well-being of veterans using extended group-based nature recreation experience. *JRRD, 51*(5), 685-696.

Dybvik, J. B., Sundsford, S., Wang, C. E., & Nivison, M. (2018). Significance of nature in a clinical setting and its percieved therapeutic value from patients' perspective. *European Journal of Psychotherapy and Counseling, 20*(4), 429-449.

Ewart, A. (2014). Military veterans and the use of adventure education experiences in natural environments for therapeutic outcomes. *Ecopsychology, 6*(3), 155-164.

Fischer, E. P., McSweeney, J. C., Wright, P., Cheney, A., Curran, G. M., Henderson, K., & Fortney, J. C. (2016). Overcoming barries to sustained engagement in mental health care: Perspectives of rural veterans and providers. *The Journal of Rural Health*, 429-438.

Fleming, L. L. (2015). Veteran to farmer programs: An emerging nature-based programming trend. *Journal of Therapeutic Horticulture, 25*(1), 27-48.

Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Jr., P. H., Lawler, J. J., . . . Wood, S. A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives*, 075001-1-075001-18.

Gass, M., Wilson, T., Talbot, B., Tucker, A., Ugianskis, M., & Brennan, N. (2019). The value of outdoor behavioral healthcare for adolescent substance users with comorbid conditions. *Substance Abuse: Research and Treatment, 13*, 1-8.

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

Grieder, M., & Chanmugam, A. (2013). Applying environmental psychology in the design of domestic violence shelters. *Journal of Aggression, Maltreatment, & Trauma, 22*, 365-378.

Grubbs, K. M., Forney, J. C., Kimbrell, T., Pyne, J. M., Hudson, T., Robinson, D., . . . Schnurr, P. P. (2017). Usual care for rural veterans with posttraumatic stress disorder. *The Journal of Rural Health, 33*, 290-296.

Hart, J. (2016). Prescribing nature therapy for improved mental health. *Alternative and Complementary Therapies, 22*(4), 161-163.

Hawkins, B. L., Townsend, J. A., & Garst, B. A. (2016). Nature-based recreational therapy for military service members: A strengths approach. *Therapeutic Recreation Journal, 50*(1), 55-74.

Heady, H. R. (2011). Rural veterans: Invisable heroes, special people, special issues. *Journal of Rural Social Sciences, 26*(3), 1-13.

How Common is PTSD in Adults? (n.d.). Retrieved from PTSD: National Center for PTSD: https://www.ptsd.va.gov/understand/common/common_adults.asp

How Common is PTSD in Veterans? (n.d.). Retrieved from PTSD: National Center for PTSD: https://www.ptsd.va.gov/understand/common/common_veterans.asp

Hyer, L., Boyd, S., Scurfield, R., Smith, D., & Burke, J. (1996). Effects of outward bound experiences as an adjunct to inpatient ptsd treatment of war veterans. *Journal of Clinical Psychology, 52*(3), 263-278.

Ingelse, K., & Messecar, D. (2016). Rural women veterans' use and perception of mental health services. *Archives of Psychiatric Nursing, 30*, 244-248.

Joiner, T. (2005). *Why people die by suicide.* Harvard University Press.

Jones, D. (2021, January 27). *New VA program investigates outdoor therapy for veterans*. Retrieved from npr.og: https://www.npr.org/2021/01/27/958138926/new-va-program-investigates-outdoor-therapy-for-veterans

Jordan, M., & Hinds, J. (2016). *Ecotherapy theory, research, & practice.* London: Palgrave.

Joshi, M., & Goldman, J. Z. (2019). Endure, evolve, achieve: Stakeholder perspectives on the effectiveness of the Swamp Apes program in restoring biopsychosocial functioning of American veterans. *Cogent Psychology, 6*.

Kamitsis, I., & Simmonds, J. G. (2017). Using resources of nature in the counseling room: Qualitative research into ecotherapy practice. *International Journal of Advanced Counselling, 39*, 229-248.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15*, 169-182.

Kaufman, C. E., Brooks, E., Kaufmann, L. J., Noe, T., Nagamoto, H. T., Dailey, N., . . . Shore, J. (2013). Rural native veterans in the veterans health administration: Characteristics and service utilizations patterns. *The Journal of Rural Health, 29*, 304-310.

Kehle-Forbes, S., Meis, L. A., Spoont, M. R., & Polusny, M. A. (2016). Treatment initiation and dropout from prolonged exposure and cognitive processing therapy in a VA outpatient clinic. *Psychological Trauma: Theory, Research, Practice, and Policy, 8*(1), 107-114.

Kreski, B. (2016). Healing and empowering veterans in a botanic garden. *Journal of Museum Education, 41*(2), 110-115.

Laszloffy, T. A., & Davis, S. D. (2018). Nurturing nature: Exploring ecological self-of-the-therapist issues. *Journal of Marital and Family Therapy, 45*(1), 176-185.

Leardmann, C. A., Kelton, M., Smith, B., Littman, A., Boyko, E., Wells, T., & Smith, T. (2011). Prospectively assessed posttraumatic stress disorder and associated physical activity. *Public Health Reports, 126*, 371-383.

Lee, H. J., Son, Y.-H., Kim, S., & Lee, D. K. (2019). Healing experiences of middle-aged women through an urban forest therapy program. *Urban Forestry & Urban Greening, 38*, 383-391.

Lee, J., Li, Q., Tyrvainen, L., Tsunetsugu, Y., Park, B.-J., Kagawa, T., & Miyazaki, Y. (2012). Nature therapy and preventative medicine. *Public Health-Social and Behavioral Health*, pp. 325-350.

Li, Q., Otsuka, T., Kobayashi, M., Wakayama, Y., Inagaki, H., Katsumata, M., . . . Kagawa, T. (2011). Acute effects of walking in forest environments on cardiovascular and metabolic parameters. *European Journal of Applied Physiology, 111*, 2845-2853.

Littman, A. J., Bratman, G. N., Lehavot, K., Engel, C. C., Fortney, J. C., Peterson, A., . . . Frumkin, H. (2021). Nature versus urban hiking for veterans with post-traumatic stress disorder: A pilor randomized trial conducted in the pacific northwest usa. *BMJ Open, 11*(e051885). doi:10.1136/bmjopen-2021-051885

Morita, E., Fukuda, S., Jagano, J., Hamajima, N., Yamamoto, H., Iwai, Y., . . . Shirakawa, T. (2007). Psychological effects of forest environments on health adults: Shinrun-yoku (forest-air bathing, walking) as a possible method of stress reduction. *Journal of the Royal Institute of Public Health, 121*, 54-63.

Mott, J. M., Grubbs, K. M., Sansgiry, S., Fortney, J. C., & Cully, J. A. (2015). Psychotherapy utilization among rural and urban veterans from 2007 to 2010. *The Journal of Rural Health*, 235-243. doi:10.1111/jrh.12099

Mowatt, R. A., & Bennett, J. (2011). War narratives: Veteran stories, ptsd effects, and therapeutic fly-fishing. *Therapeutic Recreation Journal, 45*(4), 286-308.

Park, B., Tsunetsugu, Y., Kasetani, T., Morikawa, T., Kagawa, T., & Miyazaki, a. Y. (2009). Physiological effects of forest recreation in a young conifer forest in Hiokage Town, Japan. *Silva Fennica, 43*(2), 291-301.

Poulsen, D. V. (2017). Nature-based therapy as a treatment for veterans with PTSD: What do we know? *Journal of Public Mental Health, 16*(1), 15-20.

Poulsen, D. V., Lygum, V. L., Djernis, H. G., & Stigsdotter, U. K. (2020). Nature is just around us! Development of an educational program for implementation of nature-based activities at a crisis shelter for women and children exposed to domestic violence. *Journal of Social Work Practice*.

Poulsen, D. V., Stigsdotter, U. K., & Refshage, A. D. (2015). Whatever happened to the soldiers? Nature-assisted therapies for veterans diagnosed with post-traumatic stress disorder: A literature review. *Urban Forestry & Urban Greening, 14*, 438-445.

Poulsen, D. V., Stigsdotter, U. K., Djernis, D., & Sidenius, U. (2016). 'Everything just seems much more right in nature': How veterans with post-traumatic stress disorder experience nature-based activities in a forest therapy garden. *Health Psychology Open, January - June*, 1-14.

Poulsen, D. V., Stigsdotter, U., & Davidsen, A. S. (2018). "That guy, is he really sick at all?" An analysis of how veterans with PTSD experience nature-based therapy. *Healthcare, 6*(64).

Poulsen, D., Stigsdotter, U., Djernis, D., & Sidenius, U. (2016). 'Everything just seems much more right in nature': How veterans with post-traumatic stress disorder experience nature-based activities in a forest therapy garden. *Health Psychology Open*, 1-14.

Puma, J. L. (2019). Nature therapy: An essential prescription for health. *Alternative and Complementary Therapies, 25*(2), 68-71.

Ready, D. J., Sylvers, P., Worley, V., Butt, J., Mascaro, N., & Bradley, B. (2012). The impact of group-based exposure therapy on the ptsd and depression of 30 combat veterans. *Psychological Trauma: Theory, Research, Practice, and Policy, 4*(1), 84-93.

Roberts, S. D., Stroud, D., Hoag, M. J., & Massey, K. E. (2017). Outdoor behavioral health care: A longitudinal assessment of young adult outcomes. *Journal of Counseling and Development, 95*, 45-55.

Russel, K. C., & Hendee, J. C. (2000). *Outdoor behavioral healthcare: Definitions, common practice, expected outcomes, and a nationwide survey of programs.* Moscow, Idaho: Idaho Forest, Wildlife, and Range Experiment Station.

Sahlin, E., Matuszczyk, J. V., Jr., G. A., & Grahn, P. (2012). How do participants in nature-based therapy experience and evaluate their rehabilitation? *Journal of Therapeutic Horticulture, 22*(1), 8-19.

Sidenius, U., Stigsdotter, U. K., Poulsen, D. V., & Bondas, T. (2017). "I look at my own forest and fields in a different way": The lived experience of nature-based therapy in a therapy garden when suffering from stress-related illness. *International Journal of Qualitative Studies on Health and Well-being, 12*.

Sonntag-Ostrom, E., Nordin, M., Dolling, A., Lundell, Y., Nilsson, L., & Jarvholm, L. S. (2015). Can rehabilitation in boreal forests help recovery from exhaustion disorder? The randomised clinical trial for ForRest. *Scandinavian Journal of Forest Research, 30*(8), 732-748.

Stigsdotter, U. K., Corazon, S. S., Sidenius, U., Nyed, P. K., Larsen, H. B., & Fjorback, L. O. (2018). Efficacy of nature-based therapy for individuals with stress-related illnesses: Randomised controlled trial. *The British Journal of Psychiatry, 213*, 404-411.

Teich, J., Ali, M. M., Lynch, S., & Mutter, R. (2017). Utilization of mental health services by veterans living in rural areas. *The Journal of Rural Health, 33*, 297-304.

Thake, C. L., Bambling, M., Edirippulige, S., & Marx, E. (2017). A psychoevoluationary approach to identifying preferred nature scenes with potential to provide restoration from stress. *Health Environments Research & Design Journal, 10*(5), 111-124.

U.S. Department of Veterans Affairs - Office of Rural Health. (n.d.). *Rural Veterans*. Retrieved from U.S. Department of Veterans Affairs - Office of Rural Health: https://www.ruralhealth.va.gov/aboutus/ruralvets.asp

Van den Berg, A. (2017). From green space to gree prescriptions: Challenges and opportunities for research and practice. *Frontiers in Psychology, 8*(268).

vanWingen, G. A., Geuze, E., Caan, M. W., Kozicz, T., Olabarriaga, S. D., Denys, D., . . . Fernandez, G. (2012). Persistent and reversible consequences of combat stress on the mesofrontal circuit and cognition. *Proceedings of the National Academy of Sciences of the United States of America, 109*(38), 15508-15513.

Vujcic, M., Tomicevic-Dubljevic, J., Grbic, M., & Lecic-Tosevski, D. (2017). Nature based solution for improving mental health and well-being in urban areas. *Environmental Research, 158*, 385-392.

Westlund, S. (2015). 'Becoming human again': Exploring connections between nature and recovery from stress and post-traumatic distress. *Work*, 161-174.

Zhou, C., Yan, L., Yu, L., Wei, H., Guan, H., Shang, C., . . . Bao, J. (2019). Effect of short-term forest bathing in urban parks on perceived anxiety of young-adults: A pilot study in Guiyang, Southwest China. *Chinese Geographical Science*, 139-150.