Nature-Based Therapy With Canadian Adolescents

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Abstract

Nature-based therapy is a novel therapeutic modality for consideration with adolescent populations. Nature-based therapy is the engagement in intentional therapeutic practices around or in nature, where nature acts as a co-therapist and contributor to a strong therapeutic alliance (Berger, 2006; Harper et al., 2019; Jordan, 2015). Due to high adolescent dropout rates in therapy, often cited by concerns in the therapeutic alliance, nature-based therapy has been concerned as a modality for use with adolescents (O'Keeffe et al., 2018; Robbins et al., 2006; Yasinski et al., 2018). With a focus on nature-based and not wilderness-based therapy, this literature review will explore theory and current adult research applied to the adolescent population. Developmental theories and cultural implications for Indigenous adolescent groups will be highlighted as a benefit of nature-based therapy. Research on the implications of nature-based therapies in related psychological fields will be explored. The challenges of nature-based therapy are also explored. This literature review endeavours to suggest the ethical, safe practice of nature-based therapy with adolescents. Future research directions are highlighted, emphasizing the counselling implications of nature-based therapy with Canadian adolescents.

Keywords: *Nature-based therapy, adolescence, anxiety, depression, Indigenous, connection*

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Nature-Based Therapy With Canadian Adolescents

The Cambridge Dictionary (n.d.a) defines nature as "all the animals, plants, rocks, etc. in the world and all the features, forces, and processes that happen or exist independently of people, such as the weather, the sea, mountains, the production of young animals or plants, and growth" (para. 2). This definition captures how nature, natural settings, natural environments, and green spaces are considered and used synonymously in this paper (Taylor & Hochuli, 2017). Nature's incorporation into therapy has been discussed since the 1980s (Ulrich, 1983), and its prevalence as a significant component of healing has been observed in Indigenous communities in Canada, Australia, and Norway (Harper, Fernee, et al., 2021). Numerous studies have demonstrated the positive impact of nature on mental health outcomes, highlighting its restorative and stress-reducing qualities over the past four decades (Bratman et al., 2015; Cox et al., 2017; Farrow & Washburn, 2019; Hansen et al., 2017; Kaplan, 1995; Kellert & Wilson, 1993; Ulrich, 1984; White et al., 2019).

Despite efforts to reduce mental health stigma and increasing support throughout the last decade, mood disorders like anxiety and depression have increased among Canadian adolescents (Canadian Mental Health Association National, 2021; Halsall et al., 2019; Wiens et al., 2020). Exploring the use of nature in therapy has broader implications beyond its identified positive mental health outcomes, as it aligns practitioners with global issues reflecting the ethical principle of responsibility to society outlined in the Canadian Psychological Association's (2017) Code of Ethics. Calls to action have been made to review mental health risk factors such as urbanization, social media use, and the climate crisis as they have been identified as contributors to adolescent mental health risks (Evans et al., 2020; Gunnell, et al., 2018; Thompson, 2021). It is hypothesized that this may be due to mental health concerns associated with urban living in

adolescence (Evans et al., 2020). Urban planning strategies propose space-specific legislation and increased green spaces to promote adolescent mental well-being and daily interaction with restorative environments (Buttazzoni et al., 2022; Colodrado-Conde et al., 2018; Evans et al., 2018, 2020; Gruebner et al., 2017). These urban planning strategies indicating the importance of green spaces are relevant for counsellors to be aware of. The larger environmental context that individuals live within are impactful towards mental health and are an ethical consideration regarding, responsible caring for mental health practitioners (CPA, 2017). Adolescents experience climate anxiety which is defined as a high concern about climate change, where those who experience it report feelings of sadness, fear, anxiousness, and powerlessness and being ignored or dismissed when expressing those feelings (Thompson, 2021). Eco-anxiety involves feelings of uncertainty, lack of control, and unpredictability (Panu, 2020). Therefore, exploring nature-based therapies for Canadian adolescents may be crucial for practitioners to help regulate adolescent emotions, provide autonomy, foster a stronger connection to nature, and address climate anxieties (Gabrielsen & Harper, 2018; Harper et al., 2019; Harper, Fernee, et al., 2021).

Mental health issues during adolescence significantly impact quality of life and, if left untreated, can increase healthcare services utilization in adulthood (Katzman et al., 2014; Malla et al., 2018; Ontario Ministry of Health and Long-Term Care, 2010). The developmental stage of adolescence involves questioning, pushing boundaries, and forming individual identity (Erikson, 1950; Piaget, 1971; Vygotsky, 1978). Decreased mental health outcomes in adolescents can hinder a youth's journey toward adulthood, affecting employment, education, and parenthood (Arain et al., 2013; Holmbeck et al., 2010; MacLeod & Brownlie, 2014; Mancini et al., 2023; Tau & Peterson, 2010). Understanding the impact of decreased mental health outcomes in

adolescents underscores the significance of exploring the therapeutic mechanisms and current research on the mental health benefits of nature in the context of therapy.

To comprehend the use of nature in therapy with adolescents, it's critical to explore the therapeutic mechanisms of nature and review current research on its mental health benefits, specifically in adolescents. This critical exploration is vital to provide clinicians with a comprehensive understanding of using nature in clinical work with adolescents. The research question guiding this capstone explores the use of nature-based therapy with adolescent populations experiencing internalizing disorders. Internalizing disorders are a combination of physiological responses, behaviours and emotions connected to multiple conditions including anxiety, depression, post-traumatic stress disorder, and other somatic conditions (Frye et al., 2018). To narrow the research scope, more specifically, this capstone's research question is what effect would implementing nature-based therapy have on adolescents struggling with anxiety and depression? See the Appendix for examples of key research articles that initially guided this literature review. The efficacy of nature-based therapy in the field of counselling psychology has been debated, in part due to inconsistent language used to describe this therapy making it challenging to evaluate and compare (Beck & Wong, 2022; Hansen et al., 2017; Harper, Fernee, et al., 2021; Oh et al., 2017; Putra et al., 2020; Rowley et al., 2022; Summers & Vivian, 2018).

The term nature therapy was presented within therapeutic models by Berger (2006). Nature-based therapy (NBT) engages in intentional therapeutic practices in or near nature, acting as a co-therapist and a tool in the therapeutic alliance (Berger, 2006; Harper et al., 2019; Jordan, 2015). Nature can be used as a metaphor and analogy for the client's life and experiences and provide a regulating and rejuvenating environment that enhances therapeutic change (Jordan,

2015). Most research on NBT has focused on adult populations, but this capstone aims to emphasize its applicability to adolescents (Harper et al., 2019).

Adolescence, defined by the American Psychological Association (APA) (n.d.a), encompasses the period of puberty to physical and mental maturity. For this capstone project, individuals aged 10-20 years of age will be considered adolescents. The theoretical approach adopted for this project is systems theory, which examines the reciprocal relationship between individuals and their context, relationships, and environment (Sexton & Stanton, 2016). The capstone will include a self-positioning statement, exploring my personal bias and experience with NBT as an adolescent and young adult. The literature review will include and apply research findings on NBT to the developmental period of adolescence, considering similar outcomes between adults and adolescents (Zhang et al., 2020). Primary theories related to NBT and developmental theories will be discussed, along with practical applications of NBT for adolescents, including cultural implications and overall connections between NBT and its importance for consideration in counselling.

Self-Positioning Statement

I grew up in a small, rural Alberta village surrounded by farms. My neighbours were either trades persons or oil field workers. Throughout my kindergarten to Grade 9 experiences, in the forest at recess, I spent multiple hours running through trees and along paths, playing with peers. I would play in the summer in the forests on my grandparents' and uncle's properties. I have fond memories of sitting in forest meadows beside bubbling springs or creeks, building forts, and listening to bird songs and the breeze in the trees.

I am Métis and I embrace this identity. A Métis person is an individual of mixed European and Indigenous ancestry who can trace their heritage to a specific group of people with

a distinct and unique culture and are one of Canada's three distinct Indigenous groups (Douaud, 1983; The Canadian Encyclopedia, n.d.). I did not grow up with influence from my Indigenous culture, so I found a connection to that part of my heritage and identity through my connection and relationship with nature. As an adolescent, I went to high school in a larger urban area; there was a lake beside the school with a walking path, including trees and shrubbery that I spent almost every lunch hour sitting beside or walking on. As an adolescent removed from my rural community for school, I was still exposed to and sought out nature. Statistics Canada (2018) defines a rural area as outside a population center. National Geographic (n.d.) defines a rural area as "an open swath of land that has few homes or other buildings… there are fewer people, and their homes and businesses are located far away from one another" (paras. 1–3). In my experience, agriculturally based rural communities and rural families have a unique connection to the outdoors and nature due to their remote locations.

As a youth living in a rural area in the 2000s, I was not taught about mental health topics; however, I was consistently exposed to nature. As a young adult, I maintained my love and connection with nature, broadening my knowledge and experience with the mental health profession. Through my undergraduate degree experience, I developed a passion for advocacy of mental health support. My younger sibling, still in high school then, began self-harming and developing suicidal ideation. My parents struggled to find a mental health practitioner for my sibling. Witnessing my sibling's experience of mental health support services as an at-risk adolescent drove my passion for increasing adolescent services for mental health in our community.

After obtaining my double major degree, in 2019, at age twenty-one, I worked in an adolescent group home with at-risk adolescents. Working with adolescents involved in the child

and family services system continued to solidify for me the importance of effective therapeutic care. In my experience working with adolescents in a therapeutic capacity and recollecting my past adolescent experience, I believe that the experience of adolescence can be overwhelming, as change and the unknown can be intimidating. I believe NBT, through nature's wholeness and infinite quality encompassing change and growth, could work with adolescents in a therapeutic capacity to help them work through feelings of being overwhelmed and fearing change to grow into their young adult selves. This belief in NBT fueled this capstone research project.

During the COVID-19 pandemic, in 2020, I enrolled in the Calgary Saturday cohort and began my master's degree journey with the City University of Seattle (CityU). I experienced compounding stress due to the pandemic, working on my master's degree and working full-time. Thankfully, I live in a rural community with multiple green spaces, animals, and gardens, all of which alleviated some mental health symptoms I experienced. My continued experiences of connection and psychological benefits from when I was a young child to my current young adult life experience have contributed to my belief in NBT.

Before this literature review, my experience with NBT was constrained to my personal experiences of being in nature and the impacts that I had felt by being in natural environments. I had an idea that spending time in nature had positive effects but was unaware of the mechanisms behind the impacts and effects of nature on mental health. I previously had no training or formal education on NBT, so this review has been my first step in fully understanding the evidence-informed practice of NBT. My goal with this review is to comprehensively analyze the nature of therapeutic interventions and their application to an adolescent population to broaden the existing literature. Based on my experiences with adolescent mental health, I believe that NBT can fill a gap in interventions with adolescents that give adolescents agency in a therapeutic space and

could create interest and a solid therapeutic alliance. I hold and carry this bias regarding this research topic, which I have accounted for throughout this capstone by consistently being aware of and asking myself if I am fitting research results to motivate my biased view towards NBT, along with compiling a considerable size of research from various fields that support assertions made by NBT in its application to adolescents.

Upon reading this review, I hope other therapists and mental health practitioners will have more insight into NBT. For clinicians to fully understand and have competency regarding nature-based interventions, an understanding of theory and current research in NBT will be explored. It is an ethical duty for mental health practitioners to provide responsible care to their clients, including evidence-based and culturally appropriate services (CPA, 2017). This review aims to highlight to mental health professionals the importance of NBT when working with adolescents, especially those in Canada from diverse populations.

Literature Review

This section will present a thorough literature review on NBT and its implications for working with adolescents. The review will cover three main areas of literature: 1) theories and concepts explaining the mechanisms of nature and its connections to the human psyche, 2) recent research on NBT's therapeutic benefits and its implications in related psychological fields, and 3) the relationship between developmental theories and NBT. By examining this comprehensive range of literature, including adjacent fields like neuropsychology, education, and conventional therapy practices, the implications of NBT for working with adolescents with internalizing mood disorders, such as anxiety and depression, will be highlighted. NBT offers utility to counselling across various fields, showcasing the flexibility of this topic.

Relevant Hypothesis and Theories

NBT intervention research and psychological practice center on a hypothesis, the biophilia hypothesis which highlights the human connection to nature, and two main theories, stress reduction theory (SRT) and attention restoration theory (ART) (Jordan, 2015; Kaplan, 1995; Ulrich, 1984). The two theories, SRT and ART, provide frameworks for understanding the human and nature connection identified in the biophilia hypothesis (Jordan, 2015; Kaplan, 1995; Kellert & Wilson, 1993; Ulrich, 1984). Exploring each approach will help to explain the results from various academic studies investigating the therapeutic effects of NBT. Familiarity with these underlying theories and hypotheses may be crucial for counsellors, as they provide a foundation for understanding the versatility and effectiveness of NBT (Harper et al., 2019; Jordan, 2015).

Biophilia Hypothesis: Wilson

The biophilia hypothesis was presented by Edward O. Wilson in 1984 and elaborated in his and Stephen R. Kellert's book "Biophilia," which explained the inherent emotional connection between human beings and other living organisms (Kellert &Wilson, 1993; Wilson, 1984). According to Wilson (1984), the human brain evolved and grew in a biocentric world, where our lives were intertwined with seasonal changes, weather, and animal and plant populations; human life evolved to connect and cooperate with nature (Kellert &Wilson, 1993). However, the authors argued that with industrialization, most humans became disconnected from this natural relationship, living without direct contact and connection to nature.

Wilson (1993) proposed that human behaviours have innate hereditary patterns developed by evolution that connect humans to nature. He introduced the concept of biophilic learning rules, highlighting the intricate and complex relationship between our nervous systems,

cognition, and the natural world (Kellert &Wilson, 1993). These learning rules persist across generations and align with the theory of preparedness or prepared learning suggested by Seligman (1971). According to this theory, species have a hereditary predisposition to develop associations between stimuli, reinforcers, and responses for survival (APA, n.d.; Seligman, 1971). For instance, the prevalence of phobias towards snakes can be explained by this concept (Seligman, 1971). The overall hypothesis is that humans' emotional and learning responses, influenced by biophilic learning rules, are closely intertwined with nature, and a lack of connection with nature may lead to mental health concerns (Gaekwad et al., 2022; Kellert &Wilson, 1993). This asserted human predisposition to connection with nature may indicate that the developmental stage of adolescence crucial for brain development and learning may be significant in influencing mental health. Counsellors working with young individuals should consider the impact of nature, biophilic learning rules, and prepared learning, as disconnection from nature may contribute to mental health concerns and may act as a treatment option.

The biophilia hypothesis explains the human-nature connection and is currently cited in the research and literature regarding therapeutic mechanisms of nature (Gaekwad et al., 2022; Jordan, 2015). Although a hypothesis, the biophilia hypothesis supports other nature-based theories related to mental health, despite being open to criticism regarding its broad generalizations about human nature (Gaekwad et al., 2022; Joye & De Block, 2011). With these criticisms in mind, the hypothesis is still relevant to the counselling field and informs prominent theories, such as attention restoration and stress reduction theory (Greenwood & Gatersleben, 2016; Johnson et al., 2019; Kaplan, 1995; Kellert & Wilson, 1993; Li & Sullivan, 2016; Stevenson et al., 2019; Ulrich et al., 1991). Urban and rural adolescents struggling with mood disorders could benefit from therapeutic interventions in natural environments through

mechanisms such as biophilic learning rules outlined by the biophilia hypothesis (Baudon & Jachens, 2021; Kellert & Wilson, 1993; Owens & Bunce, 2022a).

The biophilia hypothesis could also have a significant impact within Canadian Indigenous communities, where cultural knowledge such as oral histories and learning are rooted in connections with nature in association with the medicine wheel as taught by Elder Debbie Cielen (Good Talking Turtle) (personal communication, September 22, 2021; see also Sasakamoose et al., 2017). Mental health concerns are prevalent among Indigenous Canadians and reclaiming identity and cultural connection is essential for community healing (National Collaborating Centre for Aboriginal Health [NCCAH], 2015; Sasakamoose et al., 2017). Therapists working with Indigenous individuals, including adolescents, should be aware of the importance of reconnecting with traditional knowledge, cultural learning, and Indigenous ways of knowing in a culturally sensitive manner (Canadian Psychological Association [CAP], 2018).

The biophilia hypothesis assertions of an evolutionary connection that all humans have to nature are prevalent in the current NBT literature (Adams & Savahl, 2017; Harper et al., 2019; Jordan, 2015). In addition, the idea of biophilic learning rules may be essential for understanding hereditary reactions based on human connection to nature and supporting Indigenous communities' ways of understanding development and ways of knowing. Hereditary reactions to nature outlined in the biophilia hypothesis provide a pre-cognitive basis for an understanding of the therapeutic mechanisms of nature (Harper et al., 2019; Ulrich, 1983).

Stress Reduction Theory as Psycho-Evolutionary: Ulrich

Ulrich's (1984) seminal study demonstrated that patients recovering from gallbladder removal surgery had shorter postoperative hospital stays when assigned to rooms offering views of natural settings. He observed that patients with a natural view experienced faster recovery,

fewer complications, and received more positive evaluations from nurses. In his summary, Ulrich emphasized the importance of visual properties in the natural scene, including visual diversity, the presence of water, and an open view (see also Jordan, 2015). It is important to note that the patients who did not have a natural view were viewing a largely featureless brick wall, therefore visual diversity in urban landscape compared to natural landscaped cannot be extrapolated from this study (Ulrich, 1984). Nonetheless, Ulrich (1983, 1991) proposed that visual properties and qualities provoked positive emotions and a parasympathetic biological response, reducing stress, and promoting relaxation and fascination, which he named stress reduction theory (SRT). Nature has been shown to reduce stress through physiological pathways independent of executive functions, which can be explained through SRT's secondary layer, the psycho-evolutionary theory (PET) (Bratman et al., 2021; Ulrich, 1983, 1991). PET asserts that humans have an inherently emotional and pre-cognitive connection to nature due to evolution; according to PET, nature influences emotions, thus shaping cognitive responses (Harper et al., 2019; Ulrich, 1983, 1991). Ulrich's (1983, 1991) theory explained that via evolutionary connection through emotional regulation, nature promotes recovery from stress and fatigue, ultimately enhancing human survival. The regulation of the parasympathetic nervous system, facilitated by nature, may be significant when working with adolescents experiencing anxiety or depression symptoms as they learn to regulate their emotions.

Adolescents located in both urban and rural settings who are learning emotional regulation and who experience stress are at higher risk of internalizing problems; therefore, activating the parasympathetic nervous system may be necessary for therapists working with these adolescents (Danneel et al., 2019). Therapists can do this through engaging in psychoeducation with adolescents and bring awareness to their nervous systems (Harris, 2023).

Understanding the autonomic nervous system's role in regulating emotions is crucial in comprehending the impact of nature exposure on internalizing disorders (Thayer & Lane, 2000, 2009). The autonomic nervous system consists of the sympathetic and parasympathetic systems, both vital for survival (Dana, 2022; Porges, 1995). The sympathetic system engages the fight or flight response; in contrast, the parasympathetic system, composed of the ventral (connect, rest and digest) and dorsal (drop and flop) vagal branches, facilitates either safety cues (ventral) or deep immobilization (dorsal) in response to prolonged danger or stress (Dana, 2022; Harris, 2023; Porges, 1995). Therapists aware of the biological and automatic mechanisms of the fight or flight response and visible behavioural markers, especially with adolescents who do not have fully matured brains to process these responses, may be better equipped to work with youth struggling with internalizing disorders. Therapists can learn this information through engaging in trauma-informed programs as described further in the review (Harris, 2023).

The Polyvagal Theory (PVT), developed by Dr. Stephen Porges (1995), explained that evolutionarily our dorsal pathway is the oldest and the ventral pathway is the newest. When the dorsal pathway is activated, it can lead to feelings of isolation or numbness, requiring significant effort to return to the ventral vagal pathway of safety and connection (Dana, 2022). PVT provides a biological perspective on how the autonomic nervous system influences behaviours, particularly those resulting from prolonged exposure to perceived or actual threatening environments (Dana, 2022; Porges, 1995). In therapeutic training programs addressing trauma, PVT is used to understand clients' nervous system responses and symptoms (Harris, 2023). By understanding the client's nervous system states, practitioners can help clients recognize their somatic experiences and co-regulate with nature's support (Harper et al., 2019). Counselors can also help clients experience their somatic experiences and co-regulate through the practice of

somatic experiencing (Kuhfuß et al., 2021; Levine, 1997). Somatic experiencing, a bottom-up therapeutic approach, focuses on internal sensations and holistic whole-body-based therapy rather than prioritizing cognition. Somatic experiencing, through introspection, can reduce excessive autonomic nervous system arousal (Hetherington & Gentile, 2022; Payne et al., 2015). Therapists working with nature can facilitate somatic experiencing through sensory awareness, interception, and proprioception in clients, benefiting from nature's regulating effects (Harper et al., 2019; Harper, Dobud, et al., 2021; Meuwese et al., 2021).

Understanding the PVT and the utilization of somatic experiencing emphasizes the significance of SRT and NBT, as natural environments can evoke a sense of safety (Harper et al., 2019). SRT suggests that nature activates the parasympathetic response, indicating the ventral vagal pathway (Dana, 2022; Ulrich, 1993). While moving through and fluctuating between the dorsal and ventral vagal pathways is healthy, overusing the dorsal vagal pathway in non-threatening environments can contribute to mental health issues (Dana, 2022). Adolescent brain development, including the prefrontal brain areas associated with emotion regulation, relies on normative increases in vagal activity to facilitate brain development (Koenig, 2020). As SRT implies, nature can enhance therapeutic interventions by triggering the ventral vagal pathway and fostering feelings of safety and connection (Dana, 2022; Ulrich, 1993).

Nature's theorized evolutionary connection to stress reduction implies that exposure to nature can restore essential resources needed for vitality (Harper et al., 2019). Increased vitality, characterized by energy, strength, and the absence of fatigue, has significant potential in psychotherapeutic treatment, particularly for mood disorders (Cambridge Dictionary, n.d.c; Deng et al., 2015; Huppert & So, 2013). Vitality is associated with subjective well-being and positive mental health, serving as a predictor of health outcomes and recovery from mental illness,

including depression (Gana et al., 2016; Huppert & So, 2013; Iasiello et al., 2019; Logan et al., 2023; Lucas et al., 2019; Samokhvalova et al., 2022). Counsellors should be aware of nature's potential ability to enhance vitality when working with urban and rural adolescents in NBT, as it could contribute to improved subjective well-being and may aid in treating mood disorders. Adolescence is also a critical time for brain development and neuroplasticity and thus this period of development provides a cognitive environment susceptible to stress and depression (Andersen & Teicher, 2008; Arnsten & Shansky, 2004; Crews et al., 2007; Giedd et al., 1999; National Academies of Sciences, Engineering, and Medicine et al., 2019; Selemon, 2013). Environmental influences and stressors such as socioeconomic status (SES) influence the pace of brain development, impacting its trajectory (Tooley et al., 2021). High SES correlates with reduced stress exposure and increases cognitive enrichment, including access to books, activities, and quality education (Farah, 2017; Finn et al., 2017; Tooley et al., 2021). As mental health practitioners cannot influence environmental factors such as SES for youth, other accessible forms of cognitive enrichment and vitality enhancement, such as nature exposure and exploration, could prove critical for therapists to consider.

The pre-cognitive, evolutionary connection to nature explained by SRT, engages a parasympathetic stress reduction when exposed to various stimulations of nature, including visual stimulation (Harper et al., 2019; Ulrich, 1993). According to PVT, the autonomic nervous system is vital for healing chronic stress, and anxiety by sending safety messages to the nervous system (Porges, 2022). In addition, vitality, an indicator of well-being, has been suggested to increase with nature exposure (Gana et al., 2016; Harper et al., 2019; Huppert & So, 2013; Iasiello et al., 2019; Logan et al., 2023; Lucas et al., 2019; Samokhvalova et al., 2022). Given the sensitive nature of adolescent neurodevelopment, a therapeutic environment like nature that has

been correlated with the activation of the ventral vagal pathways providing stress reduction may be beneficial, particularly for adolescents from diverse SES backgrounds (Harper et al., 2019; Harper, Dobud, et al., 2021; Koenig, 2020; Meuwese et al., 2021). While SRT asserts that there is a pre-cognitive hereditary connection to nature that reduces stress, other prominent theories in NBT such as Attention Restoration Theory assert that a cognitive process is associated with nature's benefits to mental health and restoration (Harper et al., 2019; Kaplan & Kaplan, 1989).

Attention Restoration Theory: Kaplan and Kaplan

Mental fatigue and its restoration are central to Attention Restoration Theory (ART), which was proposed by Kaplan and Kaplan (1989). Mental fatigue was defined by Kaplan and Kaplan as fatigue that could arise from stress but also from enjoyable work, the key component is that the trigger for the fatigue is met without negative evaluation, which differentiates it from general stress. To measure mental fatigue Kaplan and Kaplan focused on involuntary and voluntary attention, initially conceptualized by William James (1892). Involuntary attention requires no effort and occurs when something is interesting or exciting, while voluntary attention, referred to synonymously in the literature as direct attention, involves consciously directing attention and avoiding distractions (James, 1892; Kaplan & Kaplan, 1989). Kaplan and Kaplan (1989) hypothesized that mental fatigue was associated with the fatigue of voluntary attention, resulting from the conscious effort to maintain focus and ignore distractions, which they called attention fatigue. Kaplan (1995) hypothesized that urban life, with its constant sensory input and demands, contributed to attention fatigue, which could precede mental health issues. While these are older references it may be critical of counsellors to understand the underlying literature used to build these theories, and the theories themselves such as ART to

understand and apply current research findings using these theories (Harper et al., 2019; Jordan, 2015; Summers & Vivian, 2018; Wood et al., 2018).

In the urban context of the 21st century, adolescents in 2023 may experience similar sensory inputs described by Kaplan (1995) in the 20th century or increased sensory input with technological advances. Today's adolescents are "digital natives" who spend approximately six to nine hours daily on social media and technology (Crone & Konijn, 2018; Nesi, 2020). There is concern among researchers, parents and policymakers regarding the potential impact of technology use on adolescent mental health, with mixed evidence suggesting that social media use may be more harmful rather than technology use in general (Anderson & Jiang, 2018; Etchells et al., 2016; Jensen et al., 2019; Kardefelt-Winther et al., 2020; Orben et al., 2019; Orben & Przybylski, 2019; Taylor & Silver, 2019; Twenge et al., 2018; Vuorre et al., 2021; Woods & Scott, 2016). The increased use of technology and social media and its potential harm to adolescents should be of interest to the counselling field in a Canadian context, as social media is becoming an ever-present social and environmental influence in the lives of adolescents (Crone & Konijn, 2018; Nesi, 2020). Although not within the scope of this literature review, it is important to explore social media and the impact it has on mental health to help understand how nature-based therapy can support adolescent wellbeing.

Recent research suggests a link between social media use and decreased mental well-being, and increased internalizing disorders in adolescents, although causality and directionality remain unclear (Santos et al., 2023). Social fatigue, characterized by information and social overload, has been identified as a potential factor in the connection between youth mental health and social media use (Liu & He, 2021). Social media fatigue relates to information or social overload, which occurs when the amount of information individuals receive goes beyond their

capacity to accept information, and when someone feels that they need to respond to the increased social support requests of others (Eppler & Mengis, 2004; Maier et al., 2015). Social fatigue has correlated with increased depression and anxiety among adolescents (Dhire et al., 2018). Attention fatigue may play a role in the correlation between increased social media use, social media fatigue, and decreased mental health in adolescents. NBT's ability, according to ART, to restore fatigued attention could be essential for adolescent populations in treating social media fatigue and its associated increases in anxiety and depression (Dhire et al., 2018; Eppler & Mengis, 2004; Kaplan & Kaplan, 1989; Maier et al., 2015).

Kaplan and Kaplan (1989) theorized that attention fatigue could be alleviated by spending time in environments with minimal demands on voluntary attention. First, according to Kaplan (1995), a natural environment provides a break from everyday stressors to and allows for distance from them. Second, experiencing expansive environments, whether a large forest or a Japanese garden, promotes a sense of connectedness and connection with what is seen or immediately perceived and what is still beyond. Third, engaging in activities that are compatible with our natural state following ideas presented by the biophilia hypothesis reduces cognitive effort. Last, Kaplan noted that nature's multisensory experiences, such as watching clouds or leaves swaying, gently captivates attention. These therapeutic mechanisms redirect voluntary attention from demanding tasks, allowing recovery and restoration through involuntary attention (Jordan, 2015; Kaplan, 1995; Ohly et al., 2016). While therapists cannot change the environment and social contexts that adolescents exist in, intentional NBT interventions that remove social media stress and provide a restorative environment may benefit adolescent clients (Kaplan, 1995; Ulrich et al., 1991).

ART conceptualizes mental health concerns as cognitively based through a fatigue of voluntary attention, and adolescents currently suffer from increased mental health concerns in addition to social media fatigue (Canadian Mental Health Association National, 2021; Harper et al., 2019; Kaplan & Kaplan, 1989; Liu & He, 2021). Engaging adolescents both urban and rural in NBT through ART's assertion that nature offers a sense of being away, expansiveness, compatibility, and fascination could restore attention and alleviate fatigue to enhance psychological well-being for adolescents with internalizing disorders.

Multiple studies reference the biophilia hypothesis and ART, and others combine SRT and ART as theoretical frameworks to form study hypotheses regarding NBT and the cognitive benefits of nature (Greenwood & Gatersleben, 2016; Johnson et al., 2019; Kaplan, 1995; Kellert & Wilson, 1993; Li & Sullivan, 2016; Stevenson et al., 2019; Ulrich et al., 1991). It may be beneficial for mental health professionals to clearly understand the biophilia hypothesis in addition to SRT and ART before putting NBT into practice to effectively apply it to individual cases, tailoring interventions based on clients' presenting issues.

Current Research in Nature-Based Therapy

This section examines the results of various studies, meta-analyses, and literature reviews on the therapeutic benefits of NBT. Most of the research in this review on NBT interventions was with adult populations, with only limited studies focusing on adolescents. Therefore, this review will provide an overview of the existing adult-based literature to understand the potential applicability of NBT for adolescent populations.

Benefits of Nature on Well-being

The following section will explore the benefits of nature contact on well-being and mental health, exploring direct contact and physical movement, including connections to neuro-

imaging research. Nature dosage will also be explored in addition to nature's effects on anxiety as measured by heart rate variability measurements. This exploration provides a broad academic understanding of some underlying therapeutic mechanisms of nature exposure that occur in combination with therapeutic intervention.

Physical Movement in Nature & Neurobiology. Direct contact with nature, such as walking in natural environments, offers benefits beyond those associated with physical activity alone (Coon et al., 2011; Noseworthy et al., 2023). A nationally representative study consisting of 19,806 adult participants in England found that weekly recreational nature contact of 120 minutes was associated with higher subjective health and well-being across different populations and circumstances (White et al., 2019). The data for this study was taken from a pooled multi-year data set from two waves, 2014-2015/2015-2016, which were part of the UK government national statistics survey. The data was a cross-sectional data set, where time of the year and/or season was controlled for, meaning results were not affected by the data set. It is important to consider that while this study deepened the understanding of wellbeing and contact with nature, limitations such as this being an observational and cross-sectional analysis need to be considered, in addition to all collected data being self report measures meaning that objectivity cannot be guaranteed. Contacting nature for less than 120 minutes weekly did not yield significant benefits; in addition, contact with nature had to be direct. While White et al. attempted to control for physical activity levels, there was a complex relationship between physical movement and nature; therefore, while providing critical insight, these results cannot provide certainty in nature's benefits for adults, let alone adolescents. Meanwhile, Coon et al.'s (2011) research suggested that exercising in natural environments is linked to more significant mental health improvements, including "greater feelings of revitalization and positive engagement, decreases

in tension, confusion, anger and depression and increased energy" (p. 1). While physical movement has inherent physical benefits, the above research indicates additional positive benefits to movement in nature.

An application of the research on the benefits of walking in nature therapeutically with adolescents could come in the form of walk-and-talk therapy, as outlined by Doucette (2004). Doucette described walk-and-talk therapy as involving counselling while walking outdoors, making nature the central therapeutic focus. This approach has been reported to foster nonverbal connection and facilitate psychological processing between practitioners and clients (Revell & McLeod, 2016). Applying this concept to NBT with adolescents in rural and urban contexts may yield similar results based on research and practitioner experiences highlighting the benefits of walking in nature, providing direct contact, not simply proximity (Revell & McLeod, 2016; Schwenk, 2019; White et al., 2019). Although the specific effects and mechanisms of nature exposure concerning physical movement remain inconclusive, further exploration in the field of neurobiology may shed light on the unique mental health benefits associated with direct nature exposure outside physical movement.

In the brain, there are two critical areas to consider: the limbic system that controls emotions and the frontal lobe containing the prefrontal cortex (Kalat, 2016). The frontal lobe is not fully developed in adolescents, so more research is needed regarding their brains as they change (Burkhouse et al., 2017; Fuster, 2001). Although adolescent brains differ from mature brains, counsellors may need a basic understanding of brain structures before interpreting neuro-imaging results associated with research and literature investigating NBT interventions and determining their applicability to adolescent populations. Adult neuroimaging has revealed a limbic-cortical relationship, where increased limbic activity (mood) is associated with decreased

cortical activity (cognition), linking to depression symptomology (Mayberg, 1999). Research has shown that the subgenual area of the brain, which is essential for mood regulation, is involved in depression (Alexander et al., 2019; Kerestes et al., 2014; Zhu et al., 2012). Rumination, which is correlated with depression and low acceptance, often involves continued thoughts of adverse problems and emotions, which are often not beneficial to the individual (Kross et al., 2009; Nestler, 2008; Smith & Alloy, 2009). Berman et al. (2011) found that the adult brain areas active during rumination are in the brain's default mode network (DMN). The authors noted that the DMN is active when people are not focused on a task, therefore the research indicated that an unoccupied mind in clients with depression could lead to rumination.

The subgenual area is implicated in mood regulation and the subgenual prefrontal cortex is a highly implicated area for depression symptomology (Alexander et al., 2019; Kerestes et al., 2014; Zhu et al., 2012). The DMN, which is connected to the subgenual area, is associated with rumination (Berman et al., 2011; Hamilton et al., 2015; Nejad et al., 2013). Nature-based therapy (NBT) could be helpful for depression and rumination, as nature softly directs attention outward (Kaplan, 1995), meaning it may decrease DMN activation and possibly lead to decreased rumination and depression symptomology.

Bratman et al. (2015) investigated the relationship between nature exposure, rumination, and depression. Their study with 38 participants at Stanford University found that a 90-minute nature walk resulted in decreased rumination compared to an urban walk (a walk done in a town or city environment). Neuroimaging measures showed reduced subgenual prefrontal cortex (sgPFC) activity associated with decreased self-reported rumination after nature exposure. Objective physiological measures were used to track physical activity during the walks. Compared to the urban walk, the nature walk did have more total elevation gain; however, the

physiological measures, such as heart rate and respiration rate taken on both walking conditions, found no impact on brain activation associated with the elevation. Bratman et al.'s findings suggested that nature exposure positively affects mood, specifically in reducing rumination associated with depression.

Neuroimaging research on depression and rumination in adults has implications for adolescents, but direct translation is limited due to differences in brain development (Kerestes et al., 2014). Kerestes et al. noted that the adolescent literature highlights differences in cognitive control and emotional cognition compared to adults, potentially due to ongoing brain maturation. Most important for consideration when referring to the research implications are the specific brain regions in adolescents that are reflected as important in rumination and depression symptoms (Berman et al., 2011; Bratman et al., 2015; Krishnan & Nestler, 2008; Kross et al., 2009; Mayberg et al., 1999). In adolescents, the DMN rather than the subgenual prefrontal cortex is more associated with rumination. No studies were found in the literature review that could be directly implicated to the adolescent population as the subgenual areas have been focused on in the research not the DMN, which reflects a flaw in the research (Burkhouse et al., 2017).

Neuro-imaging research may be a critical missing component of the literature investigating NBT with adolescents, as neuroimaging research can help identify mechanisms connected with the development of adolescent depression (Kerestes et al., 2014). As the leading theories and ideas in NBT described earlier are based on either a biological or pre- or post-cognitive connection with nature, neuro-imaging research may be essential in understanding the need for NBT (Kaplan, 1995; Kellert & Wilson, 1993; Ulrich, 1984). Limited neuroimaging research exists for adolescents with depression in general, let alone therapeutic research in green spaces, so while caution is needed in interpreting adult findings or those in other academic fields,

there may be broader implications for understanding the effects of nature on adolescent therapeutic well-being (Burkhouse et al., 2017). Research has suggested there are correlations between physical movements, such as walking in nature, improved well-being, and decreased brain activation in areas associated with depression and rumination (Bratman et al., 2015; Coon et al., 2011; Noseworthy et al., 2023; Revell & McLeod, 2016; Schwenk, 2019; White et al., 2019). Although inconclusive, these results may provide insight into the possibilities of walk-and-talk therapies' effectiveness in treating depression and rumination, with implications for adolescents both in rural and urban social locations.

Nature Dosage. Studies examining proximity to nature have emphasized the importance of the distinction between direct contact and immersion in natural environments rather than proximity, which is being near or viewing nature (Farrow & Washburn, 2019; White et al., 2019). Cox et al. (2017) examined the health benefits of private gardens and nearby green spaces. Surveying 1023 individuals, they measured various health outcomes using a nature dosage measurement defined by time spent in nature, frequency, duration, and biodiversity. The nature dosage explored in this study included time spent in a private garden and the green space (vegetation) surrounding survey respondents' homes. Higher nature doses were associated with improved mental and social health outcomes, except for self-reported physical health. Cox et al. found that the frequency of nature contact was more important than the duration, and diverse natural spaces were unnecessary for benefits. The researchers concluded that high nature dosage was connected to increased wellness, and spending five or more hours in nature per week was linked to potentially reducing depression cases. However, the study's cross-sectional design and reliance on self-report data limited causal conclusions as there was potential for a feedback loop of individuals experiencing depression to avoid going outdoors; thus, the researchers

acknowledged that lower nature doses may be outcomes rather than causes of depression. While the findings suggested nature is a cost-effective health approach, the evidence of nature's benefits and NBT remains inconclusive.

Forest Bathing/Shinrin-Yoku. Forest bathing, also known as Shinrin-Yoku (SY), involves mindful immersion in a forest while engaging all senses (Farrow & Washburn, 2019; Hansen et al., 2017). Forest bathing can be accomplished by spending two to four hours in the forest, walking, sitting, standing, or lying down (Farrow & Washburn, 2019). Studies have shown that SY decreases anxiety by activating the parasympathetic nervous system, as indicated by heart rate variability (HRV) (Farrow & Washburn, 2019; Hansen et al., 2017). With internalizing disorders, the sympathetic nervous system is activated, and in response, engaging in SY activates the parasympathetic nervous system with the hopes of decreasing anxiety (Farrow & Washburn, 2019; Hansen et al., 2017; Wenner, 2018). Therefore, adolescents who may be at risk of internalizing disorders like anxiety may benefit from time spent in nature through SY. SY practices provide the potential for mental health practitioners to treat and teach emotional regulation to adolescents experiencing anxiety.

Although SY and NBT are distinct practices, elements of SY can be incorporated into nature-based therapeutic interventions (Hansen et al., 2017). This knowledge may be valuable for counsellors seeking to enhance their therapeutic interventions. A critical part of NBT is building awareness of the outer landscape (Harper et al., 2019). Harper et al. noted that this is done through mindful attention to the natural environment, which practices from SY could help facilitate. Enhancing present-moment awareness serves as a foundation for therapeutic work, facilitating meaningful relationships and interactions, and harnessing the regulating properties of mindfulness in natural settings (Hansen et al., 2017; Harper et al., 2019). SY involves immersing

oneself in nature and engaging the senses (Farrow & Washburn, 2019; Hansen et al., 2017). Mental health practitioners could enhance therapy by incorporating SY elements, such as promoting mindful attention to nature.

Application of Research in Nature-Based Intervention. Research has suggested that nature provides clear mental health benefits for adults; accordingly, hypothesizing the applicability of nature to adolescents is warranted and encouraged through future research (Bratman et al., 2015; Cox et al., 2017; Farrow & Washburn, 2019; Hansen et al., 2017; Oh et al., 2017; Richardson et al., 2016; Rowley et al., 2022; Tester-Jones et al., 2020). However, there has been considerable variation in the results such as the effectiveness of the type of contact, proximity to natural environments, and nature dosage show mixed results, which reflects a consistent critique of the field of NBT of inconsistent measurements and analysis (Beck & Wong, 2022; Bratman et al., 2015; Cox et al., 2017; Farrow & Washburn, 2019; Hansen et al., 2017; Harper, Fernee, et al., 2021; Oh et al., 2017; Putra et al., 2020; Rowley et al., 2022; Summers & Vivian, 2018; White et al., 2019). Some authors have argued that direct contact with nature is necessary for benefits (White et al., 2019), while others found mental health benefits through proximity to nature without direct contact (Cox et al., 2017). Inconsistent definitions and methodologies may contribute to these diverse findings (Beck & Wong, 2022; Hansen et al., 2017; Harper, Fernee, et al., 2021; Oh et al., 2017; Putra et al., 2020; Rowley et al., 2022; Summers & Vivian, 2018). As a result, practitioners using NBT may not provide specific recommendations on proximity to nature for clients due to these mixed research outcomes. With the above critique of the research, a clear caveat is that while results are not yet consistent, there are clear correlations that, overall, there are positive mental health benefits to spending time in nature (Bratman et al., 2015). NBT is an intervention with promising results for adolescent

populations both in rural and urban settings, as there is a growing body of research indicating the positive effects of nature on mental well-being (Bratman et al., 2015; Cox et al., 2017; Farrow & Washburn, 2019; Hansen et al., 2017; Oh et al., 2017; Richardson et al., 2016; Rowley et al., 2022; Tester-Jones et al., 2020).

Engaging the parasympathetic nervous system through nature-based interventions and softly fascinating components of nature, possible deactivation of the DMN and sgPFC as described above, linked to depression and rumination may be critical in working with adolescents (Harper et al., 2019). Given the unique developmental stage of adolescence, characterized by exploration, trial and error, and learning emotional regulation, using NBT with young people could be beneficial for therapists in facilitating mindfulness and awareness, considering the stress-reducing qualities of nature and its cognitive effects on adolescent brains (Fernee et al., 2019; Greenwood & Gatersleben, 2016; Johnson et al., 2019; Li & Sullivan, 2016; Murray & Rosanbalm, 2017; Stevenson et al., 2019). However, due to the inconclusive nature of research on the benefits and mechanisms of nature exposure, therapists must practice ethical intervention by obtaining informed consent by providing information on the risks and benefits of NBT, including its inconclusive research results (CPA, 2017; Harper Dobud, et al., 2021).

Nature-Based Therapy

The following section will explore NBT as a therapeutic modality compared to currently used evidence-based practices (EBP). Specific therapeutic mechanisms identified by counsellors and clients in subjective studies will also be explored to expand the reviewed objective measures regarding NBT. As the research question prompts investigation of NBT's use with adolescents experiencing anxiety and depression, investigation of EBP used for treatment of adolescents

internalizing disorders will help to frame NBT and explain the utility of NBT within current therapeutic practices.

Evidence-Based Practice and Nature-Based Therapy. This literature section critically evaluates nature-based interventions as a possible EBP for mood disorders. APA's Division 12 (D12 APA), the Society of Clinical Psychology has recommended cognitive behavioural therapy (CBT) and mindfulness-based interventions, such as acceptance and commitment therapy (ACT), for various age groups, including adolescents (APA, n.d.d). CBT and mindfulness interventions have a strong evidence bases for treating anxiety and depression in adolescents (Dunning et al., 2019; Guideline Development Panel for the Treatment of Depressive Disorders [GDPTDD], 2022; Weisz et al., 2017). The Society of Pediatric Psychology Division 54 of the APA (D54 APA) also listed interpersonal psychotherapy (IPT) as an EBP to use with adolescents (APA, n.d.e, 2022). While CBT, IPT, and mindfulness-based practices such as ACT are recommended for adolescent depression, the APA's clinical practice guidelines acknowledge inadequate evidence to endorse one treatment modality over another when treating adolescent depression (GDPTDD, 2022).

CBT uses the ABC model (affect, behaviour, and cognition) to address maladaptive beliefs and behaviours (Beck & Beck, 2021). By evaluating thinking patterns, clients can adjust behaviours and influence their moods. Beck and Beck observed that cognitions in a CBT model occur at three levels: automatic thoughts, underlying assumptions, and core beliefs, all of which are examined for their content, validity, and frequency during treatment. While CBT shows positive treatment effects, it may not be as effective across time regarding diagnostic criteria met by patients post treatment, and its utility with adolescents requires further investigation (Baker et al., 2021; GDPTDD, 2022). The GDPTDD (2022) has found that with adolescent populations

CBT has insufficient evidence for it to be recommended over other modalities for the treatment of major depressive disorder. Baker et al. (2021) found that with anxiety disorders, only 36% of treated adolescents post treatment no longer met diagnostic criteria for their primary anxiety disorder. A hallmark of CBT is the use of adjuncts to therapy, which can be seen using psychoeducation, worksheets, and structured or preplanned activities during the therapeutic session and outside of it (Consoli et al., 2018). NBT, which can be used as an adjunct to therapy or a stand-alone modality, could be used to enhance CBT through taking sessions outdoors, providing a more relational focus, impacting therapeutic alliance, and in the case of Indigenous clients, providing a culturally sensitive form of treatment (Ansloos et al., 2019; Consoli et al., 2018; Jordan, 2015). Using a Western approach to therapy with Indigenous peoples could potentially exacerbate the continuing process of colonization. While practicing CBT, for example, which works primarily on thinking patterns, if a clinician is not actively aware of Indigenous ways of seeing the world, the therapist may unconsciously advocate for Western thinking and perpetuate assimilation. Thus, not just historically but also current well-meaning interventions can endorse colonial practices; when aware of this, clinicians who are mindful in incorporating NBT into practice may be able to have perspective in de-colonizing their therapeutic approach (Ansloos et al., 2019). Ansloos et al. also observed that it is possible for the CBT model to fit and be understood within Indigenous cultural models such as the medicine wheel, which could be further understood and conveyed to clients from an NBT perspective.

ACT aims to enhance psychological flexibility and promote a meaningful life for clients (Harris, 2019). It utilizes the hexa-flex, a six-pronged model of psychological flexibility addressing acceptance, defusion, present-moment awareness, self-as-context, values, and commitment (Harris, 2019). Unlike CBT, Harris noted that ACT does not focus on the

truthfulness of clients' cognitions but explores actions aligned with their desired life. Mindfulness, a key component of ACT, is "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145). NBT offers ACT practitioners multiple interventions that can work with multiple areas of the hexa-flex—acceptance, defusion, present-moment awareness, and self-as-context can be captured through mindfulness practices offered through SY, along with multiple metaphors of the self within nature. An example of an NBT metaphor that addresses multiple hexa-flex areas was created by Steven Foster and Meredith Little in 1998 and utilizes medicine wheel teachings, which make it culturally significant as well (Jordan, 2015). In the four shields exercise, four objects are placed on the ground representing the four directions, the four seasons, and the four stages of development; the client and therapist then explore and move around the objects and explore what they represent (Foster & Little, 1998; Jordan, 2015). The four shields exercise is also an example of why it is important for a therapist to be present with adolescents in nature, as the therapist can facilitate this psychoeducation piece that an adolescent may not have access to simply by being in nature.

Interpersonal therapy focuses on improving relationships to alleviate mood problems (International Society of Interpersonal Psychology [ISIP], n.d.). It recognizes the reciprocal relationship between mood symptoms and interpersonal dynamics. According to the ISIP, therapists assist clients in identifying emotions as social signals. A core component of NBT is the relational base of the modality, in addition to nature being a co-therapist (Harper et al., 2019; Jordan, 2015). NBT could provide practitioners with the physical environments to better work with youth to identify the connections between mood and interpersonal dynamics, in addition to

providing a venue for family therapy, which is discussed later in the literature review (Harper et al., 2019).

For a therapeutic intervention to earn evidence-based practice status, it must undergo and pass the Tolin evaluation criteria (APA, n.d.d; Tolin et al., 2015). With an assessment with Tolin Criteria by the APA's Division 12, any mental health treatment can work toward gaining EBP status (APA, n.d.d). Currently, NBT is not considered an EBP, and from the reviewed research, it was challenging to locate an assessment of NBT with Tolin criteria. Perhaps the challenge in evaluating NBT as an EBP lies within Western ideology.

EBP is based on a Western medical perspective, in contrast with Indigenous holistic views of health (Rogers et al., 2019; Young et al., 2018). Western knowledge prioritizes empirical evidence, while Indigenous perspectives value elders' knowledge and experiential learning (Martin, 2012; Rogers et al., 2019; Bartlett et al., 2012). Through a Western lens, other evidence gathered outside the scientific realm is considered "inconclusive and ideological" (Martin, 2012, p. 25). Research and health practices should be decolonized to address and understand health from an Indigenous perspective (Bartlett et al., 2012; Battiste, 2002; Ermine, 2000; Gone, 2009). Decolonizing research and evidence-based practices involve incorporating Indigenous definitions of evidence such as knowledge from elders and experiential learning (Battiste, 2002; Rogers et al., 2019).

Although NBT is not currently recognized as an EBP and the studies available show inconsistent results, NBT does exhibit therapeutic potential (Beck & Wong, 2022; Hansen et al., 2017; Harper, Fernee, et al., 2021; Oh et al., 2017; Owens & Bunce, 2022b; Putra et al., 2020; Rowley et al., 2022; Summers & Vivian, 2018). NBT is evidence-informed, drawing from a substantial research body (Bohart, 2005; Harper et al., 2019). NBT emphasizes feedback-

informed treatment and the client/therapist/nature relationship (Harper et al., 2019; Miller et al., 2015). From the perspective of decolonizing research and privileging Indigenous ways of knowing, NBT is a culturally appropriate and effective mental health treatment (Claxton, 2021). Although more research is needed, NBT shows potential for improved adolescent mental health functioning (Mygind et al., 2019; Zhang et al., 2020).

NBT is a flexible intervention that can be used alone or in combination with other therapies and combining NBT with CBT and/or mindfulness-based approaches has shown comparable effectiveness to evidence-based practices (Kim et al., 2009; Lewis et al., 2022; Ulrika et al., 2018). Forest walking-based CBT resulted in higher remission rates for depression than traditional CBT (Kim et al., 2009). A systematic review found positive client outcomes when NBT was combined with various therapies, including CBT and mindfulness interventions (Lewis et al., 2022). While NBT has been combined with EBP to produce meaningful results, based on the reviewed research, there is not a large body of this specific research available (Kim et al., 2009; Lewis et al., 2022; Ulrika et al., 2018). NBT does utilize mindfulness in its interventions (Harper et al., 2019); however, NBT can incorporate interventions from mindfulness-based and cognitive-behavioural therapies like DBT (Linehan, 1993) and ACT (Harris, 2022; Hayes, 1987). This flexibility allows practitioners to tailor interventions to different treatment settings and improve the therapeutic alliance, crucial for working with adolescents, as a lack of alliance leads to high rates of adolescent therapeutic drop-out (de Haan et al., 2013; Garcia & Weisz, 2002; Harper et al., 2019; Miller et al., 2015; O'Keeffe et al., 2018; Robbins et al., 2006; Yasinski et al., 2018). In addition to alliance, the flexibility offered by NBT to be utilized with other EBPs allows for counsellors to adhere to the code of ethics, as they can

practice within their competency boundaries and are providing evidence-informed treatment (CPA, 2017).

Therapeutic Mechanisms of Nature. NBT offers unique therapeutic factors not found in traditional therapy settings, as described by clients and practitioners, which will be explained in the following section (Meuwese et al., 2021; Naor & Mayseless, 2021). Nature's presence as a living thing promotes a growth-oriented environment, invoking feelings of aliveness, change, and constant wholeness. Both Meuwese et al. and Naor and Mayseless reflected that the growth and change orientation that nature provides allows for a different perspective and may be beneficial in helping clients make meaningful changes in their lives, especially for adolescents in a stage of growth and transition. However, for this kind of intervention to be of value, it may be essential for an adolescent to be taught the importance of this kind of therapy.

Nature offers a non-judgmental and spacious environment invoking feelings of unconfined freedom physically and mentally that promotes acceptance and flexibility in therapy (Fernee et al., 2019; Meuwese et al., 2021; Naor & Mayseless, 2021). Nature fosters a sense of interconnectedness and helps clients see the bigger picture, expanding their perspective, which can help clients reframe outdated or maladaptive thought patterns, thus impacting maladaptive behaviours. Engaging with nature enables clients to connect with their emotions and a larger existence, providing unique opportunities for meaningful cognitive and self-engagement (Meuwese et al., 2021; Naor & Mayseless, 2021). However, if adolescents or practitioners do not have access to nature such as a major metropolitan center removed from public green spaces, or in close vicinity to high traffic areas, these mental health benefits may not be achievable.

Adolescence is a period of growth and change, and flexibility in treatment is crucial due to high dropout rates in office-based therapy for adolescents (de Haan et al., 2013; Garcia &

Weisz, 2002; National Academies of Sciences, Engineering, and Medicine et al., 2019; O'Keeffe et al., 2018; Robbins et al., 2006; Yasinski et al., 2018). The adolescent experience of transitioning from childhood to adulthood can be described as an in-betweenness, resulting in the experiences of existential ideas and feelings of existential loneliness, characterized by a sense of disconnect (Garnow et al., 2022; Lundvall et al., 2019, 2020; Mansfield et al., 2021). NBT interventions offer unique benefits for adolescents by fostering feelings of interconnectedness and providing a non-judgmental and neutral environment (Garnow et al., 2022; Mansfield et al., 2021). Utilizing NBT could help adolescents, both urban and rural, address existential questions and loneliness, promoting an increased internal locus of control linked to increased protective factors (National Academies of Sciences, Engineering, and Medicine et al., 2019). An internal locus of control is a belief that life events and outcomes are because of one's ability and agency (Rotter, 1954). Providing increased internal locus of control and generating a feeling of interconnectedness may be especially important for Indigenous youth as colonization has removed control from the lives of Indigenous people.

Culturally appropriate therapy is crucial for Indigenous mental health, and NBT could be beneficial for Indigenous adolescents (Ansloos et al., 2019; Bartlett et al., 2012; CAP, 2018; Hall et al., 2015; Marsh et al., 2016, 2018; Sasakamoose et al., 2017; Wright et al., 2019). Western psychological approaches do not capture Indigenous emotional and spiritual practices, potentially perpetuating colonization (Ansloos et al., 2019). Indigenous healing emphasizes balance across spiritual, emotional, mental, and physical health using the Medicine Wheel (Sasakamoose et al., 2017). Counsellors incorporating traditional healing practices have reported improved openness to treatment, fostering a greater sense of grounding and stability (Marsh et al., 2018). Reconnecting with culture and traditional sources of meaning promotes healing for

Indigenous individuals, including adolescents (Ansloos et al., 2019). The CPA (2018) has advocated for inclusive psychological treatment that respects Indigenous ways of knowing as a call to action for Canadian therapists.

Developmental Theories and Nature-Based Therapy

In the following section, Bronfenbrenner's Ecological Theory will be briefly explained, reviewed, and connected to Family Systems Theory as a developmental theoretical basis. These ecological and systems based developmental theories are important for the counselling, as they situate psychological development in the environment and systems that children and youth exist in. Strength-based psychological ideas and approaches, such as the broaden and build theory of positive emotions and positive youth development, will then be explored. Working with adolescents from a strength-based lens can increase therapeutic outcomes compared to the traditional medical model of the presence or absence of disease and, therefore, is an important consideration regarding the application of developmental theories in working with youth (Yuen et al., 2020). Finally, connections between developmental theory and NBT will be discussed, as NBT is a strength, and systems-based modality.

Bronfenbrenner's Ecological Systems Theory

Bronfenbrenner's (1979) ecological systems theory highlights the influence of various environmental systems on a youth's development including the family. Within each system of ecological systems theory, adolescents are interconnected. It is comprised of the microsystem, mesosystem, exosystem, chronosystem, and macrosystem (Bronfenbrenner, 1979; Ward & Belanger, 2019). According to Bronfenbrenner (1979), adolescents have direct interactions with others in the microsystem, for example, the family system. Within the mesosystem connections between various microsystems exist, for example how family and friends interact in an

adolescent's life. Within the exosystem, adolescents are influenced by systems that they cannot directly influence or control, like institutions, organizations, or local government. Within the chronosystem the adolescent is further influenced indirectly by transitions over time and environmental events, which are often things that distinguish generations. In the macrosystem, adolescents interact with society and cultural influences. Therefore, Bronfenbrenner's seminal theory emphasized the interplay of an adolescent's interactions within these systems and their influence on a youth's growth.

Nature fits into the micro, meso, exo, chrono and macro systems outlined by Bronfenbrenner (1979). Nature directly interacts with youth and is also impacted by global environmental events, making NBT relevant across multiple systems (Thompson, 2021). Clinicians must recognize the importance of positive connections in adolescents' lives that influence mental health recovery, encompassing parents, peers, schools, professional services, and society (Kelly & Coughlan, 2019; National Academies of Sciences, Engineering, and Medicine et al., 2019). In addition to general adolescent development, Indigenous cultural identity aligns with ecological systems theory, highlighting the individual, family, community, nation, and creation as interconnected components, with land and nature central to Indigenous cultural identity, Elder Debbie Cielen (Good Talking Turtle) (personal communication, September 22, 2021). Bronfenbrenner's ecological systems theory provides a comprehensive understanding of youth development and the impact of multiple systems and their broader impacts and implications (Ward & Belanger, 2019).

However, as with all theories, there are critiques of ecological systems theory. As explained above, Bronfenbrenner (1979) conceptualized development on an individual youth based on social context, and the inter-related components of these multiple systems impacting

and acting on the individual (Christensen, 2016). Christensen reflected that ecological systems theory does not take into account individual resiliency, where a felt sense of purpose or belief in oneself or imagined future can have a drastic impact on development. A focus on individual strengths and ability to overcome obstacles is missing from this theory, and is addressed through other theories of positive development, which will be explored further in this section of the review (Bowers et al., 2021; Christensen, 2016; Fredrickson, 2001)

The ecological systems theory can help counsellors recognize how external systems influence adolescents, including the relevance of NBT and Indigenous ways of knowing. This is important for counsellors to implement ethical practice, as responsible caring speaks to maximization of benefits and minimization of harm, which an understanding of the multiple systems impacting adolescents would contribute to maximizing benefits of therapy (CPA, 2017).

Family Systems Theory

Family systems theory focuses on the family system and its internal interactions and emphasizes the influence of external systems on family dynamics (Bowen, 1978; Walsh, 2012; Ward & Belanger, 2019). It is essential that therapists be aware of family systems theory when working with adolescents, as it includes recommended evidence-based treatments for pediatric clients (APA, 2022). NBT can be utilized in family therapy to engage the entire family system, fostering connections, and bridging to the more extensive global environmental systems (Harper et al., 2019).

In family systems theory, the focus of therapy is not on individuals, but the entire family system; therefore the therapeutic alliance and maintenance of relationships with each member of the family, including any adolescents, is essential to the therapeutic work (Heatherington et al., 2018). Outdoor therapy with the family system enhances emotional connections and reduces

power dynamics compared to office-based therapy, as the environment and space may represent where an adolescent is more comfortable (Harper et al., 2019). Harper et al. argued that NBT interventions address various family concerns, including emotional expression, trust, regulation, shifting roles, and conflict resolution. They noted that sensory awareness activities are one key component of engaging the family system in therapy, as practitioners helping youths and parents attune to the outer landscape together can help in healing attachment between family members. Research has shown that NBT facilitates mindfulness, shared wonder, and gratitude, cultivating appreciation within the family system (Farrow & Washburn, 2019; Hansen et al., 2017; Harper et al., 2019). According to Harper et al. (2019), NBT also fosters connection and healing and provides coping tools for engaging with nature beyond therapy. The unique process, effects, and regulating aspects of NBT distinguish it as an essential intervention for counsellor's consideration (Harper et al., 2019; Kim et al., 2009; Lewis et al., 2022; Meuwese et al., 2021; Naor & Mayseless, 2021; Ulrika et al., 2018).

Nature-based frameworks emphasize the biological and evolutionary connections between humans and nature, leading to stress reduction and specific learning mechanisms such as prepared learning (Kaplan, 1995; Kellert & Wilson, 1993; Ulrich et al., 1991). Developmental theories, such as family systems and ecological theory, acknowledge the interconnection of multiple systems and environments in youth development (Ward & Belanger, 2019). While nature is not currently integrated into systems theories, this may be a future endeavour as Indigenous cultures and the decolonization of treatment methods is a goal for counsellors (CAP, 2018). NBT asserts that as we evolved, we had a reciprocal and deep connection to nature, but now most humans are disconnected from the living earth, leaving us with a sense of non-belonging (Harper et al., 2019). NBT, in alignment with Indigenous perspectives, highlights the

attachment wounds humans have with nature and the potential for healing through reconnecting with the natural world. NBT interventions with adolescents and their families can address attachment concerns within the family system and the deeper attachment wounds with nature (Harper, 2019; Meuwese et al., 2021). This multidimensional approach illustrates the therapeutic connection between clients and nature in NBT.

Broaden and Build Theory and Positive Youth Development

Adolescence involves significant social and cognitive developments and a quest for independence from caregivers (APA, n.d; National Academies of Sciences, Engineering, and Medicine et al., 2019). For more than one hundred years, traditional theories portrayed adolescence as a time of turmoil and crisis and were based on a deficit-based view of adolescence (Bowers et al., 2010; Hall, 1904; Erikson, 1968; Freud, 1969); however, newer perspectives have focused on leveraging the strengths of youth during this stage (Dong & Geng, 2022; Fredrickson, 1998). These strength-based perspectives fill the gap identified in Bronfenbrenner's ecological systems theory, and perhaps when all these developmental theories (ecological systems theory, family systems theory, strength-based perspectives) are brought together, it will showcase how NBT can be a unique modality in working with adolescents from a developmental perspective (Bronfenbrenner, 1979; Christensen, 2016; Dong & Geng, 2022; Fredrickson, 2001; Heatherington et al., 2018).

The broaden and build theory of positive emotions (BBTPE) suggests that joy, contentment, and love help build momentary thought-action repertoires and develop personal resources across various domains (Fredrickson, 2001). Fredrickson asserted that building and broadening these thought-action repertoires would enable youth to draw upon a broader range of cognitions and behaviours. For example, children engage in play, which builds social, cognitive,

and physical skills (Boulton & Smith, 1992; Dolhinow & Bishop, 1970). Emphasizing positive emotions and leveraging the BBTPE framework can foster adolescents' creativity, curiosity, and skill development (Dong & Geng, 2022; Fredrickson, 2001). Therapists viewing clients and interventions through a lens of the BBTPE could reframe how they work with adolescents, focusing on strengths, problem-solving and skill building to broaden skills and independence. NBT complements the BBTPE since NBT strengthens positive emotions and cognition, which is a critical component of the therapy (Bratman et al., 2015; Cox et al., 2017; Farrow & Washburn, 2019; Harper et al., 2019; Summers & Vivian, 2018).

Positive youth development (PYD), aligned with the BBTPE, emphasizes the role of relational developmental processes and interactions between individuals and their environment (Lerner et al., 2015). Lerner et al. noted that PYD's philosophy fosters healthy development by building on youth strengths through self-regulation skills, engagement, and hope. Applying the PYD model in NBT may be particularly beneficial for supporting adolescents with anxiety and depression by promoting self-regulation (Bowers et al., 2021). Bowers et al. reflected that PYD's 5Cs model is widely supported and has shown positive outcomes, especially in rural youth who regularly interact with nature and score higher in PYD outcomes.

The 5Cs model emphasizes that when adolescents utilize their strengths across different areas, they thrive in competence, confidence, connection, character, and caring (Bowers et al., 2010; Lerner, 2009). According to Lerner et al. (2015), competence relates to successful navigation of the environment, while confidence involves a positive sense of self-worth. Connection refers to healthy bonds and a sense of value and belonging, while character encompasses adherence to social norms and displaying prosocial behaviours. Caring reflects compassion and empathy for others. Nature-based therapeutic work with adolescents often aligns

with the 5Cs model, promoting holistic developmental outcomes and reducing adverse effects (Bowers et al., 2021).

Positive Youth Development, Nature-Based Therapy and Forest Pedagogy

Adolescents access the 5Cs within their social contexts, including the microsystem, family system, and environment (Bowers et al., 2021; Mercier et al., 2019). Nature-based interventions can facilitate developing the 5Cs by providing additional resources and opportunities (Bowers et al., 2021; Mercier et al., 2019). NBT is particularly impactful for rural adolescents who are close to nature and may benefit from the continuity of care that nature provides outside of therapy sessions (Bowers et al., 2021; Harper et al., 2019). The goal of NBT with children, adolescents and families is to "bring families together and into connection with nature on a regular basis, within their own communities, and adaptable to their work and school schedules" (Harper et al., 2019, p. 172). Rural youths' constant exposure to nature fosters motor skill development, environmental competence, and confidence through challenging activities (Bowers et al., 2021; Mercier et al., 2019). NBT benefits adolescents regardless of their routine access to nature, offering flexibility for various clients, allowing for therapeutic homework and interventions to be practiced outside of session, which the therapist could facilitate (Bowers et al., 2021). Research reviews have shown that nature exposure is associated with increased social connection and prosocial behaviours among adolescents and adults (Goldy & Piff, 2020; Putra et al., 2020). The ability of NBT to be impactful for a possible myriad of clients with regular exposure to nature in individual or group settings, could add to this modality's flexibility for multiple types of clients, which may be crucial for therapists to consider when implementing NBT. However, youth must be able to access nature.

Forest pedagogy, a method of teaching using the natural environment, has shown positive outcomes in adolescent populations (Beck & Wong, 2022; Cambridge Dictionary, n.d.b; Macháčková et al., 2021; Putra et al., 2020). Forest pedagogy differs from forest therapy by fostering self-awareness, values, and teamwork through discussions and brainstorming (Macháčková et al., 2021). Forest pedagogy aligns with the principles of positive youth development and the BBTPE by stimulating curiosity and facilitating growth (Harper, 2017; Johnston, 2020). Forest pedagogy has the potential to continue to engage in culturally appropriate interventions if the land and nature are considered healers and teachers (Hansen & Antsanen, 2016; Johnston, 2020). The adoption of forest pedagogy is vital for counsellors to support adolescents when exploring NBT, as they may find that it offers multiple structured activities and interventions to implement in multiple session settings.

Forest pedagogy in therapy educates youth about animal behaviours and interactions, whether through intentional plans or naturally occurring education during therapy and has been noted as significant in decreasing target behaviours such as risky and anti-social behaviours (Beck & Wong, 2022; Macháčková et al., 2021). Through observing harmonious relationships in nature, adolescents can metaphorically compare their own behaviours and learn adaptive strategies (Beck & Wong, 2022). In forest pedagogy, practitioners describe the forest and animals as "teachers and mentors who come dressed in foliage, fur, and feathers providing comfort in their presence and guidance" (Beck & Wong, 2022, p. 42). By incorporating nature as a metaphor and teaching tool, therapists could build competence and tangible skills in adolescents. Forest pedagogy exemplifies the co-therapist role of nature in NBT, with therapists facilitating the application of acquired skills and knowledge (Adams & Savahl, 2017; Claxton, 2021; Richardson et al., 2016; Rowley et al., 2022; Summers & Vivian, 2018). However, forest

pedagogy is predicated on the ability for facilitators and adolescents to be in a forest setting, which is not always possible in counselling environments, and it may need adaptation to be utilized in more urban green spaces.

Adolescent Development and Nature-Based Therapy Interventions

Exposure to natural environments positively impacts adolescents' cognitive, moral, and emotional development, providing skills and support that may act as protective factors against internalizing disorders (Adams & Savahl, 2017; Richardson et al., 2016; Rowley et al., 2022; Summers & Vivian, 2018). Nature exposure improves working memory, a crucial aspect of cognitive functioning, in children and adolescents (Vella-Brodrick & Gilowska, 2022). Working memory involves holding and reproducing information while performing actions, and it is influenced by attention, concentration, and the ability to ignore distractions (Cowan, 2017; Dr. Heudes, personal communication, February 18, 2023). Experiences of clinical anxiety and acute stress are linked in a reciprocal relationship to decreased working memory performance; thus, improved working memory may be correlated with decreases in experienced anxiety symptoms (Moran, 2016; Petkus et al., 2017). Studies have shown that visual exposure to nature enhances cognitive performance, specifically working memory, in adolescents and may then, in turn, decrease anxiety symptoms (Li & Sullivan, 2016; Vella-Brodrick & Gilowska, 2022).

Nature exposure enhances sustained and selective attention in adolescents, as evidenced by improved response speed and stability after walking in natural environments (Greenwood & Gatersleben, 2016; Johnson et al., 2019; Stevenson et al., 2019; Vella-Brodrick & Gilowska, 2022). Selective attention involves processing specific pieces of sensory information while ignoring others, and sustained attention is maintaining awareness of a specific sensory input for a specified time (Fisher, 2019; Vella-Brodrick & Gilowska, 2022). These findings may be relevant

for counsellors as it could enhance therapeutic success by potentially generating increased engagement in therapeutic content. In attention to therapeutic engagement, sustained attention impairments in individuals with depression showcase that depression and sustained attention are correlated with the potential involvement of rumination and excessive worry; however, further investigation is required to make concrete connections (Gyurak et al., 2016; Keller et al., 2019, 2020; Li et al., 2016; van Vugt et al., 2018).

Natural environments serve as safe spaces for youth to build healthy identity connections, which connect to mechanisms posed by SRT (Adams & Savahl, 2017). Creating a socio-spatial identity with nature allows youth to regulate themselves in various settings (Adams & Savahl, 2017; Jones, 1999). A socio-spatial identity is a place-based attachment that holds significance to children and youth, which they use to help attach meaning to their lives (Adams & Savahl, 2017; Holloway & Valentine, 2000). In line with the concept of biophilic learning mentioned earlier, people have an innate connection to nature. If fostering a socio-spatial identity with nature in youth is done, it may be preventative against mental health concerns (Adams & Savahl, 2017). By creating a socio-spatial identity, nature can act as an entertaining, challenging, reflective, or educational space for youth engagement (Adams & Savahl, 2017; Wals, 1994). Building a socio-spatial identity with nature in rural and urban youth extends the benefits of NBT beyond sessions, enabling the practice of learned skills (Adams & Savahl, 2017). This highlights the importance of accessibility to nature for adolescents.

NBT offers psychoeducation and experiential learning on regulation and stress responses (Harper et al., 2019). Adolescent development is positively impacted by nature and connection to nature through cognitive enhancement, the creation of adaptive socio-spatial identities, and psychoeducation provided in an NBT context. While there is not a large body of research geared

explicitly towards NBT's utility with adolescents, multiple other branches of research such as forest pedagogy, education, cognition and cognitive performance, strength-based theories and family systems theory, showcase the potential for this intervention's utility with youth populations.

Summary

There are multiple ways in which NBT can benefit an adolescent population. Multiple theories represented in NBT research, such as attention restoration, stress reduction, and the biophilia hypothesis, assert that a connection between the human psyche and the natural environment is a complex relationship ending in positive affect changes. Exploration of the literature on NBT shows considerable research with adult populations but not adolescents, highlighting the need for adolescent specific research focus. The research explored within adult populations has showcased that contact with nature alone significantly benefits well-being and, when combined with current EBP's, produces results comparable to the EBP on its own, along with providing a culturally sensitive way to conduct therapy with Indigenous populations. Explorations regarding the therapeutic mechanisms of nature with adult populations also have shown the unique benefits of NBT that office-based therapeutic modalities may not produce. What this means for counsellors is that NBT may offer a unique way to enhance current therapeutic practices that counsellors are implementing.

In connection with developmental theories prominent in psychology, Bronfenbrenner's ecological systems theory and family systems theory explored how NBT and nature, in general, can uniquely impact an adolescent's well-being through multiple systems in their life. Further connections to developmental theories, including the broaden and build theory of positive emotions and positive youth development, specifically the 5Cs, indicate that using NBT and the

impacts on positive affect by nature exposure can produce meaningful results with adolescents. These theories are important for counsellors and the counselling field to be aware of as theory is a way for counsellors to ground their interventions and provides a framework for understanding counsellors can work within. This research also highlights the importance of access to nature for the benefits of this therapy to occur.

NBT research with adult and adolescent populations and multiple theories showcase that NBT could be a unique and vital modality for adolescents. Counsellors should be aware of this overarching body of research and theory if there is a desire to implement NBT. Although not an EBP, NBT has shown its potential as an effective treatment for internalizing disorders, specifically for adolescents, and the current literature review has showcased the promise of this therapy with future research needed to gain EBP status.

Implications for Counselling Psychology

The final portion of this capstone research project explores the impact of nature-based therapy on adolescents. It applies findings from the literature review to Canadian counsellors, considering individual intervention, and psychotherapy, ethical considerations, and specific adolescent populations. Following implications, recommendations for practice, including training, and suggested areas for future research will be discussed then the project concludes with my self-reflective statement.

Implications and Considerations for Counsellors

Counsellors should be aware of the individual and systems-level implications of utilizing NBT. Systems-level implications involve NBT's accessibility and its potential to address global environmental responsibilities. At an individual level, NBT can foster a strong therapeutic

alliance between counsellors and adolescent clients, while also promoting therapist well-being and preventing burnout, ultimately maximizing therapeutic benefits for clients.

Systems Implications: Accessibility and Global Responsibility

NBT practices have the potential to be accessible to both practitioners and clients across various locations. Research indicates that NBT can be conducted in public and private natural settings, serving as a resource for psychological well-being (Cox et al., 2017). The affordability and wide accessibility of NBT, facilitated by free public green spaces and urban parks, allow practitioners to offer continued support to individuals from diverse backgrounds, including low socioeconomic status (SES) adolescents and families. In Canada, the significance of nature exposure and accessibility is evident in programs like A Prescription for Nature (PaPx), where registered healthcare providers can prescribe nature through free national park passes (BC Parks Foundation, n.d.).

In NBT, the natural world becomes a co-therapist, emphasizing the reciprocal relationship between humans and nature and urging practitioners to acknowledge their environmental responsibility (Hasbach, 2022). As reviewed in the literature, NBT can help alleviate eco-anxiety in adolescents by offering a space for them to connect with nature and express their concerns about climate change. This connection to the environment may encourage adolescents to adopt green values and take action to address the global climate and environmental crisis (Gabrielsen & Harper, 2018). NBT also aligns with calls for mental health practitioners to assume greater responsibility for environmental behaviours and the climate crisis (APA, 2009, 2011b, 2020).

Individual Implications: Therapeutic-Alliance and Therapist Wellbeing

NBT offers multiple benefits and contributes to the development of a strong therapeutic alliance with adolescents, a key factor in successful therapy. With young clients a consideration for counsellors that may hinder therapeutic alliance is adolescent non-compliance in attending therapy such as the potential for parental pressure (Harper et al., 2019). In NBT, both parental informed consent and adolescent informed consent are required, granting the adolescent a sense of control in the therapeutic relationship. This choice and autonomy in NBT reduces the power imbalance, promotes adolescent autonomy, and upholds respect for all individuals in the therapeutic process (CPA, 2017; Meuwese et al., 2021; Naor & Mayseless, 2021). NBT's experiential approach further enhances the therapeutic alliance by addressing negative experiences associated with office-based treatment, where adolescents often feel confined (Fernee et al., 2019).

NBT offers benefits not only to clients but also to practitioners, which is an important yet under-discussed implication. Spending time in nature has various physical and mental health advantages beyond therapy as explored in this literature review. In the counselling profession, self-care often takes a backseat, leading to issues like burnout that can impact therapists' interpersonal skills and patient outcomes (Kirsten & Gall, 2020; Tasca et al., 2018). Burnout and compassion fatigue can hinder therapists' compassion and therapeutic judgment (Richardson et al., 2020). NBT serves as a therapeutic venue that restores both clients and practitioners, providing multiple benefits to the individuals involved.

Ethical Considerations

Relational centring is a key aspect of the NBT framework (Harper et al., 2019). Relational centering means that the therapeutic relationship above all else is prioritized which

means the comfortability of the client is of the upmost importance (Harper et al., 2019). When implementing NBT, practitioners must first address the potential that a client may experience biophobia, which can stem from prepared learning, biophilic learning rules, and eco-anxiety (White & Heerwagen, 1998). It combines grief for a deteriorating world with fear of its potential harm, leading individuals to seek safety in controlled environments (Delaney, 2021; Kellert & Wilson, 1993; Panu, 2020; White & Heerwagen, 1998). An individual who experiences biophobia would not find NBT and the venue of nature therapeutic and may find it psychologically harmful. Counsellors must acknowledge and address biophobia while adhering to ethical principles that optimize well-being and mitigate harm (CPA, 2017).

Once the potential for biophobia has been addressed when implementing NBT, counsellors must address additional ethical considerations, including the lack of complete control over the environment, which can impact confidentiality, physical risk, and professional boundaries. Being outdoors in NBT, whether in a public park or private natural area, means that complete confidentiality cannot be guaranteed (Harper et al., 2019; Hasbach, 2022; Jordan, 2015). Accordingly, informed consent for NBT should include discussions about potential breaches of confidentiality and proactive planning to mitigate harm in such situations.

NBT being outdoors entails potential physical risks, including insect bites or stings, sunburn, encounters with wild animals, and fall hazards resulting in scratches or bruising. Seasonal changes and weather variations also impact NBT's therapeutic effectiveness. Adolescents predominantly associate nature's benefits with the summer season, despite acknowledging drawbacks such as bugs and heat (Hakoköngäs & Puhakka, 2021). Conversely, Hakoköngäs and Puhakka reflected that the winter season is described and characterized as coldness, snowy, gloomy, slippery, and bad weather. In addition to nature's barriers, counsellors

must also consider physical barriers such as mobility concerns, allergies, and potential harm versus benefits prior to suggesting the use of NBT (Harper et al., 2019; Hasbach, 2022; Jordan, 2015). Considering adolescents' perspectives on seasons, nature's qualities and adolescent physical abilities is crucial when evaluating the therapeutic effects of the natural environment in psychotherapeutic settings.

Finally, professional boundaries differ in NBT, as therapy outside the confines of four walls may blur professional boundaries (Jordan, 2015). For counsellors and those they work with NBT may feel like taking a stroll with a friend; therefore it is essential that counsellors maintain therapeutic boundaries and communicate this in the informed consent process (Harper et al., 2019). In considering ethics, NBT involves nature as a co-therapist, and moving therapy outside the traditional office space, this shift necessitates additional ethical considerations such as biophobia, physical risks, confidentiality, and professional boundaries.

Implications for Specific Adolescent Populations: Experiencing Barriers to Accessibility, Rural and Indigenous

The explored research in this review primarily focused on the benefits of nature-based therapy for the general adolescent population. Firstly, there are unique considerations for youth who experience accessibility barriers, either due to limited mobility, or social and physical location. Secondly for Canadian practitioners, specifically those in the prairie provinces of Western Canada, two specific subsets of the adolescent population would greatly benefit from NBT. These include agricultural and trades-based rural adolescents, as well as Indigenous adolescents. These groups face unique barriers and risks within their respective communities, making NBT highly beneficial.

Adolescents Who Experience Barriers to Accessibility

The literature on NBT with adolescent populations lacks sufficient research on accessibility inclusion. NBT can be conducted in various environments such as remote rural forests and urban parks, involving sitting or walking (Harper et al., 2019; Jordan, 2015). However, social location and disabilities may limit some adolescents' participation. For instance, those from low SES families may lack means to access urban parks, while wheelchair-bound adolescents may face challenges with park accessibility.

The emerging field of virtual reality of natural experiences shows potential to address accessibility concerns. Although research on the psychological impacts of virtual nature is still in its early stages, promising results have been observed with adult populations. Studies have indicated that virtual nature experiences can reduce psychological stress, improve mood, and offer restoration (Browning et al., 2020; Ho et al., 2023). A systematic review and meta-analysis have demonstrated positive effects on various outcomes, such as increased calmness and decreased stress, tension, fatigue, anxiety, and depression (Li et al., 2023). However, barriers to access include equipment costs, specialized rooms for immersive simulations, and the need for further research in this area. While simulated and virtual experiences of nature can open accessibility to NBT, challenges, such as those listed above, would need to be considered for counsellors wanting to implement virtual nature experiences.

Agricultural and Trades Rural-Based Adolescents

The reviewed literature lacked extensive exploration of rural-based Western Canadian adolescents, a population of significant importance for counsellors due to their high-risk nature. Rural communities in Canada exhibit higher rates of suicide, particularly among young men and adults, attributed to factors such as toxic masculinity, limited access to care, and increased risk-

taking behaviors (Barry et al., 2021; Corrigan et al., 2014; Creighton et al., 2017; Malla et al., 2018; Pickett et al., 2017). Implementing NBT with rural adolescents could address unique barriers they face, first understanding these barriers is critical to understanding NBT's utility. Research with rural youths is limited, therefore examining research with adults provides contextual understanding, in addition to considering the influence of parental barriers on their youth's subsequent barriers (Chan et al., 2023; Hansen et al., 2021; Reardon et al., 2018).

Rural residents in Canada face challenges in accessing timely and adequate mental health services, aside from NBT, with high levels of stress, depression, anxiety, and the highest suicide risk in Canada reported among adult farmers and young rural males (Creighton et al., 2017; Hirsch, 2006; Jones-Bitton et al., 2020; Malla et al., 2018). Barriers to other types of therapy, outside the scope and detail of this Capstone, include transportation, cost, limited programming, and stigma, leading to lower help-seeking rates and dependence on self-reliance (Libon et al., 2022; Stanford et al., 2009). This lack of access encompasses physical barriers (Caldwell et al., 2015; Karunanayake et al., 2015; Sibley & Weiner, 2011; Zayed et al., 2016) and comfort-related factors. It is recommended that future research continue to explore all therapeutic modalities, inclusive of NBT.

Belonging and not belonging are crucial aspects for rural communities and their youth, influenced by a balance between continuity and change. Traditional values signify belonging, often resistant to change (Jones, 1999). In rural communities, Jones observed that limited exposure to evolving perspectives on mental health contributes to stigma and the formation of identities that align with traditional values. Stigma, a significant access barrier, involves creating labels to distinguish an out-group, perceiving harm in the label, establishing separation between in and out-groups, and resulting discrimination and status loss associated with the out-group

(Link & Phelan, 2001). For example, in rural Western Canada, toxic masculinity, an outdated and harmful ideology, exists amongst boys and men as a belief held by the in-group, and mental health support seeking is seen as an out-group behaviour (Barry et al., 2021; Corrigan et al., 2014; Creighton et al., 2017). The harmful rural masculine culture was exemplified by a participant in Creighton et al.'s (2017) study, who was quoted after the suicide of her son explaining rural Western Canadian toxic masculinity culture:

> Maybe that's part of that sort of rural Alberta kind of "You've gotta make it on your own," right? Always, "You gotta be tough, if you're not tough you don't deserve to be here"— that kind of mentality that only the tough survive . . . you can't depend on anybody. (p. 1887)

Corrigan et al. (2014) observed that stigma towards mental health in rural individuals manifests as avoidance of treatment, lack of knowledge, skepticism towards outcomes, lack of social support, and cultural beliefs in irrelevant treatment outcomes. Mental health care providers may also contribute to rural individuals' barriers due to cultural incompetence and stigmatizing attitudes towards rural culture. Corrigan et al. also noted that rural patients have reported providers pathologizing or disregarding their concerns. This is the gap in services that NBT could fill. NBT can address access barriers by providing comfort in seeking mental health support for rural individuals. NBT aligns with the rural lifestyle where the outdoors is where most rural-based individuals spend a large amount of their time and can express emotions that may be stigmatized inside the home and community; if nature-based therapy was employed with rural adolescents, it may help to build a therapeutic alliance and create buy-in amongst the adolescents, which then could lead to combating stigma. A nature-based practice may also create initial buy-in for parents of adolescents, as this provides a commonality between therapist and

parents, leveling out power dynamics and lessening in- and out-group associations. Future research could explore these hypotheses.

NBT can serve as a bridge for rural adolescents and their families to access mental health services by utilizing the outdoors as a widely accessible therapeutic tool. Practitioners can collaborate with parents and adolescents to integrate nature-based activities between sessions, amplifying the benefits of nature contact and enhancing therapeutic interventions for youth.

Indigenous Canadian Youth

NBT holds unique potential for addressing the barriers and trauma experienced by Indigenous adolescents in Central Alberta and Canada. These youths face intergenerational trauma resulting from colonization, cultural genocide, and the legacy of residential schools (The Canadian Encyclopedia, n.d.). Intergenerational trauma is experienced by descendants of an individual who experienced a terrifying event that resulted in adverse emotional and behavioral reactions to the event, these descents experience the same symptoms as the original ancestor (APA, n.d.b). Moreover, the over-representation of Indigenous youth in the Child and Family Services (CFS) system further compounds their experiences of trauma (Government of Alberta, 2022). NBT can offer a culturally responsive approach to healing and support the well-being of Indigenous adolescents.

NBT offers an opportunity to integrate culturally sensitive practices and support community healing, emphasizing the importance of cultural connection and identity reclamation (NCCAH, 2015; Sasakamoose et al., 2017). It is important to explore how counsellors can privilege Indigenous ways of knowing. Elder Albert Marshall brought forward the idea of weaving Western and Indigenous practices together and referred to learning as seeing from each eye the strengths of Indigenous knowledge and Western thought (Bartlett et al., 2012). This

Two-Eyed Seeing approach or in Mi'kmaq, Etuaptmumk, requires genuine investment and respect from Western thinkers to honor Indigenous perspectives (Broadhead & Howard, 2021). Two-Eyed Seeing has been recognized as inclusive and a decolonizing approach across various Indigenous communities (Wright et al., 2019), highlighting its potential implications in NBT for Indigenous populations.

NBT with Indigenous adolescent mental health incorporates the identified benefits from the literature and aligns with the Two-Eyed Seeing approach. Two-Eyed Seeing recognizes the spirits of place, client knowledge, and colonial power dynamics (Hall et al., 2015). NBT practitioners can consciously choose which lens to use in therapy, promoting holistic wellness and cultural healing (Sasakamoose et al., 2017). By partnering with Indigenous leaders and elders, counselors can further enrich NBT interventions with cultural teachings, fostering a connection to identity and facilitating healing from intergenerational trauma and internalizing disorders.

Recommendations for Counselling Practice

This section will provide recommendations for counseling practice with NBT. A key recommendation is the standardization and implementation of consistent training and certification in NBT including informed consent practices. Given the unique considerations of NBT and the practitioner's ethical responsibilities to work within their competency (CPA, 2017), standardizing NBT practice is a recommendation of the upmost importance.

There is currently no standard protocol or recommendation for training or certification in NBT within the APA, including the APA's Division 34, which is the Society for Environmental, Population and Conservation Psychology (APA, 2011a). The Canadian Psychological Association (2023) also does not provide recommendations or standardization for training or

certification in NBT, although it offers weblinks to resources related to eco-psychology. While there is no official standardization or certification regulation for NBT in Canada, there are numerous training resources available from non-profit organizations, charities, and private organizations for practitioners interested in NBT in Canada (Global Institute of Forest Therapy & Nature Connection, n.d.; Human-Nature Counselling Society, n.d.; Nature Based Therapy, n.d.; Nature and Forest Therapy of Canada, n.d.).

Counsellors should adhere to ethical guidelines and practice within their knowledge limitations and without current standardization for NBT, they must do so diligently (CPA, 2017). They should seek training from organizations offering NBT-specific programs and gain experience under the supervision of experienced NBT practitioners. In addition, it is recommended that counsellors wanting to implement NBT adopt a Two-Eyed Seeing approach to ensure cultural sensitivity and respect for the ancestral knowledge in which NBT is rooted. Current certification in First Aid is also recommended to ensure safety during NBT sessions. Ethical issues specific to NBT, such as confidentiality and risk, should be thoroughly addressed in the informed consent process with adolescents and their guardians, practitioners can create appropriate consent forms by following ethical guidelines and consulting experienced professionals in the field.

Limitations and Future Research

This section will critically review NBT research, identify limitations in methodology and theoretical basis, and critique the focus on wilderness therapy and delinquent behaviors in research with adolescent populations. Suggestions for future research will be provided to guide new directions in NBT research and advance its practice in the field of counseling.

Lack of Standardization and Current Theories

As it was highlighted in the literature review, NBT is not considered an evidence-based practice due to the lack of standardization, thus inconsistent methodologies in current research exist (Beck & Wong, 2022; Hansen et al., 2017; Harper, Fernee, et al., 2021; Oh et al., 2017; Owens & Bunce, 2022b; Putra et al., 2020; Rowley et al., 2022; Summers & Vivian, 2018). The field lacks consistent language, identified mechanisms of change, and methodological approaches, while also facing potential researcher bias and confounding factors (Beck & Wong, 2022; Hansen et al., 2017; Harper, Fernee, et al., 2021; Oh et al., 2017; Owens & Bunce, 2022b; Putra et al., 2020; Rowley et al., 2022; Summers & Vivian, 2018).

Future research in NBT should focus on consistent language and definitions, aiding in standardization (Harper, Fernee, et al., 2021). Harper, Fernee, et al. noted that replicability should be prioritized to enhance reliability and validity of NBT modalities and while challenging, randomized control trials should be considered to strengthen the research base. NBT in the present day is evidence-informed; to further this practice in the counselling field, it must also work towards being evidence-based unless the Canadian counselling and psychology field moves from Western medical-based perspectives towards more holistic and Indigenous perspectives.

A consideration of future improvements in the field of NBT is the reliance on the theories of biophilia hypothesis, stress reduction theory, and attention restoration (Kaplan, 1995; Kellert & Wilson, 1993; Ulrich, 1984). While these theories are essential and, as explored in the literature review, have applications and connections to current theories in counselling practices today, they are relatively outdated and the research in the field, while promising, is not of a quality high enough to provide an evidence-based background. One way to update these theories

it to view them through the lens of the waves of psychology which captures at a general level how psychological theories and practices have evolved over time.

The three main underlying assumptions of the therapeutic mechanisms of NBT described by Kaplan (1995), Wilson (1993), and Ulrich (1984) have evolutionary-based understandings consistent with the second wave of psychology. Third-wave psychotherapies, becoming increasingly prominent in counselling, are acceptance-based therapies utilizing techniques such as mindfulness (Hooper & Larsson, 2015). The theories and ideas underlying NBT could be updated to fit within third-wave psychology ideologies, as many of the practices and interventions of this modality fit within acceptance and mindful-based practices (Hooper & Larsson, 2015). Updating the theoretical basis of NBT to align with third-wave psychology, which emphasizes acceptance and mindfulness, could strengthen its research and practice.

Research with Adolescents Outside of Delinquent or Risky Behaviours and Wilderness Therapy

The focus of past research on NBT with adolescents has been within the framework of wilderness therapy, particularly addressing delinquent or risk-based behaviors. Wilderness therapy differs from NBT, as it is primarily based in group interventions in remote natural environments and lasts for multiple days or even weeks (Beck & Wong, 2022; Fernee et al., 2019; Kraft & Cornelius-White, 2020). Unlike boot camps, as it is sometimes confused with, wilderness therapy is a therapeutic group intervention in remote natural environments (Beck & Wong, 2022). Boot camps use the wilderness as punishment and utilize emotional and psychological abuse to generate compliance in youth (Harper & Russell, 2008; Russell, 2006).

Wilderness therapy, although extensively researched with adolescents, does not provide the same therapeutic benefits as NBT due to its group-oriented nature and limited accessibility

(Gabrielsen & Harper, 2018). Additionally, its focus on specific presenting problems limits its generalizability. Therefore, further research is needed in NBT, specifically targeting internalizing disorders among adolescents, and increasing accessible options for NBT, including virtual simulations. These recommendations for research are a gap in the existing literature that this capstone project hopes to fill.

Self-Reflexive Statement

Through the process of writing this literature review I have found that my perspectives and beliefs regarding the usage of NBT have changed and grown stronger. To fully comprehend and understand how this literature review has impacted me and how I view NBT, I must explain the practicum and professional journey I partook in while completing this capstone project. This literature review was completed in conjunction with my practicum experience in a private practice location in my local community that also practices NBT. Through my practicum experience, I could implement experientially what I was learning and reading in the literature with adult populations and adolescent clients.

A pivotal moment for me was conducting a nature-based session with a client who I had been struggling with, as this client had a hard time opening-up, going deep and staying present. In my second to last session with this adolescent client, I gained informed consent to conduct a walk-and-talk style therapeutic session in the forest behind the office, which has trails that go deep into the forest and lead to a creek. During this session, I facilitated Forest Bathing or Shinrin-Yoku based mindfulness and immersion with the client, and when we got to the creek, we found a young raven sitting on a log not yet ready to fly. I used this raven as a metaphor for the client's life as they were seventeen and entering their last year of secondary school. This metaphor helped the client open up about topics that had not yet been disclosed or explored in

therapy. In a mindful moment sitting with the raven, two deer came to the edge of the creek and jumped over the water. All this happened in an hour-long session. This client and I achieved therapeutically in this one session what had taken me nearly two months of bi-monthly sessions to achieve. This session showcased to me experientially the utility of NBT with adolescents experiencing internalizing concerns. This session was then fully discussed in my supervision session.

Reviewing the literature during my practicum experience deepened my understanding of the therapeutic mechanisms and techniques present in NBT, in a way that simply reading or understanding interventions could not. I felt deeply connected to the literature, especially as a Métis person, where much of the NBT literature referenced the importance of Indigenous knowledge and traditional practices. I also experienced frustration at the lack of literature and how I had to fit bits and pieces together from various theories and schools of thought to prove that NBT is worth considering from a theoretical point of view. However, as was mentioned multiple times in the review, NBT is evidence-informed not evidence-based, which was a hard consideration for me to explore, as I often work from relational and subjective standpoints, and an objective view against my own bias was difficult.

Before conducting this research, I had a biased view of the utility of NBT without any objective foundation for this belief. The research in this field provides a near-similar view, that there are benefits, but not substantial proof. As I worked through the literature review, it was important for me to check my bias and view this topic and research with as much objectivity as I could to provide clear results and connections, and to write this paper with the academic rigor that I have been trained to do through this master's program. I also wanted to ensure that Indigenous ways of seeing the world were mentioned multiple times, as NBT is heavily

influenced and based in Indigenous practices. Through this project I wanted to demonstrate the way in which psychotherapy can be effective while also being rooted in non-westernized practices, and while it is important for the counselling field to practice from an evidence base, we can expand our understanding of what that means.

Conclusion

This literature review focuses on the relevance of NBT in counselling, particularly for adolescents experiencing internalizing disorders. It highlights the diverse areas of literature that support the utility and showcase the flexibility of NBT. The goal of this review was to provide a comprehensive knowledge base for Canadian practitioners and emphasize NBT's implications for the general adolescent population experiencing internalizing disorders, along with demonstrating its implications for specific vulnerable populations. The underlying theme of this review was to show that while individual fields and research are essential to understanding the breadth of psychotherapy, and mechanisms of change, NBT can act as a web, connecting and holding these multiple pieces together, grounding them in a deep healing connection to nature.

This review emphasized the importance of NBT for adolescents, given the rising prevalence of internalizing disorders with increasing urbanization despite decreasing stigma against mental health in the general population. While traditional psychotherapies are effective, the growing complexity of factors impacting adolescents requires additional interventions. NBT offers a holistic approach that can be used alone or in combination with other therapies. The research explored in this review demonstrates the unique mental wellness benefits of NBT for adolescents. Moreover, NBT with vulnerable and at-risk Canadian populations, including rural and Indigenous youth, can help overcome barriers and provide numerous advantages in accessing mental health support. A critical perspective is that practitioners of NBT should

acknowledge and hold space for the Indigenous knowledge and contributions that may have been lost to their culture or others that have not been communicated to the mental health field. The counselling field is rooted in a Western perspective, and when working with Indigenous clients, practitioners should honour Indigenous traditions and coping tools without imposing their own practices.

The findings of this review have implications for mental health practitioners working with adolescents, regardless of an urban or rural context. Understanding NBT provides opportunities for client-centered case planning, self-reflection, and increased cultural competency. Counsellors must address their personal biases towards NBT and be willing to acknowledge them whether those a positive or negative and assess if this is a relevant and beneficial practice to utilize with individuals they are working with. The practice of NBT also highlights the importance of social justice and the role of mental health practitioners in addressing the global climate crisis and our relationship with nature. A key component of NBT is recognizing that nature acts as a co-therapist, which means respecting the natural environment and its living things is critical. Humans are an integral part of nature's circular system even though we often see ourselves as removed and separate from it. By embracing the holistic approach of NBT, therapists can facilitate a significant shift in wellness that is culturally and socially relevant.

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Appendix

Table 1: An example of methodology for the literature review, which includes research exploring the effects of implementing nature-based therapy on adolescents

Citation	Sample Size	Selection/ Recruitment	Data Collection Process	Data Analysis Process	Notes on Findings / Perspectives to Highlight
Ulrika, K. S., Sus, S. C., Sidenius, U., Patrik, K. N., Larsen, H. B., & Lone, O. F. (2018). Efficacy of nature-based therapy for individuals with stress-related illnesses: Randomised controlled trial. *The British Journal of Psychiatry, 213*(1), 404-411. https://doi.org/10.1192/bjp.2018.2	84	Participants had to be unable to work due to a level of severe stress resulting in 3-24 months of an inability to work (ages 20-60)	In this quantitative random control trial, participants completed self-rated measures at five points (baseline, end of treatment, and 3,6 and 12 months after treatment. Questions were based on the psychological general well-being index; the second outcome measure was based on the shirom-melamed burnout questionnaire.	Analysis was based on intention-to-treatment, where they were analyzed regardless of non-adherence or deviations from protocol and is the recommended approach in Random Control Trials. Multiple statistical analyses were employed, including the Shapiro-Wilk test for skewness and kurtosis values, two-way mixed design ANOVA's, Friedmans test, Wilcoxon tests, and Bonferroni correction.	There is a small breadth of random control trials (RCT) when reviewing outdoor therapeutic intervention research; including the results of this study is essential. In addition to being a random control trial, the study compared nature-based CBT therapy and regular CBT protocols for stress-related illness and found both treatments to produce statistically significant results in outcomes and decreased burnout with no real outcome difference between the two interventions. As the research question is based on similar interventions with adolescents, it was also a critical study.

Oh, B., Lee, K. J., Zaslawski, C., Yeung, A., Rosenthal, D., Larkey, L., & Back, M. (2017). Health and well-being benefits of spending time in forests: Systematic review. *Environmental Health and Preventive Medicine, 22*, Article 71. https://doi.org/10.1186/s12199-017-0677-9	6 studies	Inclusion criteria were studies reporting the effects of forest exposure on health and well-being that were random control trials with adult participants. Epidemiological, case studies and qualitative studies, along with non-human trials, were excluded studies between 2012-2015	This qualitative study conducted a systemic review following PRISMA guidelines. A digital search of online databases was conducted, use of PRISMA flow diagram	Quality assessments of the random control trials used were the Cochrane risk of bias tool.	This being one of the first reviews only to include RCT, and it only has six analyzed studies after a search yielding 2185 studies, shows the need for more quantitative research on this topic, as the qualitative research based on observational studies shows promise in the interventions. Even with the results indicating no significant/strong evidence of forest-based practices, the article states that this, along with previous research, shows promise and strong evidence of benefits. Through higher-quality research, this could yet be proven.

Beck, N., & Wong, J. S. (2022). A meta-analysis of the effects of wilderness therapy on delinquent behaviors among youth. *Criminal Justice and Behavior, 49*(5), 700-729. https://doi.org/10.1177/00938548221078002	11 studies	Population type, date, location, accessibility, Abstract and titles reviewed (majority U.S.A based, age 11-26, program activities diverse, post-test measurements were taken at discharge)	This quantitative study conducted a meta analysis following PRISMA guidelines. It involved an electronic database search, use of PRISMA flow diagram.	For the meta-analysis used DerSimonian and Laird random-effects mode; publication bias was combated using funnel plots and Egger's test of small-study effects; Heterogeneity was examined through effect sizes of Q-statistics and I2 statistics	The analysis had reasonably strict criteria when including studies which are notable and similar to other reviewed studies. Although there was not enough quantitative research to include in the study to produce more compelling results, it indicated by what was included that wilderness therapy has the potential to be a viable treatment for at-risk youth with conduct issues. The conclusions from this article are a recurring theme in other analyzed literature reviews and meta-analyses.
Kraft, M., & Cornelius-White, J. (2020). Adolescent experiences in wilderness therapy: A systematic review of qualitative studies. *Journal of Creativity in Mental Health, 15*(3), 343-352. https://doi.org/10.1080/15401383.2019.1696259	9 studies	Qualitative empirical studies, specifically client, not facilitator experiences (2004-2016 dates of articles used)	This qualitative study conducted a systemic review following PRISMA guidelines. It involved a digital search of two online databases, use of PRISMA flow diagram to illustrate data collection.	Systematic search procedures and Noblit & Hare's (1988) steps of meta-ethnography	Qualitative perspectives of adolescents are essential for the research question regarding outdoor therapeutic interventions. Results are reminiscent of other reviewed studies exploring wilderness therapy with youth; major contributing factors regard the group therapy aspects, combined with the physical exertion of multiple days of being outdoors.

Bowers, E. P., Larson, L. R., & Parry, B. J. (2021). Nature as an ecological asset for positive youth development: Empirical evidence from rural communities. *Frontiers in Psychology, 12*(1), Article 688574. https://doi.org/10.3389/fpsyg.2021.688574	587	18 different sites, the average age was 12.9 years old	This quantitative involved regression analysis. Middle school students were surveyed who lived in rural areas. Time in nature was measured by nature-based outdoor time; the nature relatedness scale was used to measure youth connection to nature, and the inclusion of nature in self scale was also used for nature connection metrics. Youth development was measured using the 34 items short-form measure of the Five Cs of Positive Youth Development, and the Teen Assessment Project Survey Question Bank was used.	Using Cronbach's alpha and Mcdonald's omega, rigorous statistical procedures were employed, such as reliability and consistency. Bivariate correlations, OLS regression models, normal distribution without multicollinearity, standardized parameter estimates. Minimized risk of type two errors by statistical significance cut off at a=0.10 or lower. Data were analyzed with IBM SPSS Statistics Version 25	The study was one of the few quantitative research articles focusing on adolescents with a large sample size. The study's results were also connected to developmental theories while focusing on rural youth. The study also takes place in North Carolina in the United States of America, which, a North American context, is vital for the transferability of results to a Western Canadian rural context.