

**Integrating Nature-Based Therapy Interventions in Schools:
Supporting Students with Anxiety in a Post COVID-19 World**

by

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**Integrating Nature-Based Therapy Interventions in Schools:
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Dedication or Acknowledgement

I'd like to thank my parents for always believing in me and for inspiring me to go after my dreams. To my husband, for always being my number one supporter and for being the ultimate partner through the highs and lows of the last two years. To my Nana, for making it possible for me to complete this graduate degree and for lighting a fire in me to keep going when it got hard. And to my pups, Enzo and Kona, for being right there beside me for the journey that was writing this paper.

Abstract

The purpose of this capstone is to provide nature-based interventions that counsellors and educators can use to support the wellbeing of students with increased anxiety in a post COVID-19 era. Worldwide, the COVID-19 pandemic has been linked to a significant increase in anxiety disorders and related social risk factors among children, adolescents, and young adults (Fortuna et al., 2023). Global evidence indicates that prevalence rates of depression and anxiety have doubled, with 20% of youth reporting clinically significant anxiety symptoms (Racine et al., 2021). When left untreated, anxiety has the potential significantly impact well-being and quality of life (Garcia & O'Neil, 2021). Research consistently demonstrates a strong link between exposure to nature and improved overall well-being. This capstone aims to explore the impact that the COVID-19 pandemic had on anxiety in children and youth, and to explore nature-based therapy interventions as a means to support students with anxiety.

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Integrating Nature-Based Therapy Interventions in Schools: Supporting Students with Anxiety in a Post COVID-19 World

Chapter 1: Introduction

Statement of the Problem

Anxiety disorders are the most common mental health disorders among youth, effecting 10 to 30% of children and adolescents (Vossoughi et al., 2024). Since the COVID-19 outbreak, lockdown and prevention control measures (i.e., home isolation, school closures, and social distancing) adopted during the pandemic have ultimately had a significant effect on the way people live (Wang et al., 2022). It has been documented that the pandemic had a large impact on global mental health, with (PTSD) symptoms such as stress, anxiety, and depression being the most common psychological effects (Basheti et al., 2023). However, there is a growing body of research that indicates both passive and more active forms of ecotherapy can help to reduce anxiety (Mackay & Neill, 2010).

Purpose of the Paper

The purpose of this capstone is to explore how counsellors and educators can use nature-based therapy interventions in schools for students experiencing increased anxiety after the COVID-19 pandemic. This paper will begin by exploring the neurobiology and prevalence of anxiety, and the impact the COVID-19 pandemic had on anxiety in children and youth. It will then define nature-based therapy interventions and examine how they can support the mental health of students with anxiety. The aim of this paper is to provide a framework grounded in research that will assist school counsellors and educators in implementing nature-based therapy

interventions for students living with increased anxiety after the COVID-19 pandemic. This paper focuses on nature-based therapy as a complimentary intervention when paired with traditional counselling.

Research Question

How does integrating nature-based therapy interventions at school impact students with anxiety in a post-COVID-19 world?

Positionality Statement

For 32 years I've lived my life as a neurotypical, Caucasian, heterosexual, cis-gendered female. I grew up in a middle-class household with educators for parents, who were loving and supportive and always ensured my every need was met. Though I was diagnosed with anxiety and OCD at a young age, I was given counselling and strategies that have helped me to manage my symptoms and thrive in life. My experiences and personal background have ultimately shaped the way I perceive the world around me, and I am cognizant of the possible impact these factors have on my interactions with clients in the counselling space. I acknowledge that many aspects of my identity come with inherent privilege; however, I always strive to seek to understand others and recognize the diverse perspectives and experiences that exist outside of my own. My experience as an educator has also shaped how I interact with students and clients, ultimately influencing my pedagogical stance - to honour the diversity and perspectives of others, and to always treat others with empathy, care, and respect.

Theoretical Framework

Bronfenbrenner's ecological systems theory proposes four environmental subsystems that influence development and behavior, including: microsystems, mesosystems, exosystems,

and macrosystems (Killam & Degges-White, 2017). Each of these systems is influential on growth and development, with ecological systems theory illustrating the idea that human behavior emerges from the dynamic interactions between the individual and their environment (Killam & Degges-White, 2017). For the purpose of this research paper, ecological systems theory will be used to frame nature-based therapy interventions for school counsellors working with students with anxiety in a post-COVID-19 world. By integrating NBT interventions into school counselling, ecological systems theory could be used to suggest that the environment (nature) can be a transformative element within the different environmental subsystems that influence development, and ultimately, the mental health of students.

Significance of the Study

This research is significant given that prevalence rates of anxiety has doubled, with 1 in 5 youth reporting symptoms of anxiety (Racine et al., 2021). Schools increasingly recognized as essential spaces for cultivating children's connection to, understanding of, and stewardship toward the natural world (Chawla et al., 2014). The integration of nature-based activities into education is an opportunity in supporting children's mental health and well-being ((Bakogianni et al., 2022). When used as a complementary intervention alongside traditional counselling, nature-based therapy interventions have considerable potential to enhance student mental health and provide innovative strategies for individuals experiencing anxiety (Jessen et al., 2025). This capstone encourages schools to incorporate nature-based therapy interventions into school environments in order to help support students living with increased anxiety symptoms.

Outline of the Remainder of the Paper

The remainder of this paper consists of two main chapters. The next chapter provides a review of the literature, beginning with an examination of the definition and diagnosis, the prevalence, and neurobiology of anxiety. It then explores the COVID-19 pandemic and its impact on mental health, specifically anxiety in children and youth. The chapter then examines nature-based therapy interventions and evaluates their application in schools for supporting students experiencing anxiety. The final chapter presents several strategies for incorporating nature-based therapy interventions in schools for both counsellors and educators. It also includes informational posters designed for distribution among school staff. The aim of this capstone is to provide educators and counsellors with nature-based interventions to support their students living with anxiety in a post COVID-19 world.

Chapter 2: Literature Review

Introduction

This chapter provides a review of the literature that examines nature-based therapy interventions as a means of supporting students experiencing heightened anxiety in the post-COVID-19 era. The literature review will focus on the following themes: Anxiety and the COVID-19 Pandemic, and Nature-Based Therapy. Based on the literature presented, in Chapter 3 I will propose recommendations for ways in which school counsellors can implement nature-based therapy into their practice to help support their students with anxiety or symptoms of anxiety.

Anxiety and the COVID-19 Pandemic

This first topic will focus on research that explores anxiety as a mental health disorder. This discussion will examine the definition and prevalence of anxiety in youth, its distinction from fear, the diagnosis process, the neurobiology underlying anxiety, and the behaviors associated with it. This topic will also explore the COVID-19 pandemic as a mental health phenomenon and the impact it's had on anxiety in children and adolescents. This research is essential in understanding the scope and complexity of anxiety in youth in a post-pandemic context, ultimately informing how schools can respond and the importance of evaluating interventions, such as nature-based therapy.

Defining Anxiety

Anxiety is characterized as an individual's response to actual or perceived threats that may disrupt their homeostasis (Garcia & O'Neil, 2021). Anxiety disorders are distinct from developmentally normative or stress-related anxiety in that they are excessive or out of

proportion to the actual threat, persist over time, and/or impair daily functioning (Craske & Stein, 2016). The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) defines eleven anxiety disorders: separation anxiety disorder, selective mutism, specific phobia, social anxiety disorder (social phobia), panic disorder, agoraphobia, generalized anxiety disorder, anxiety disorder due to another medical condition, other specified anxiety disorder, and unspecified anxiety disorder. Individuals with anxiety disorders may exhibit heightened fear, anxiety, or avoidance in response to perceived threats, whether external (i.e., social situations or unfamiliar environments) or internal (i.e., unusual bodily sensations) (Craske & Stein, 2016). Klein et al (2023) found that the etiology of anxiety disorders is complex and multifactorial, encompassing biological determinants such as temperament, genetic predispositions, and epigenetic influences, in conjunction with psychological and social factors (i.e., adverse childhood experiences). Additionally, anxiety disorders frequently demonstrate comorbidity and overlapping symptoms with other psychiatric conditions, including depression, eating disorders, and attention-deficit/hyperactivity disorder (Garcia & O'Neil, 2021). Most anxiety disorders affect almost twice as many females as males (Craske & Stein, 2016).

Prevalence of Anxiety

Anxiety disorders are the most prevalent mental health challenges impacting children and adolescents in Canada (Bobbitt et al., 2023). It is estimated that about one-third of adolescents aged 13 to 18 will experience an anxiety disorder, with a median age of onset at 11 years and roughly three-quarters of cases manifesting by age 21 (Garcia & O'Neil, 2021). Although reported rates of anxiety disorders have remained relatively stable for many decades, recent population survey data now suggests higher rates of self-reported anxiety in children and adolescents (Klein et al., 2023). When compared with pre-pandemic estimates, recent research

indicates that symptoms of anxiety have doubled since the onset of COVID-19, with approximately one in five youth worldwide experiencing significant symptoms of anxiety (Racine et al., 2021). If left undiagnosed or untreated, anxiety has the potential to disrupt normal psychological development and significantly impact well-being and quality of life (Garcia & O'Neil, 2021).

Anxiety vs. Fear

Although often used interchangeably, fear and anxiety are conceptually and neurologically distinct. Fears are a typical aspect of normative development during childhood and adolescence (Klein et al., 2023). Fear is often defined as an aversive reaction in response to a specific threat stimulus, whether it is conditioned or not (Sylvers et al., 2011). Three behavioral responses that mammals display in response to fear include fight, flight, and freezing in place (Sylvers et al., 2011). The DSM-5 defines fear as including “surges of autonomic arousal necessary for fight or flight, thoughts of immediate danger, and escape behaviors” (American Psychiatric Association, 2013, p. 189). In regard to the duration of arousal, fear response tends to be short-lived whereas anxiety is long-lived (Sylvers et al., 2011).

While fear can be understood as the emotional reaction to an actual or perceived immediate danger, anxiety reflects the anticipation of a possible future threat (American Psychiatric Association, 2013). While it is developmentally appropriate for children and adolescents to have worries and fears, anxiety disorders can be diagnosed when these fears and worries cause distress that is significant, lasting, or interferes with their daily functioning (Bobbitt et al., 2023). Despite the prevalence of anxiety disorders in today's society, “the literature is only beginning to clarify the often poorly delineated relationship between trait fear and anxiety” (Sylvers et al., 2011, p. 123). Research on animals has provided valuable insight

into the biological mechanisms behind fear and anxiety, as many of the same brain structures, such as the amygdala, play similar roles in humans (Sylvers et al., 2011). Recent studies in humans also explore the biological bases of fear and anxiety, showing that while there is some overlap in brain activity, there are also distinct patterns that differentiate the two states (Sylvers et al., 2011).

Diagnosing Anxiety

Anxiety disorders are characterized by persistent, excessive, or distorted responses that significantly impair an individual's ability to function in daily life (Klein et al., 2023). The DSM-5 defines anxiety disorders as differing from “developmentally normative fear or anxiety by being excessive or persisting beyond developmentally appropriate periods” (American Psychiatric Association, 2013, p. 189). Clinicians are responsible for determining whether or not the fear or anxiety is excessive, taking into account contextual factors of the individual (i.e., culture) (American Psychiatric Association, 2013). Anxiety disorders typically persist for 6 months or more; however, the criteria for duration allows for some flexibility in patients, particularly in children (American Psychiatric Association, 2013). Anxiety disorders frequently emerge in childhood and are diagnosed in females at about twice the rate seen in males (American Psychiatric Association, 2013). An anxiety disorder is diagnosed only when the symptoms cannot be explained by the effects of a substance or medication, another medical condition, or a different mental disorder (American Psychiatric Association, 2013).

Neurobiology of Anxiety

Exploring the neurobiology of the developing brain is key to understanding how anxiety arises and manifests in children. Research has greatly advanced our knowledge of the neurobiology of anxiety disorders in children, and often suggests dysfunction in prefrontal-

amygdala-based circuits (Wehry et al., 2015). The onset of most anxiety disorders occurs in childhood and adolescence, a developmental period characterized by structural and functional changes of the frontolimbic circuitry (Cohodes & Gee, 2017). The amygdala, prefrontal cortex (PFC), anterior cingulate cortex (ACC), and hippocampus play central roles in fear conditioning and extinction, and their interactions have been linked to anxiety during development (Cohodes & Gee, 2017). In youth with anxiety disorders, altered amygdala volumes and elevated responses to neutral and fearful stimuli have been observed, with the degree of amygdala reactivity linked to the intensity of symptoms (Cohodes & Gee, 2017). Abnormalities in the PFC and ACC, along with their connections to the amygdala, may indicate diminished top-down regulation or compensatory attempts to regulate heightened amygdala activity associated with anxiety (Cohodes & Gee, 2017). Ultimately, disruptions in frontolimbic connectivity likely contribute substantially to the onset and persistence of anxiety disorders (Cohodes & Gee, 2017).

Anxiety and Behaviour

Anxiety can elicit both physiological and behavioural symptoms in individuals. The brain regulates physiological responses to fear and anxiety by activating the sympathetic nervous system, which releases epinephrine and norepinephrine to initiate the fight-or-flight response (Garcia & O'Neil, 2021). In addition to epinephrine and norepinephrine, serotonin and dopamine serve as key neurotransmitters in mood regulation, with low dopamine linked to depression and reduced motivation and serotonin influencing emotional processing (Garcia & O'Neil, 2021). The behavioral component of anxiety may include actions such as inhibiting behaviours, heightened situational awareness, and avoidance of perceived threats (Garcia & O'Neil, 2021). Acting withdrawn, avoiding eye contact, or refusing to speak in children and youth, and

clinginess, hypervigilance, or fearful behaviors in younger children, are also indicators of possible anxiety (Klein et al., 2023).

Within the school context, anxiety in children and adolescents can frequently interfere with academics, social and emotional functioning, and peer and/or family relationships (Jones et al., 2019). Some children with anxiety may display school reluctance or refusal to attend school (Jones et al., 2019). Anxiety in childhood and adolescence is not only connected to reduced school attendance, but also to overall academic underachievement and specific challenges such as poor concentration, challenges with oral presentations, and heightened test anxiety (Jones et al., 2019). Research also shows that students with anxiety often have difficulties regulating emotions, which can negatively impact essential cognitive processes needed for academic success, including attention, working memory, planning, and self-control (Jones et al., 2019). Additionally, anxious youth who exhibit behaviors such as social withdrawal, limited class participation, excessive questioning, restlessness, or inattention may disrupt the classroom environment, leading to frustration among teachers and peers (Jones et al., 2019). Over time, these patterns can strain interpersonal relationships and contribute to increased social isolation and academic disengagement (Jones et al., 2019).

COVID-19 as a Mental Health Phenomenon

The COVID-19 pandemic emerged not only as a global health crisis but also as a significant mental health phenomenon, with the needs of youth shifting dramatically during this time (Fortuna et al., 2023). During the COVID-19 pandemic, governments worldwide implemented varying lockdown and quarantine measures to curb the spread of the virus, and recent studies indicate that these restrictions have had significant effects on the psychological well-being of children and adolescents (Abawi et al., 2020). Pandemic-related stressors had a

disproportionate effect on racially and ethnically minoritized youth, including school-age children, adolescents, and young adults (Fortuna et al., 2023). Research suggests that social distancing measures such as remote learning, closed college dorms, reduced peer interaction and increased isolation have been especially harmful to youth mental health (Hawes et al., 2022).

Evidence shows considerable adverse effects on children's mental health, with 18.9% to 43.7% of those surveyed in Asian, European, and American countries reporting anxiety, worry, irritability, depressive symptoms, or even post-traumatic stress symptoms (Abawi et al., 2020). Quarantine has been associated with adverse psychological effects, including health-related anxiety, feelings of loneliness, and financial concerns (Śniadach et al., 2021). Compared with pre-pandemic levels, the prevalence of depression and anxiety symptoms doubled during COVID-19, with higher prevalence observed later in the pandemic, particularly among older adolescents and females (Racine et al., 2021). Anxiety has emerged as a particularly pressing concern since the pandemic, with one national survey in the United States revealing that more than one in four children experience sleep difficulties, unhappiness, and worry related to anxiety (Fortuna et al., 2023).

COVID-19 Pandemic

The novel coronavirus disease (COVID-19), originating in Wuhan, China at the end of 2019, quickly escalated into a global health crisis due to its rapid transmission (Ye et al., 2020). The World Health Organization (WHO) classified COVID-19 as a Public Health Emergency of International Concern in January 2020 and subsequently declared it a pandemic on March 11, 2020 (Duong, 2021). In response to the rapid transmission of the disease, most governments enforced lockdowns, social and physical distancing, and school closures, thereby disrupting in-person education (Duong, 2021). An estimated 1.5 billion school-aged children and college

students worldwide were significantly affected by the closure of schools and educational institutions (Hasan & Bao, 2020). In 2021, WHO data indicate that more than 187 million cases had been reported worldwide, with fatalities exceeding 4 million (Śniadach et al., 2021). With pandemics endangering the lives of those infected, they also generate widespread mental health consequences that affect both infected individuals and uninfected populations (Feng et al., 2020). The COVID-19 pandemic introduced new stressors into the daily lives of children and adolescents, which are expected to have contributed to an increase in mental health problems such as depression, anxiety, and stress-related symptoms (Śniadach et al., 2021). Ultimately, research suggests that the COVID-19 pandemic has had wide-ranging adverse effects on the mental health of young people (Hawes et al., 2022).

The Impact of COVID-19 on Anxiety

Globally, the COVID-19 pandemic has been associated with a marked rise in anxiety disorders and social risk factors among children, adolescents, and young adults (Fortuna et al., 2023). Psychological distress among young people intensified during the pandemic, with increases observed in symptoms of anxiety disorders (i.e., generalized anxiety disorder, social anxiety disorder, separation anxiety), broader manifestations of anxiety (i.e., worry and fear), and depression (Fortuna et al., 2023). Evidence from a study of 80,000 youth worldwide indicates that prevalence rates of depression and anxiety have doubled, with 20% of youth reporting clinically significant anxiety symptoms (Fortuna et al., 2023). This increase may be explained by multiple factors, as the pandemic imposed unprecedented disruptions on children and youth, ultimately reshaping education and social interaction, and limiting opportunities to connect with friends, teachers, and family (Fortuna et al., 2023). Uncertainty, disruptions in routine, and concerns for the health and well-being and of family members during the COVID-19 pandemic

may also be connected to the increase in generalized anxiety symptoms in youth, such as worry, fear, and hyperarousal (Racine et al., 2021). Taken together, these findings underscore that the COVID-19 pandemic has profoundly exacerbated mental health challenges for children and adolescents worldwide, with disruptions to education, social interaction, and family life contributing to significant increases in symptoms of anxiety.

Summary

Anxiety disorders are the most common mental health conditions among children and adolescents, defined as persistent, excessive, and impairing responses to real or perceived threats that differ from normal stress or developmentally appropriate fears. There are numerous diagnoses in the DSM-5, which often emerge by adolescence, are influenced by biological, psychological, and social factors, and affect nearly twice as many females as males. Anxiety not only produces physiological responses such as heightened arousal and avoidance behaviors, but can also disrupt academic performance, emotional regulation, and social relationships. If left untreated, anxiety disorders can severely hinder healthy development, well-being, and long-term quality of life. Since the COVID-19 pandemic, we have seen a significant increase in anxiety with global rates of anxiety in youth having doubled. It is theorized that the disruptions to education, daily routines, and social connections caused by the pandemic have contributed to this increase.

Nature-Based Therapy

This second topic will focus on research that explores nature-based therapy (NBT), also referred to as ecotherapy, as a therapeutic approach that integrates natural environments and processes to promote health and well-being. This discussion will review the definition and principles of NBT, the various interventions it encompasses, and its application in school

settings. It will also consider the relationship between NBT and anxiety, highlighting evidence of its effectiveness as a complementary mental health strategy, alongside the practical and ethical limitations that accompany its use. This research is essential for understanding the potential of nature-based interventions to support psychological health, particularly in children and adolescents, and for informing how schools and mental health systems can integrate these practices to enhance well-being in students with anxiety.

Defining Nature-Based Therapy

Nature-based therapy (NBT), also known as ecotherapy, is a broad term that refers to various nature-based approaches designed to enhance overall well-being, with a particular focus on psychological health (Rueff & Reese, 2023). NBT originated in Anglo-American countries and has a longstanding history of application within healthcare (Stigsdotter et al., 2018). Ecotherapy, as a form of applied ecopsychology, seeks to establish a human–nature relationship from which psychological healing may be derived (Kamitsis & Simmonds, 2017). NBT integrates natural resources, including settings, activities, and processes (Rueff & Reese, 2023). Current reviews suggest that close interactions with natural environments can enhance physical health, psychological well-being, and social functioning for both children and adults (Wang et al., 2024). In particular, systematic reviews highlight that ecotherapy interventions provide mental health and social benefits such as improved self-esteem and confidence, reduced stress, increased resilience and restoration, and stronger social skills (Wang et al., 2024).

Forming a relationship with nature encompasses both passive and active processes (Kamitsis & Simmonds, 2017). When developed passively, the human–nature relationship is fostered through appreciation of the aesthetic qualities of natural environments, which in turn serve as spaces of healing (Kamitsis & Simmonds, 2017). In contrast, active engagement

involves therapeutic practices such as green exercise, physical exercise-involved therapy wilderness therapy, social and therapeutic horticulture, nature arts and crafts, and animal-assisted therapy (Wang et al., 2024). These interventions can support healing, enhance overall well-being, and even generate positive environmental outcomes (Wang et al., 2024). The effectiveness of nature-based interventions may be shaped by factors such as nature connectedness, physical activity, and the duration of the intervention (Kaleta et al., 2025). It is important to note, however, that ecotherapy is not limited to outdoor settings; the human–nature relationship can also be fostered indoors through therapeutic techniques that incorporate physical, sensory, or experiential engagement with nature (Kamitsis & Simmonds, 2017).

Principles of NBT

Ecotherapy is grounded in three core principles that aim to explain how nature supports mental health: biophilia hypothesis, attention restoration theory (ART), and stress reduction theory (SRT) (Rueff & Reese, 2023). In 1984, Edward O. Wilson suggested that natural selection shaped an adaptive human affinity for life forms and life-like processes, a concept he termed ‘biophilia’ (Joye & De Block, 2011). The biophilia hypothesis suggests that humans are innately drawn to connect with nature, rooted in evolutionary development that occurred primarily in natural environments (Rueff & Reese, 2023). Although the original formulation of the biophilia hypothesis was quite broad, it has also been defined as "a set of genetic predispositions of different strength, involving different sorts of affective states towards different kinds of life-like things" (Joye & De Block, 2011, p.193). The biophilia hypothesis posits that this connection is biological, genetic, and emotional (Gaekwad et al., 2022). Because human evolution occurred within the natural world, it is proposed that all people possess an inherent, biologically based tendency, or biological preparedness, to connect with nature (Gaekwad et al., 2022).

Although research has not yet confirmed a genetic basis for biophilia, two additional theories, attention restoration theory (ART), and stress reduction theory (SRT), offer insight into how the hypothesis may affect people (Rueff & Reese, 2023). ART offers a cognitive explanation, suggesting that voluntary attention, or directed attention, becomes depleted in urban environments or during cognitively demanding tasks, but can be restored in natural settings (Kaplan, 1995). This process of restoration is grounded in feelings of fascination, a sense of being away, coherence, and compatibility (Rueff & Reese, 2023). Finally, SRT is a prominent theory that explains how environmental exposure affects mental stress, proposing that natural settings reduce mental stress while artificial environments tend to induce mental stress (Ulrich et al., 1991). SRT proposes an emotional pathway to recovery, suggesting that natural environments positively influence affective states, ultimately supporting recovery from stress (Rueff & Reese, 2023). In recent decades, numerous empirical studies have supported SRT, documenting the positive effects of green landscapes, such as trees and shrubs, in reducing mental stress (Luo & Jiang, 2022).

NBT Interventions

Nature-based interventions (NBIs) encompass a wide range of names, approaches, and target populations, many of which overlap (Kaleta et al., 2025). NBIs may take place outdoors or indoors and can involve both natural and virtual environments (Kaleta et al., 2025). Keeping in mind that some individuals may lack access to green spaces, NBIs should offer a variety of options, allowing individuals to select those best suited to their environment and personal preferences (Kaleta et al., 2025). Personalization is an effective strategy for improving therapeutic outcomes and offering a wide range of NBI options is valuable for nature

prescriptions, as it can enhance patient engagement and promote better health outcomes (Kaleta et al., 2025).

Nature-based interventions, ecotherapy, and nature-assisted therapy serve as an umbrella term for a variety of different therapeutic approaches such as horticulture/horticultural therapy, nature exposure/nature viewing, green exercise, wilderness/adventure therapy, forest bathing/forest therapy, blue space interventions, nature play, nature-based education, and immersive nature experiences (Kaleta et al., 2025). Horticulture-based interventions consists of treatment programs that use activities such as gardening and plant care to achieve specific therapeutic goals (Tu, 2022). This approach is grounded in the belief that engaging with plants promotes well-being, reflecting the biophilic tendency of humans to connect with plants and natural environments (Tu, 2022). Nature exposure interventions involve exposure or time spent in outdoor environments but may also include indoor simulations of nature (Yeo et al., 2020). Nature exposure and nature viewing interventions are generally passive and involve minimal physical activity (Kondo et al., 2018). In many cases, participants may simply sit or lie down while observing outdoor settings in either built or natural environments (Kondo et al., 2018). Green exercise interventions involve physical activity, such as walking or running, within natural environments (Bikomeye et al., 2022). Wilderness and adventure therapy programs typically include extended outdoor activities such as hiking, trekking, and camping, and range in duration from two weeks to up to three months (Bettmann et al., 2016). Forest bathing, or *shinrin-yoku*, is the practice of consciously and mindfully immersing oneself in the forest through all five senses (Caponnetto et al., 2022). Forest therapy builds on forest bathing as its clinical application, addressing the specific needs of individuals by targeting physical and mental health challenges, reducing distress, and supporting overall recovery (Caponnetto et al., 2022). Blue spaces, defined

as visible outdoor natural surface waters that can promote health and well-being form the basis of Blue Space Interventions, which include activities such as surfing, scuba diving, and outdoor swimming (Britton et al., 2020). While there is overlap with green spaces, some reviews suggest that blue spaces provide unique benefits not available through green space exposure alone (Britton et al., 2020). Nature play interventions are unstructured, nature-based activities designed for children to play and engage with natural elements such as gardens, forests, ponds, water, mud, plants, and rocks (Dankiw et al., 2020). Nature-based education, or nature-based learning, is an educational approach that incorporates the natural environment to support learning (Miller et al., 2021). This approach may include using outdoor spaces as classrooms or actively engaging with natural elements as part of lessons (Miller et al., 2021). Finally, immersive nature experiences, also known as the Scandinavian tradition of “friluftsliv”, covers broad range of interventions that emphasize fostering a closer connection to nature (Mygind et al., 2019). These interventions may include outdoor life, outdoor recreation and education, or adventure recreation and education (Mygind et al., 2019). Living in a world where more than half the population lives in cities and faces constant overstimulation from noise, light pollution, time pressure, and fast-paced living, nature immersion stands out as a vital protective factor for mental health (Simonienko et al., 2023).

NBT in Schools

Over the last few decades, children’s physical activity has declined and their connection to nature has weakened, influenced by the rise of electronic media, reduced opportunities for unstructured play, and environmental barriers, with technology emerging as the dominant force limiting outdoor time (McCurdy et al., 2010). Louv (2005) introduced the concept of nature deficit disorder, referring to children who grow up with limited access to the natural world and

the consequent negative impacts on their cognitive, emotional, and physical well-being. Ensuring that children connect with nature as early and as frequently as possible is important for them to fully benefit from this relationship (Klein et al., 2018). Childhood exposure to nature can occur in structured settings, such as school or non-formal environmental education programs, as well as informally through experiences with friends, family, or independently (Asah et al., 2012).

There is a growing movement focused on naturalizing school grounds with woodlands, gardens, and spaces for nature-based play and learning (Chawla et al., 2014). In today's urbanized societies, children have limited opportunities for free play and exploration in forests, fields, or gardens; therefore, schoolyards are becoming increasingly recognized as vital places for fostering children's connection, knowledge, and care for the natural world (Chawla et al., 2014). Evidence from horticultural therapy highlights green spaces as powerful settings for healing, education, and development, positioning the schoolyard as an opportunistic place where nature, childhood, and ecopsychology can be interconnected (Buru et al., 2019). Incorporating ornamental indoor plants in schools is an example of how education-based therapeutic horticulture activities can offer children meaningful opportunities to connect with nature (Buru et al., 2019). Ornamental plants in public education offer potential benefits such as increased time outdoors, exposure to fresh air and sunlight, experiencing a sense of control, and exposure to sensory stimulation (Buru et al., 2019).

Research also shows that integrating school gardens into curricula can enhance students' mental well-being while also supporting learning and physical health (Ambusaidi et al., 2019). In a study of gardening programs for high school students, adolescents reflected deeply on their experiences after cultivating vegetables, fruits, herbs, and flowers in school or after-school programs (Chawla et al., 2014). Interview analyses revealed that across all programs, youth

consistently described feeling calm, peaceful, and relaxed while gardening (Chawla et al., 2014). The four main reasons teens gave for the peace and calm they felt during and after gardening included “being outdoors in fresh air in nature, feeling connecting to a natural living system, caring for living things successfully, and having time for quiet self-reflection” (Chawla et al., 2014). A Danish study found that school garden programs promoted student wellbeing by fostering positive emotions associated with being outdoors and by strengthening relationships with peers, educators, and teachers, which in turn enhanced self-esteem (Dyg & Wistoft, 2018). Beyond these social benefits, engagement with the natural environment supported student wellbeing as they developed empathy for animals, insects, and plants (Dyg & Wistoft, 2018). Given the benefits of the human–nature relationship and the importance of establishing this connection early in life, the integration of nature-based activities into education is an opportunity in supporting children’s mental health and well-being (Bakogianni et al., 2022).

NBT and Anxiety

In essence, nature serves as an effective co-regulator of the nervous system by restoring attention through gentle and varied visual stimulation, natural rhythms and cycles, and the opportunities for movement, curiosity, and exploration that it invites (Segal et al., 2020). There is an ever-growing body of research in both ecopsychology and counselling practice indicating that exposure to nature can positively influence psychological health (Kamitsis & Simmonds, 2017). Studies involving both clinical and non-clinical populations have shown that ecotherapy provides benefits for a range of physical and mental health conditions, including post-traumatic stress, chronic pain, anxiety, depression, and attention deficit/hyperactivity disorder (Isham et al., 2025).

In a study comparing the effectiveness of ecotherapy to cognitive-behavioural therapy (CBT), it was found that ecotherapy significantly reduced anxiety symptoms, though to a lesser extent than CBT (Isham et al., 2025). Mackay and Neill (2010) found both passive participation and more directive forms of ecotherapy to be effective in reducing anxiety. Although NBIs are not intended as a substitute for conventional therapeutic methods, they hold considerable potential as complementary strategies for enhancing mental health and can serve as valuable adjuncts by filling gaps in traditional treatments and offering innovative options for individuals experiencing anxiety, depression, or stress (Jessen et al., 2025). Integrating NBIs into existing mental health interventions may enable practitioners to more effectively respond to the complex nature of mental health challenges, while also promoting resilience, enhancing accessibility, and fostering holistic well-being (Jessen et al., 2025).

Limitations to NBT

While evidence on ecotherapy suggests that experiences of nature are relatively universal across cultures, belief systems, and socio-demographic groups, there are limitations to these interventions (Isham et al., 2025). For example, the relationship between nature and health is shaped by cultural, spiritual, gender, ethnic, and class-based factors, which may influence the outcomes of ecotherapy (Isham et al., 2025). Practical barriers can also limit the effectiveness of ecotherapy interventions, including challenges with accessibility, physical or mental capabilities, and risks of injury (Isham et al., 2025). Ethical concerns also arise around maintaining privacy and emotional safety in open, outdoor settings in comparison to traditional indoor therapy (Isham et al., 2025). Hasbach (2013) similarly highlighted several possible ethical concerns in outdoor counseling, including maintaining confidentiality in public spaces, avoiding physical harm, and ensuring the competence in relation to the activities the counselor and/or clients engage in. In

addition, seasonal changes, weather conditions, and cultural norms influence the desirability and feasibility of participation in ecotherapy (Isham et al., 2025).

Although research in professional counseling increasingly highlights the positive effects of nature connections on health and well-being, there remains limited international literature on how to apply this knowledge ethically in clinical practice (Reese, 2016). With few resources available to guide the ethical integration of nature into therapy, counselors risk potential breaches of ethical codes designed to protect clients and the therapeutic relationship (Reese, 2016). Further research is needed to fully understand the mechanisms of change and effectiveness of NBIs, optimize their implementation, and examine their integration within broader mental health systems (Jessen et al., 2025).

Summary

Nature-based therapy (NBT), also known as ecotherapy, is an umbrella term for therapeutic approaches that integrate natural settings, activities, and processes to promote well-being, with a strong emphasis on psychological health. Rooted in theories such as biophilia, attention restoration theory, and stress reduction theory, NBT is delivered through diverse interventions, including horticultural therapy, green exercise, wilderness programs, forest therapy, blue space interventions, and school-based gardens. Evidence demonstrates that these practices can reduce stress and anxiety, enhance resilience, improve self-esteem, and strengthen social skills, with particular benefits for children and adolescents in educational contexts. While NBT is not intended to replace conventional therapies, research suggests it can serve as a valuable complement. However, barriers such as accessibility, cultural differences, seasonal changes, and ethical concerns around privacy and safety do present limitations to its wider application. Despite these challenges, NBT continues to show strong potential as an innovative

approach in supporting mental health, particularly when integrated into schools and broader mental health systems.

Conclusion

This chapter explored recent research to address the research question: How does integrating nature-based therapy interventions at school impact students with anxiety in a post-COVID-19 world? The chapter began by examining the impact of anxiety in youth, emphasizing its prevalence, how it differs from fear, the diagnostic process, underlying neurobiology, and associated behaviours. It then explored the COVID-19 pandemic as a mental health phenomenon and the impact it's had on anxiety in children and adolescents. Finally, nature-based therapy was presented as a therapeutic intervention to enhance well-being in students with anxiety. The research presented in this chapter provides a starting point for how school counsellors can introduce nature-based therapy interventions for students with anxiety or symptoms of anxiety in a post-COVID 19 world.

Chapter 3: Summary, Recommendations and Conclusions

Summary

Throughout chapters 1 and 2, the central problem that was explored in this capstone is the growing prevalence of anxiety among children and adolescents, particularly in the aftermath of the COVID-19 pandemic. Although anxiety disorders have long been among the most common mental health conditions in youth, it appears that the pandemic has heightened anxiety levels by disrupting education, peer relationships, and daily routines, leading to a doubling of reported rates of anxiety symptoms worldwide (Fortuna et al., 2023; Racine et al., 2021). If left untreated, anxiety not only impairs social and emotional development, but also hinders academic achievement and long-term well-being (Garcia & O'Neil, 2021; Jones et al., 2019). This problem is especially urgent in school environments, where anxiety frequently presents as absenteeism, poor concentration, social withdrawal, or disengagement from learning (Jones et al., 2019). From this problem, the research question emerged: How does integrating nature-based therapy interventions at school impact students with anxiety in a post-COVID-19 world? This question guided a review of literature that examined both the nature and prevalence of youth anxiety, particularly in the post-pandemic context, as well as the role of nature-based therapy (NBT) as a complementary mental health intervention.

The literature review revealed three key insights. First, anxiety in youth is multifactorial, influenced by biological, psychological, and social determinants, and often comorbid with other mental health challenges (Craske & Stein, 2016; Klein et al., 2023). Second, the COVID-19 pandemic substantially intensified rates of anxiety, disrupting normal development and increasing the urgency for accessible, school-based interventions (Abawi et al., 2020; Racine et

al., 2021). Third, research on NBT indicates that structured and unstructured engagement with natural environments, such as gardening, forest therapy, outdoor play, or even indoor integration of natural elements, can reduce stress, regulate emotions, enhance resilience, and improve social connection (Asah et al., 2012; Chawla et al., 2014; Dankiw et al., 2020; Dyg & Wistoft, 2018; Rueff & Reese, 2023). These interventions have demonstrated effectiveness in educational contexts, positioning schools as ideal environments for implementing NBT (Ambusaidi et al., 2019; Buru et al., 2019; Chawla et al., 2014).

Connecting these findings to practice, this capstone proposes that school counsellors implement nature-based interventions as part of their counselling toolkit to assist students experiencing anxiety in this post COVID-19 era. Practical applications may include incorporating nature into counselling sessions through mindful outdoor walks, integrating school gardens into wellness programming, advocating for naturalized schoolyards, and indoor integration of natural elements, such as indoor plants and greenery. While NBT is not a substitute for traditional therapy, its restorative benefits make it a powerful complement to established counselling approaches, offering school counsellors more ways to help promote resilience, reduce anxiety, and foster student well-being in a post-pandemic educational setting.

Recommendations

Having started my teaching career after the COVID-19 pandemic, my work as both a teacher and counsellor has been defined by the elevated anxiety present among students in educational settings. In both of these roles, I have observed the significant impact of anxiety on students' academic performance, social development, and personal well-being. My own experiences with severe anxiety as a child have made this topic especially meaningful and has motivated me to help students build coping strategies that improve their everyday well-being,

much as I once benefited from similar support. In my future counselling practice, I see great potential in incorporating nature-based therapy interventions as a complement to traditional school counselling. To support the well-being of students with anxiety in a school setting, I recommend implementing nature-based therapy interventions that include mindful outdoor walks, the integration of school gardens, the advocacy for naturalized schoolyards, and the incorporation of natural elements indoors, or indoor greening. A poster that introduces these four strategies for school counsellors and teachers, how they relate to the BC Core Competencies will be included in Appendix A.

1. Mindful outdoor walks

Taking students outside during counselling sessions rather than sitting inside an office is a simple way that nature-based therapy can be introduced in the school counselling setting. Whether or not your school has excess surrounding green space, simply walking and talking outside, or finding a comfortable place to sit outdoors can support students in reducing stress and anxiety. Pairing the outdoors with mindfulness strategies, like playing the “5 Things” game can help students be present and clear the mind and body. An initiative such as 'Walking Wednesdays' could be implemented in group counselling for students presenting with anxiety, during which the counsellor and students engage in longer neighbourhood walks.

2. School Community Gardens

Many schools I have worked at have implemented school gardens that the entire community helps maintain, fostering a sense of ownership and collaboration among students and staff. When integrated into counselling practice, these gardens provide students with anxiety a supportive environment that can help alleviate stress, strengthen

emotional regulation, and improve overall mood. Beyond their therapeutic value, school gardens also serve as outdoor classrooms where teachers can connect lessons to real-world learning, promote hands-on engagement, and encourage teamwork. In this way, school gardens not only benefit individual well-being but also contribute to a positive, inclusive, and holistic school culture.

3. Nature Playgrounds

Depending on many variables, including school budget and district policies, advocating for the construction of nature playgrounds can be an important step toward supporting student well-being. These natural spaces encourage exploration/imaginative play, help reduce stress, and provide opportunities for social connection in a non-directive environment. By integrating natural elements into play areas, schools can create inclusive spaces that foster both emotional regulation and positive peer relationships, particularly for students with anxiety.

4. Indoor Greening

Introducing plants into classrooms, counselling offices, and other school spaces is a simple yet effective way to incorporate nature-based therapy interventions and create calming environments that support student well-being. Indoor greenery not only provides sensory stimulation that reduces stress and anxiety, but also invites exploration and gives students a greater sense of control. In addition, teachers can use plants as living classrooms to enhance hands-on learning. The presence of green spaces has been shown to help boost productivity and lower stress, which will support students in their learning environments

Conclusions

Nature-based therapy (NBT) interventions offer schools an accessible and research-supported means of addressing the rising rates of anxiety among students in a post COVID-19 world. Evidence highlights that exposure to natural environments can reduce stress, regulate emotions, enhance resilience, and improve social connection. By incorporating strategies such as mindful outdoor walks, implementing school gardens and naturalized play areas, and incorporating indoor greenery in schools, counsellors and educators can create restorative spaces that complement traditional counselling approaches. These interventions not only promote calm and well-being in students, but enhance academic engagement and social connection, providing students with practical tools to manage anxiety in their everyday lives. For schools seeking sustainable, cost-effective, and holistic approaches to student mental health, nature-based therapy stands out as a powerful addition to existing supports.

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Appendix A




4 Ways to Integrate Ecotherapy in Schools

Mindful Outdoor Walks

Walking in nature can help reduce stress and anxiety, calm the nervous system, improve focus and attention, & supports emotional regulation

BC Core Competencies

- Communication - encourages respectful/reflective listening when walks include discussions/pair sharing
- Thinking - reflective thinking (notice their thoughts & feelings)
- Personal/Social - develop healthy coping strategies, builds mindfulness and awareness

Play “5 Things” Game

- 5 things you see
- 4 things you can touch
- 3 things you hear
- 2 things you smell
- 1 emotion you’re feeling

Teachers can use as a movement break or mindfulness exercise, & implement “Walking Wednesdays” where classes go on walks and engage with nature through lessons & activities

School Community Gardens

Gardening can help to reduce stress and anxiety, promotes emotional regulation, can boost moods, & strengthens connection through collaboration with others

BC Core Competencies

- Communication - collaboration, reflecting & sharing knowledge
- Thinking - planning, creative thinking & problem solving
- Personal/Social - builds responsibility, empathy, & self awareness

Teachers can use for “hands on” lessons in literacy, numeracy, science, health, First People’s Principles, & art





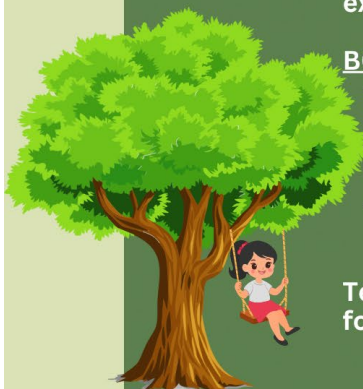
4 Ways to Integrate Ecotherapy in Schools

Nature Playgrounds

Unstructured play reduces stress and anxiety, natural settings boost mood and encourage creativity, invites exploration and adventurous play

BC Core Competencies

- Communication - collaboration, cooperation & conflict resolution
- Thinking - problem solving, creative thinking & problem solving
- Personal/Social - builds responsibility, empathy, & self regulation



Teachers can use natural play areas as outdoor classrooms for physical education and hands on learning activities

Indoor Greening

Ornamental plants in schools help reduce stress and anxiety, create a sense of control in students, & exposes them to sensory stimulation

BC Core Competencies

- Communication - observing plant and its visual cues, sharing knowledge of care with others
- Thinking - creates a sense of calm, encourages mindfulness and reflection
- Personal/Social - meaningful opportunity to connect with nature, builds awareness and caring for living things

Teachers can use indoor greenery to create living classrooms that can be integrated into lessons. Indoor greenspaces are linked with increased productivity and lower levels of stress

