

**AN INFORMATION MANUAL TO SUPPORT ANXIETY-FOCUSED MUSIC
INTERVENTIONS**

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Abstract

This Final Project establishes a manual aimed at providing educators and parents with insight into the experience of childhood anxiety, the efficacy of music for reducing anxiety in children, as well as effective methods and recommended practices for music activity implementation. Given the detrimental effects children with anxiety may experience and the potential for music to reduce anxiety or to help cope with anxiety provoking situations, compiling a compendium of information on current musical interventions and best practices may enable caregivers and families to access anxiety reducing activities best suited to supporting some children. The literature review supports the project manual, the efficacy of music-based interventions for reducing anxiety, and reviews best practices involved in the administration of music-based interventions.

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Table of Contents

Abstract.....	iii
Acknowledgements.....	iv
Chapter I: Introduction	1
Overview	1
Rationale	2
Childhood Anxiety.....	2
Why Music for Anxiety Reduction?	3
Significance of this Project	6
Chapter II: Literature Review.....	8
The Neurobiology and Physiology of Anxiety	8
The Stress Response System: Neurobiology	8
The Stress Response System: Physiology.....	11
Stressors.....	12
Physiological and Behavioural Outcomes Associated with Anxiety.....	12
The Impact of Chronic versus Adaptive Stress for Children	12
Developmental Plasticity.....	14
Behavioural Outcomes.....	15
Interventions to Reduce Anxiety	16
Typical Interventions	16
Advantages of Musical Interventions.....	17
In Combination with Other Interventions.....	18
The Use of Music to Reduce Anxiety	18
Theoretical Background.....	18

Music Interventions and Anxiety	20
The Neurobiological and Physiological Impact of Music Interventions	21
Neurobiological Effects.....	21
Physiological Effects	22
Music Interventions Support Coping Strategies & Behaviours.....	24
Enhancing the Efficacy of Music Interventions for Anxiety	25
Developmentally Appropriate Interventions.....	25
Musical Qualities Associated with Anxiety Reduction	26
Characteristics of Anxiety-Reducing Music Interventions	28
For Whom are Musical Interventions Particularly Effective?	36
Precautions with Musical Interventions	37
Examples of Interventions for Anxiety Reduction	38
School-Based Music Interventions	38
Guided Imagery and Music.....	41
Recreational and Community-Based Music.....	41
Creating Personalized Music Playlists	42
Music Therapy	42
Summary	43
Chapter III: Methodology	46
Method	46
Manual Creation	47
Chapter IV: Manual Development.....	48
Overview of the Final Project Manual	48
Manual Objective.....	48

Overview of the Manual	48
Chapter V: Review and Discussion	51
Review	51
Discussion.....	51
Implications of the Project	51
Intended Readership	52
Considerations	52
Accessibility	52
Readability	52
Critical Review and Future Directions	53
Strengths.....	53
Limitations	54
Recommendations for Future Research.....	56
References:	57
Appendix: The Use of Music to Reduce Childhood Anxiety: An Information Manual for Caregivers and Educators	69

Chapter I: Introduction

Overview

The purpose of this final project has been to develop a manual for educators, caregivers, and parents, providing an accessible overview of the impact music can have on children's anxiety levels, as well as strategies for implementing effective musical interventions within a variety of settings. In creating *The Use of Music to Reduce Childhood Anxiety: An Information Manual for Caregivers and Educators*, relevant literature and research was synthesized and distilled to create a document accessible to readers from a variety of backgrounds. The ultimate aim of this document is to provide individuals working with children additional means of ameliorating the negative impact of anxiety on developmental processes.

The rationales for the use of musical interventions to reduce childhood anxiety and for the creation of this manual are offered. A review of the literature and research relevant to this topic area is presented, touching on the neurobiology of the stress response system, the impact of childhood anxiety, predominant treatment methods for childhood anxiety, and the advantages of music-based interventions. After which an overview of the efficacy and impact of music interventions on childhood anxiety is presented, including a review of the characteristics that impact the efficacy of musical interventions for anxiety, as well as music-based intervention options. Following this, a description of the methodology involved in reviewing the literature and the creation of the manual is provided, outlining the methods involved in information collection. A discussion regarding the significance and intended use of the manual is provided, including strengths and limitations of the literature discussed, as well as directions for future research. The manual, *The Use of Music to Reduce Childhood Anxiety: An Information Manual for Caregivers and Educators*, is presented in the index of this final project.

Rationale

Childhood Anxiety

“Anxiety is a multisystem response to a perceived threat or danger” (Mitchell, 2018, p. 328), involving physical and psychological processes. It can be a response to something in a person’s external environment or to internal biological or psychological processes (Mitchell, 2018). Anxiety may be triggered by one’s present circumstances or the memory of past experiences (Mitchell, 2018). Some stressors may be fairly universal in nature, such as sudden loud noises, while others are particular to an individual’s experiences and memories, for instance loud noises produced by a figure that one fears (Thompson, 2014). Anxiety instigates a multi-system response that involves focus on the perceived threat, unconscious physiological responses aimed at preparing one for self-defense, and emotional arousal (Thompson, 2014). The persistent experience of anxiety can negatively impact an individual’s adaptive functioning and development (Thompson, Robertson, Curtis, & Frick, 2013).

Experiences and circumstances inherent in childhood include a number of stressors and stressful situations. From striving for social inclusion to physical development to academic success, the lives of children include a number of situations that can provoke a stress response. It is apparent that school-based experiences can have a significant impact on a child’s self-perception, emotional wellbeing, and health related behaviours (Inchley et al., 2016). For some individuals growing up in disadvantaged circumstances, socio-economic factors can negatively impact their overall health and wellbeing (Foraker et al., 2011). For others, cultural differences, racism, and acculturation can be a source of stress and anxiety (Arthur & Collins, 2010).

For children, anxiety can have a negative impact on academic performance (Mychailyszyn, Mendez, & Kendall, 2010), problem solving (Wilson & Hughes, 2011), self-

confidence, and social interactions (Fisak, Richard, & Mann, 2011). Further, anxiety can be mistaken for aggression or hyperactivity (Thompson et al., 2013), which may disrupt learning or social environments. The development of school-age children is responsive to their environment and experiences; meaning they are, therefore, particularly prone to the negative impact of chronic or intense stress and anxiety (Thompson, 2014). The presence of pronounced symptoms of anxiety in childhood are predictive of risk for problematic anxiety later in life (Broeren, Muris, Diamantopoulou, & Baker, 2013). As such, activities and interventions that help children maintain lower levels of anxiety may enhance their quality of life and promote adaptive development.

Why Music for Anxiety Reduction?

Currently, the go-to treatment for problematic anxiety is cognitive behavioural therapy (CBT) (Lanouette & Stein, 2010), which involves one-on-one and/ or group-based psychotherapeutic treatment aimed at restructuring problematic cognitions (such as excessive worry), promoting awareness of one's instinctive cognitive, emotional, and behavioural reactions to stress, and enhancing effective coping strategies (Leahy, Holland, & McGinn, 2012). Other notable intervention strategies include: mindfulness-based activities (such as meditation) (Semple, Reid, & Miller, 2005), relaxation training (Nassau, 2007), and individual counselling (Erford, Kress, Giguere, Cieri, & Erford, 2015).

However, it is apparent that a number of individuals experiencing psychosocial difficulties do not reach out for psychotherapeutic support (Corrigan, 2004). Notable barriers to pursuing support are the stigmas associated with mental illness and pursuing psychotherapy (Vogel, Wade, & Hacklet, 2007). Many young people may feel too embarrassed to reach out for support, including accessing in-school counselling services (Gulliver, Griffiths, & Christensen,

2010). Thus, although effective treatment and services may be available, children that require or could benefit from such services may not necessarily access them. For some individuals, there may be cultural barriers, including a sense of shame, to garnering psychological services (Tuliao, Velasquez, Bello, & Pinson, 2016). Individuals from low socio-economic backgrounds may face barriers to garnering services, and thus are often less likely to attain psychological services (Hodgkinson, Godoy, Beers, & Lewin, 2017). A barrier for individuals in rural areas can be the long distances they are required to commute in order to access services (Hodgkins et al., 2017). Children with less pronounced symptoms of anxiety may be more likely to go unnoticed by caregivers and educators (Buchler, 2013), and thus may not receive beneficial services. Finally, the services previously described are considered treatments for problematic anxiety. The use of preventive measures may help children avoid reaching a state of distress or discomfort, in which treatment services are necessary. Therefore, it is apparent that there is a need for an effective intervention method that avoids social stigma, children are confident and comfortable using independently or in groups, and that may be employed as a preventive and/ or early intervention technique.

One such intervention method is the use of music, including music listening and specific musical interventions aimed at reducing anxiety. For many people, music offers enjoyable stimuli they can connect with in a meaningful way across a variety of situations and for a variety of purposes. However, beyond general enjoyment, music can promote a sense of familiarity, support the experience of positive feelings, and reduce negative emotional experiences across a variety of settings (Nilsson, 2008). In particular, music has been shown to offer relief from symptoms and reports of anxiety in medical settings (Chanda and Levitin, 2013), which may include a number of stressors, and thus, in which the subjective experience of anxiety may be

high. It may also provide a distraction from rumination and other stress-elevating thoughts (Chanda and Levitin, 2013). Further, the use of music can be a cost-effective, non-invasive, and non-time consuming means of reducing anxiety (Korhan, Khorshid, & Uyar, 2011; Nilsson, 2008).

Given the ubiquity of technology in our modern world and through it, ease of access to music, individuals are increasingly capable of using personal music listening devices to help modulate their mood; and children are no exception. It is apparent that many children already have an existing understanding and comfortability with the use of music to regulate their emotional state (Chen, Mishra, & Chen, 2019; Saarikallio, & Erkkilä, 2007). Additionally, given their developmental stage, school-age children may respond better to nonverbal techniques, such as musical interventions, rather than talk-based therapy (Gladding, 2005). The use of music as an intervention for childhood anxiety can support coping efforts (Barry, O'Callaghan, Wheeler, and Grocke, 2010).

To summarize, anxiety can have significant negative impacts on current functioning as well as the long-term development of children. While there are effective treatments currently available, they are associated with social stigma and are, therefore, not accessed by all those who may benefit from them. Further, these treatment options may predominantly serve children with pronounced symptoms of anxiety, failing to treat those for whom anxiety is moderate or less apparent. Therefore, there is a need for an effective means of reducing childhood anxiety that avoids stigma, may be accessed by a broad range of children, and is affordable. The use of music has proven effective for reducing childhood anxiety, is cost effective and relatively easy to employ, may be well suited as an intervention to the developmental milestones of school-age children, and is pleasurable and familiar to many children.

Significance of this Project

Given the detrimental effects children with feelings of anxiety may experience and the potential for music to reduce anxiety or to help cope with anxiety provoking situations, compiling a compendium of information on current musical interventions and best practices may enable caregivers and families to access anxiety reducing activities best suited to supporting some children.

Given that anxiety can manifest in oppositional behaviours, as well as difficulty in social and academic situations, caregivers and professionals working with children who report feelings of anxiety will be able to implement these methods successfully. Following consistent information regarding anxiety reducing music interventions promotes consistent practices amongst caregivers and professionals. Individuals subsequently make informed decisions as a team to program effectively, resulting in a calmer environment overall for the child.

As will be reviewed in the next chapter, there is substantial research supporting the efficacy of music for reducing subjective reports, as well as physiological symptoms of anxiety in children. However, it is apparent that the predominance of literature pertaining to the relationship between music and childhood anxiety centres on the use of musical interventions within medical settings (Linnemann, Ditzen, Strahler, Doerr, & Nater, 2015). While literature regarding musical interventions aimed at reducing childhood anxiety exists, articles and studies are largely disparate focusing on particular programs, rather than providing general directions and resources for readers. Thus, there is a gap in the literature regarding a general overview of the relationship between musical interventions and childhood anxiety. Given the need for interventions and resources aimed at reducing childhood anxiety, discussed above, it is apparent

that providing an outline of this topic area, including intervention options and recommendations for promoting their efficacy, will benefit caregiver, educators, and communities at large.

Chapter II: Literature Review

The purpose of this final project is to create a manual to provide educators and parents with insight into the efficacy of music in reducing anxiety in children, recommended practices and effective methods for implementation. A review of the literature provides an overview of relevant research findings, including the neurobiology and physiology involved in stress-response, the impact of chronic versus adaptive anxiety and the potential impact on children's adaptive functioning. A theoretical explanation of the relationship between music and anxiety, the impact of musical engagement in reducing measurable anxiety levels and physiological responses is examined. Developmental milestones and competencies, including their potential impact on musical engagement, are reviewed. Finally, best practices involved in the administration of music, including a review of school-based interventions are outlined.

The Neurobiology and Physiology of Anxiety

The experience of anxiety is multifaceted, encompassing varying emotional states such as fear, panic, and worry in addition to physiological responses, including elevated heart rate, sweaty palms, and muscle tension.

The Stress Response System: Neurobiology

Behind the sensations associated with the experience of anxiety, is a complex and interconnected system of neurobiological processes. One's "stress response system" includes activity in the limbic system, the hypothalamic-pituitary-adrenal (HPA) axis, and the autonomic nervous system (ANS) (Guilliams & Edwards, 2010; Kabat-Zinn, 2009).

The limbic system refers to a group of brain structures, including the amygdala and hippocampus, which processes and integrates body-based affective and socio-emotional information, as well as higher-order cognitions from one's cortex (Hill, 2015). The amygdala, in

particular, is key to the experience of anxiety, as it serves a role in threat recognition and emotional processing (Martin, Ressler, Binder, & Nemeroff, 2009). The amygdala perceives and responds to stressors, activating fear responses faster than one's capacity for conscious perception of danger or lack thereof (Hill, 2015). Essentially, the amygdala interprets internal and external information sending an alarm signal to the hypothalamus when danger is perceived. The hippocampus registers the emotional significance of events and supports the recording, as well as retrieval of memories (Hill, 2015). Thus, information that is deemed stressful will be recorded as such by the hippocampus, increasing the sensitivity of one's amygdala to such internal or external cues going forward. Alternatively, cues related to memories of safety may inform signals to the hypothalamus that indicate the absence of threat (Hill, 2015). Together, the limbic system appraises and responds to emotional information, informing the hypothalamus as to the presence of threats or safety cues (Martin et al., 2009).

The hypothalamus serves as the so-called "command centre" of the brain's stress-response system, instigating or inhibiting cascading neurobiological stress-response processes via the pituitary and adrenal glands (Hill, 2015). Together, these systems make up the HPA axis, which is the lynchpin to exciting or inhibiting the physiological responses involved in the experience of anxiety. In response to stressors and subsequent stimulation via the limbic system, the hypothalamus produces corticotropin-releasing hormone (CRH), which triggers secretion of adrenocorticotrophic hormone (ACTH) in the pituitary gland (Kallen et al., 2008). ACTH stimulates the release of the stress hormones cortisol and epinephrine from the adrenal glands (Kallen et al., 2008; Shonkoff et al., 2011). The circulation of these hormones throughout the body, prepare one's cardiovascular and muscular systems for activity (Kabat-Zinn, 2009). Peak cortisol levels are usually reached within 30 minutes of the onset of a stressor, before returning

to basal levels within 60-90 minutes following the cessation of the stressor (Spencer & Deak, 2017). Thus, stress hormones linger in one's system for an extended period beyond one's actual stress-provoking experience. The HPA axis is regulated by three brain structures: the hippocampus, amygdala, and the prefrontal cortex (Marin et al., 2011). As discussed, the amygdala is involved in activation of the HPA axis. The hippocampus, as well the prefrontal cortex, which is responsible for executive functions such as decision-making and regulating mood and behaviour, have inhibitory control over the HPA axis (Martin et al., 2009).

Beyond stimulating the release of mobilizing hormones, the hypothalamus communicates with the ANS, which controls involuntary physiological functions, including the cardiovascular system (Hill, 2015). The ANS has two dimensions, the sympathetic nervous system (SNS), which serves an excitatory role in triggering one's physiological systems; and the parasympathetic nervous system (PNS), which calms the body following an excitatory response (Hill, 2015). When responding to potentially stressful triggers, the HPA axis stimulates the sympathetic branch of the ANS, producing states of hyper-arousal (fight or flight) or hypo-arousal (freezing in place) (Hill, 2015). Inhibitory control of the HPA axis stimulates the parasympathetic branch of the ANS, down-regulating one's physiological arousal (Kabat-Zinn, 2009). Essentially, the SNS and PNS act as the gas and brake pedals, respectively, for the physiological arousal involved in stress response. Activation of each branch of the ANS is mutually exclusive, meaning that when the SNS is activated, the PNS is deactivated, and vice versa (Hill, 2015). Normal stress-reactivity involves fluid oscillation between these systems, as one's physiological systems are up and down-regulated to accommodate various interactions throughout the day. Prolonged or over-reactivity of one's SNS, associated with chronic stress exposure, can result in difficulties (Shonkoff et al., 2011).

The neurobiological “stress response” system, which produces states of anxiety, can be summarized as such: socio-emotional, cognitive, and somatically-based information is initially processed by the limbic system, which stimulates the HPA axis and sympathetic or parasympathetic responses in the ANS to produce up or down regulation of one’s physiological systems (Hill, 2015).

The Stress Response System: Physiology

As previously described, the involuntary activity of one’s vital organs is regulated by the ANS. When responding to stress, stimulation of the SNS branch of the ANS instigates an increase in heart rate, blood pressure, respiratory rate, and sweat gland activity (Hoehn-Saric & McLeod, 2000; Thompson, 2014). The increase in rate and strength of heart contractions to nearly five times their usual, delivers more blood and energy to muscle groups in one’s limbs to support intense activity (Kabat-Zinn, 2009). To facilitate increased blood-flow to muscle groups involved in movement, blood-flow to one’s digestive system is diverted, effectively shutting down digestion and causing the “butterfly” sensations in one’s stomach (Kabat-Zinn, 2009). As a result of these processes, the individual will experience increased muscle tension, palpitations, and increased respiratory rate (Hoehn-Saric, 2007).

Increased activity in one’s stress response system is associated with perceptual changes, including increased hyper-vigilance for threats, increased emotional arousal, and hyper-reactivity and defensiveness (Kabat-Zinn, 2009; Thompson, 2014). The increased arousal associated with the experience of anxiety can contribute to difficulties in concentration and focus, as well as difficulties with sleep (Hoehn-Saric, 2007).

Stressors

The activity associated with the stress-response system can be initiated by the presence of both internal and external cues. Threats to one's safety present in the environment, such as predatory animals, will instigate an individual's fight, flight, or freeze responses. However, it is important to note that non-physical stressors, including a variety of emotional states (fear, anxiety, embarrassment, guilt) can trigger significant activity in one's stress-response system (Guilliam & Edwards, 2010). Some stress-provoking cues may be universal in nature, such as sudden loud noises, while others are specific to one's particular life experiences, such as loud noises produced by a figure that one fears (Thompson, 2014). The key stressor characteristics that determine the intensity of the stress-response system activity are their unpredictability, the threat they pose, novelty, and the associated sense of losing control (Guilliam & Edwards, 2010). Individual characteristics such as age, gender, genetics, temperament, and early developmental experiences can also impact the level of one's stress response (Guilliam & Edwards, 2010).

Physiological and Behavioural Outcomes Associated with Anxiety

The Impact of Chronic versus Adaptive Stress for Children

The activation of one's stress-response system is a normal process, enabling increases in stress hormones and ANS activity that promote adaptive responses to circumstances and experiences in one's life, essential for one's survival (Shonkoff et al., 2011). As part of a healthy developmental trajectory, children need experiences in which their stress-response system becomes activated, so as to facilitate the development of their self-regulating capacities (Thompson, 2014).

A positive stress response occurs when one experiences a reasonable state of stress for a brief period (Shonkoff et al., 2011). The accessibility of responsive caregivers is key to positive

stress experiences, as the child's coping efforts can be supported, promoting a decrease in their stress response (Shonkoff et al., 2011). Spending time with loved ones can help release the hormone oxytocin, a natural stress reliever (Taylor et al., 2000). Positive physical contact, such as hugging, can communicate a sense of support, which has been shown to have a stress reducing effect (Cohen, Janicki-Deverts, Turner, & Doyle, 2015). Additionally, breathing exercises, such as deep breaths or focused counting of breaths, can enable caregivers to provide effective stress-relieving support to anxious children (Wilson & Lyons, 2013). Coping cards, prompting self-regulation strategies and reminding children of positive self-talk can support anxiety reduction (Wilson & Lyons, 2013). Finally, caregivers can also support anxiety reduction and self-regulation efforts through promoting positive environments that are perceived by children as safe, orderly, and predictable (Syeda & Andrews, 2015). This may mean tidying and organizing living spaces or classrooms, creating a day-to-day routine and/ or schedule of activities, and ensuring that these environments encompass limited stressful sensory sources (loud noises, flashing lights, etc.). Environmental support reduces the risk that stress responses become excessive and/ or overwhelming, reducing the long-term risk for learning or health consequences (Shonkoff et al., 2011; Thompson, 2014). The experience of anxiety within a context of support can provide important developmental opportunities for children to learn effective coping strategies from experienced models and to practice adaptive responses to stressful experiences (Shonkoff et al., 2011).

In contrast to such development promoting experiences, for some individuals hyper-arousal of their stress-response system can become a consistent part of their life (Kabat-Zinn, 2009). As a result of persistent environmental stressors, individual characteristics, and/ or lack of protective factors, individuals may experience extended, chronic states of anxiety. Prolonged

activation of the stress-response system and resulting hormones in the absence of protective factors can be harmful, potentially resulting in physiological dysregulations that can lead to later behavioural and learning impairment (Shonkoff et al., 2011). Further, chronic stress has been linked to a number of negative long-term health outcomes (Chrousos, 2009).

Through their longitudinal study, Blair, Raver, Granger, Mills-Koonce, and Hibel (2011) exhibited that children living with chronic stressors (poor parenting or financial stress) display disruptions in HPA axis activity, fostering changes to typical neurobiological responses to stress. Significant stress during childhood can promote overdevelopment and hyper-responsivity of one's amygdala, resulting in increased anxiety (Shonkoff et al., 2011). Chronic stress diminishes the capacity of the hippocampus to regulate the HPA axis (Shonkoff et al., 2011).

The hormone dehydroepiandrosterone (DHEA), which is produced in the adrenal cortex, serves to prevent over inflammation of one's neural systems, in particular, protecting the hippocampus from damage as a result of exposure to cortisol (Guilliams & Edward, 2010). Exposure to chronic stress leads to a reduction in DHEA levels, which may threaten the integrity of some neural systems (Guilliam & Edwards, 2010). Further, stress increases the immune system's sensitivity to inflammatory agents (cytokines), increasing the likelihood of inflammatory responses (Miller, Chen, & Parker, 2011). Thus, chronic activation of the HPA axis suppresses one's immune functioning (Thompson, 2014). Beyond the developmental toll associated with chronic stress, adults with an history of adverse childhood experiences may be more likely to develop anxiety disorders (Faravelli et al., 2012).

Developmental Plasticity

Plasticity refers to one's ability to adapt and develop in response to experiences (Kolb, Gibb, & Robinson, 2003). One's capacity for neurobiological and behavioural plasticity is

highest during the early years of their life, supporting early growth and development adaptive to their environment, and progressively declining thereafter with age (Thompson, 2014). A reason that anxiety in children may be particularly detrimental, is that their potential for plasticity makes them particularly vulnerable to the maladaptive long-term effects associated with neurobiological and behavioural changes caused by chronic stress (Thompson, 2014). However, by the same principle, childhood may be a prime time to target anxiety reduction and to build self-regulating skills, as one's neurobiological and behavioural systems are not hardwired, and thus, may be more pliable to adaptive change (Thompson, 2014). Essentially, efforts toward building coping mechanisms and self-regulation may be most impactful at younger ages, due to the neurobiological and behavioural plasticity associated with this period in one's development.

Behavioural Outcomes

The impact of childhood anxiety on functioning is influenced by the nature of the stress children experience and, therefore, may result in a number of behavioural outcomes (Thompson, 2014). Behavioural patterns typical of chronic anxiety and stress include: hyper-vigilance, difficulties with emotional self-regulation, difficulty concentrating, and poor social functioning (Blair & Raver, 2012). Some children respond to stressors through internalizing their anxiety, producing shy, inhibited states of being that lead to their anxiety often going unnoticed (Buchler, 2013). Others externalize their anxiety, leading to hyperactivity and other conduct difficulties, which may cause disruptions in their environments (Buchler, 2013). In either case, the behavioural patterns associated with chronic anxiety have the potential to negatively impact both a child's academic performance, as well as their social interactions (Thompson, 2014). Helping children to develop skills for coping with everyday stressors can support prevention efforts with regard to the behavioural symptoms described above (van de Weijer-Bergsma et al., 2012).

Interventions to Reduce Anxiety

Typical Interventions

There exist a number of interventions that have proven effective for reducing anxiety in children. In-school group-based CBT programs, comprised of psychoeducation, relaxation skills training, cognitive restructuring, problem solving work, and graduated in-vivo exposure facilitated by school mental health professionals have been shown to be effective in reducing anxiety (Herzig-Anderson, Colognori, Fox, Stewart, & Warner, 2012). Mindfulness-based interventions, such as mindfulness colouring activities (Carsley, Heath, & Fajnerova, 2015), as well as mindful breath work, walking, and sensory-based meditations have proven effective in reducing anxiety (Semple, Reid, & Miller, 2005). Progressive muscle relaxation (PMR), which involves a sequential tensing and releasing of different muscles throughout one's body, can be effective in providing both a reduction of the physiological symptoms of anxiety, while providing a distraction from anxious thoughts and emotions (Nassau, 2007). Through their study, Larson, Ramahi, Conn, Estes, and Ghibellini (2010) exhibited that PMR training over a relatively short period (5-weeks) can support anxiety reduction in grade-school students. Finally, the efficacy of individual counselling has been exhibited for reducing anxiety in youth (Erford et al., 2015).

Short-term pharmacotherapy treatment, for instance through use of selective serotonin reuptake inhibitors (SSRI) or serotonin and norepinephrine reuptake inhibitors (SNRI), has proven effective as a short-term treatment for children with anxiety disorders (Ipser, Stein, Hawkrige, & Hoppe, 2010). It is important to note that pharmacotherapy is used in the treatment of clinical anxiety, rather than non-clinical presentation.

However, it is apparent that individuals experiencing psychosocial difficulties do not always access psychotherapeutic support (Corrigan, 2004). This may be the result of a number of barriers that exist to accessing services. Notable barriers to pursuing support include: the stigmas associated with mental health and psychotherapy (Gulliver et al., 2010; Vogel et al., 2007), culturally based shame associated with mental health services (Tuliao et al., 2016), socio-economic barriers (Hodgkins et al., 2017), and barriers associated with rural and remote centres (Hodgkins et al., 2017). Further, children who do not endorse or exhibit pronounced symptoms of anxiety may go unnoticed by caregivers and educators (Buchler, 2013), and thus go untreated. The interventions previously described are considered treatments for problematic anxiety. The use of preventive measures may help children avoid reaching a state of distress or discomfort, in which such services are necessary.

It is apparent that there is a need for an effective intervention method that avoids social stigma and may be employed as a preventive and/ or early intervention technique useful to those whose experiences with anxiety may otherwise go unnoticed and untreated.

Advantages of Musical Interventions

The use of music for anxiety offers a number of potential advantages over these methods, including familiarity and experience with its affect regulating properties among youth (Chen et al., 2019; Saarikallio, & Erkkilä, 2007). Gladding (2005) contends that, given their limited vocabularies and tendency to express emotions through play, youth often respond better to nonverbal techniques rather than talk therapy. Further, the use of music-based interventions to reduce anxiety can be non-invasive, inexpensive, and non-time consuming (Korhan et al., 2011).

In Combination with Other Interventions

Music can be used effectively in combination with, and thereby supporting, other forms of treatment for anxiety. There is research supporting the use of music within group-based CBT counselling programs (Ugwuanyi et al., 2020). Ugwuanyi et al. (2020) organized a 12-week group-counselling program, in which music was infused into nearly every aspect of CBT programming, with an aim to reduce test anxiety in high school students. The instruments and interventions used were geared toward non-musicians, so that all could participate. CBT techniques such as cognitive restructuring, cognitive challenges, reframing, and mood monitoring were used in combination with active music listening and songwriting. The results showed that the use of CBT-music interventions promoted a significant reduction in physics test anxiety among high-school students and were maintained in follow-up assessment several months later (Ugwuanyi et al., 2020). Some suggest that music can help counsellors in emotional externalization, reframing ideas, and deepening experiences (Situmorang, Mulawarman, & Wibowo, 2018). Beyond formal counselling, music has been shown to effectively support and perhaps enhance mindfulness-based meditation and other activities (Hernandez-Ruiz & Dvorak, 2020). Research shows that the use of music in combination with Progressive Muscle Relaxation can be an effective means of reducing anxiety (Zhou et al., 2015).

The Use of Music to Reduce Anxiety

Theoretical Background

A common theoretical foundation cited to explain the efficacy of music in reducing anxiety is that music serves as a distractor, diverting one's attention away from anxiety provoking stimuli and providing something more pleasant and potentially familiar on which to concentrate (Jadavji-Mithani et al., 2015; Lee, Chao, Yiin, Chian, & Chao, 2011; Nguyen et al.,

2010). Others suggest that the pleasurable emotional states produced by music (Cooke, Chaboyer, Schluter, & Hiratos, 2005) or its ability to bring up autobiographical memories may underlie its ability to reduce anxiety (Panteleeva, Ceschi, Glowinski, Courvoisier, & Grandjean, 2018). As of now, there is not a definitive understanding of the neurobiological processes underlying these positive effects (Linnemann, Strahler, & Nater, 2016). However, this theoretical explanation is in line with the function of the stress response system previously described. By diverting attentional focus away from threatening stimuli, thereby reducing the triggering effect on one's amygdala, activation of the stress response system may be reduced. The presentation of pleasurable or relaxing musical stimuli may further support self-regulatory efforts, presenting one with cues indicating safety and pleasure, thus contradicting signals of stress. Koelsch (2014) found through neuroimaging work that music-evoked emotions are associated with activity in one's core emotional networks, including the hippocampus and the amygdala. Given their prominence in regulating the stress response system, it is apparent that music may, in fact, influence neurobiological systems involved in stress.

In addition to the above, Chanda and Levitin (2013) propose that successful use of music to reduce stress and promote regulated states can, in part, be attributed to the capacity of music to induce brainstem responses. Brainstem neurons typically fire sympathetically, exhibiting synchrony with the tempo of music (Griffiths, Uppenkamp, Johnsrude, Josephs, & Patterson, 2001). This, in effect, produces increased cardiovascular activity when stimulating music is played and decreased activity when relaxing music is played (Lundqvist, Carlsson, Hilmersson, & Juslin, 2009). As brainstem activity also impacts sensory and motor function, music may influence neurotransmissions at the root of cardiovascular and motor function (Chanda & Levitin, 2013).

Music Interventions and Anxiety

In medical settings, music has been shown to reduce patient anxiety prior to medical procedures (Lee et al., 2011), as well as during (Hsu, Chen, & Hsieh, 2016; Jadavji-Mithani, Venkatraghavan, & Bernstein, 2015) and after medical procedures (Allred, Byers, & Sole, 2010; Liu & Petrini, 2015). De Witte et al. (2020) conducted a meta-analysis of 47 studies to assess the relationship between music interventions for anxiety and a reduction of physiological, as well as psychological markers related to stress. The results of the meta-analysis exhibited that music interventions have a significant effect on stress levels (de Witte et al., 2020).

In a particularly representative study, Chlan et al. (2013) found a connection between music listening and reduced standardized anxiety measure score. In their randomized clinical trial, researchers provided collections of CDs to intensive care unit patients receiving mechanical ventilator support to be played whenever desired, while providing others with only noise-cancelling headphones. Chlan et al. (2013) not only found reduced anxiety scores in patients receiving music, they discovered that these patients exhibited a reduction in sedative use over the period during which they had access to music. Further, because participants receiving music had significantly lower anxiety scores than the headphone group, the results suggest that the impact of music listening extends beyond simply blocking out anxiety provoking hospital noises. Similar results have been exhibited with children, as researchers have found music to be effective at reducing anxiety in hospitalized children (Nguyen, Nillson, Hellström, & Bengtson, 2010), as well as those undergoing medical procedures (Kazemi, Kazemi, Ghazimoghaddam, Besharat, & Kashani, 2012). Given the efficacy of music in reducing anxiety within potentially stress provoking medical environments, it is apparent that it may also be an effective means of reducing anxiety in other settings too.

In fact, Linnemann et al. (2015), found that music can be an effective means of reducing stress and anxiety in everyday situations. By tracking the self-reported musical listening patterns and perceived stress levels throughout the day during a five-day period of normal stress, as well as a five-day period of increased stress (exam week), researchers found that music listening reduced participants' subjective stress levels (Linnemann et al., 2015). These results were further bolstered by a subsequent study, in which Linnemann, Wenzel, Grammes, Kubiak, and Nater (2018) found that participants reported lower subjective stress levels when listening to music via their iPods or smartphones throughout their daily-life. These results are in line with research by Juslin, Liljeström, Västfjäll, Barradas, and Silva (2008) who exhibited that music listening increased self-reported feelings of calmness. Taken together, the results of these studies suggest that the stress-reducing effects of music listening extend beyond laboratory and clinical settings (Linnemann et al., 2015), enabling individuals to access the calming effects of music when experiencing everyday stressors.

The Neurobiological and Physiological Impact of Music Interventions

Neurobiological Effects

As previously discussed, the stress response system, active during anxious states, centers on the activation of the HPA axis. An end product of stress induced HPA axis activation is the production of the hormone cortisol. As such, HPA axis activity, and by extension the activation of one's stress-response system, can be measured by assessing cortisol levels (Hellhammer, Wüst, & Kudielka, 2009). Activation of the ANS, another prominent component of the stress response system, can be assessed through measuring the salivary enzyme alpha-amylase (Nater & Rohleder, 2009). Through their study, Linnemann et al. (2015) exhibited that music listening can promote a reduction in both salivary cortisol and alpha-amylase, thus reflecting a reduction

in HPA axis, as well as ANS activity. Similarly, Thoma et al. (2013) found that music listening promoted expedited autonomic recovery from stress. Francourt, Ockelford, and Belai (2014), through a systematic review of the results of 63 studies, found significant evidence to support a similar conclusion regarding the effect of music on the neurobiological and physiological symptoms typical of anxiety and stress. In particular, Francourt et al. (2014) found the results of 29 studies demonstrated a decrease in cortisol levels as a result of musical interventions, bolstering the argument that music listening promotes a stress reduction response in the HPA axis. The researchers also found that a number of studies produced results that indicated a decrease in epinephrine levels occurs in response to music listening interventions (Francourt et al., 2014), which may indicate down-regulation of the adrenal axis. Conrad et al. (2007) found that listening to relaxing music may promote an increase in the release of pituitary growth hormone, through which activity of the HPA axis is modulated. Additionally, increased levels of this growth hormone resulted in decreased levels of inflammatory cytokines, thereby decreasing part of the inflammatory response associated with the stress response (Conrad et al., 2007). Taken together, the results of these studies suggest that music listening can promote a reduction in the HPA axis activity typically associated with anxiety and stress. Further, music listening may promote neurobiological processes involved in the recovery from one's stress response.

Physiological Effects

Anxious states are associated with a number of physiological symptoms, including: increased heart rate, blood pressure, respiratory rate, and sweat gland activity. The results of numerous studies support a connection between music listening and a change in physiological symptoms associated with relaxation or deactivation of one's stress response. Specifically, a connection between music listening and lowered diastolic blood pressure (Ferrer, 2007), reduced

respiratory rates (Nguyen et al., 2010), and increased blood oxygen levels (Longhi & Pickett, 2008) has been exhibited. Additionally, the results of Francourt et al.'s (2014) review, suggest that a number of studies exhibited similar decreases in blood pressure and respiratory rate in response to relaxing music. Beyond these promising results, there is discrepancy in the literature with regard to the influence of music on heart rate, as some researchers have found music to positively influence a reduction in heart rate in response to anxiety-based music interventions (Buffum et al., 2006; Mok & Wong, 2003; Nguyen et al., 2010), while others have not (Ferrer, 2007; Lee et al., 2011; Longhi & Pickett, 2008).

In their study, Korhan et al. (2011) found that music listening may be associated with changes in certain physiological measures associated with relaxation, namely a decrease in systolic and diastolic blood pressure, as well as respiratory rate. In their experimental design, hospital patients receiving mechanical ventilator support listened to slow classical music with headphones for sixty-minutes, while having physiological measures taken every thirty-minutes. By measuring the effects of music over this extended period, researchers were able to find that relaxing music has a potentially cumulative effect, becoming increasingly impactful over time. Additionally, researchers found that the relaxing effect of music interventions can persist for at least thirty-minutes beyond the actual intervention.

Liu and Petrini (2015) described a similar relationship between music and physiological measures, noting a reduction of systolic blood pressure, as well as heart rate and anxiety scale scores following a 30-minute recorded music intervention. In their randomized clinical trial, the researchers conducted physiological and anxiety measures following 30-minute music sessions over a three-day period with post-operative patients.

Given the relationship between one's physiological stress-response and the stimulation of their sweat glands, measuring skin conductance level (which is an indicator of sweat gland activity) can help discern one's stress-response (Sandstrom & Russo, 2010). In their laboratory-based study, the researchers invited some participants to listen and relax to classical music following exposure to an acute stressor (involving recorded public speaking). Through their results, Sandstrom and Russo (2010) exhibited that music high in valence (that participants enjoyed) and low in stimulation (soothing) contributed to positive changes in recovery heart rate and skin conductance levels following exposure to stressors. In particular, skin conductance level exhibited a rapid recovery in response to music following exposure to stressors (Sandstrom & Russo, 2010).

A limiting factor apparent in the literature reviewed is that much of the research and literature is divided on the physiological impacts of musical interventions. This may be a result of the diversity of assessment settings (hospitals versus laboratories), procedural and measurement methodology, as well as diversity in the musical interventions used across the studies.

Music Interventions Support Coping Strategies & Behaviours

Beyond promoting neurobiological and physiological changes associated with relaxation, music can contribute to one's psychological wellbeing, bolstering their sense of resilience in the face of anxiety provoking circumstances. Music-based interventions have been found to assist with children's decreased ability to cope with distress associated with clinical procedures. Barry et al. (2010) found that music interventions not only serve as distractors, but can aid in the use of effective coping strategies. In Barry et al.'s (2010) study, participants created their own music using software, which was recorded onto a CD to be played during radiation procedures.

Researchers employed a standardized interview with children, used pre and post-treatment questionnaires with parents and healthcare staff, and included information from the music therapist's reflexive clinical journal. The team of researchers discovered that the music intervention offered a medium for social interaction, enabling more social and potentially positive coping strategies.

Tucquet and Leung's (2014) clinical practice review, in which patient and family feedback surveys were distributed within a hospital in Australia, provides similar findings. In their review, it is reported that parents believed music helped relieve children of their anxiety and facilitate adjustment to oncology care. Children expressed appreciation for the emotional support offered through music.

Enhancing the Efficacy of Music Interventions for Anxiety

Developmentally Appropriate Interventions

The developing capacity of school-aged children to sustain attention, differentiate between past and present viewpoints, as well as their increased self-awareness and developing sense of autonomy in problem-solving have important implications for intervention (Davies, 2011). In contrast to pre-school age children, the increased cognitive capacity of school-age children enables them to identify problems and participate in goal-setting (Davies, 2011). Further, they have developed the ability to contemplate the progression of steps necessary for implementing goal-directed behaviour (Eisenberg et al., 1996). Muris, Mayer, Vermeulen, and Hiemstra (2007) found that children as young as 7-years-old were able to recognize the connection between physical sensations, such as increased heart-rate, sweating, dizziness, and increased respiratory-rate with the experience of anxiety. As such, the cognitive development of school-age children enabled them to interpret some physiological symptoms as being indicators

of anxiety. Taken together, this means that school-age children may be able to identify some anxiety provoking situations, recognize physical symptoms indicating their anxious state and, following training, identify and utilize music interventions as potential solutions.

School-age children have an increased ability over pre-school children to maintain focus on goal-directed behaviour, delaying gratification (Davies, 2011), and thus may need less support in maintaining use of music interventions. The capacity for this age group of children to understand the concept of planning, while resisting distractions and frustrations to their efforts (Harter, 1999), may enable them to more effectively engage in self-regulation efforts through the autonomous use of music interventions.

To summarize, most school-age children are developmentally capable of recognizing physical symptoms associated with stress as an indication of their anxious state. They have the capacity to learn and remember to independently utilize tools and strategies associated with stress relief when experiencing anxiety or as preventive measures. When efforts toward stress-reduction are initially frustrated they have some capacity to maintain efforts toward reducing their anxious state. Finally, the developing capacity of school-age children to appreciate the incremental improvement of their skillsets (Davies, 2011) make this age group optimal for the implementation of education and training involving the use of anxiety reducing interventions, such as musical activities.

Musical Qualities Associated with Anxiety Reduction

Tempo. In a study exploring musical characteristics that promote anxiety control, Elliott, Polman, & McGregor (2011), found that slow tempo, between 80 - 100 beats per minute, provides the greater recorded impactful on anxiety. In fact, there is some consensus among researchers that slower music, between 60 - 100 beats per minute, is most effective in reducing

anxiety (Hsu et al., 2016; Lee et al., 2011; Mok & Wong, 2003; Nilsson, 2008). Gerra et al. (1998), found that listening to upbeat techno music increased stress hormone levels.

Arousal Level of Music. Beyond the recommendation that slower music be used, research indicates that low-arousing, relaxing music is most effective at reducing anxiety levels (Gan, Lim, & Haw, 2015; Jiang, Rickson, & Jian, 2016). Further, it is also apparent that energetic music may actually increase arousal levels. Linnemann et al. (2015) found that saliva alpha-amylase, indicating ANS activity, increases upon exposure to energizing music and decreases in response to more relaxing music. Sandstrom and Russo (2010) found that relaxing music was more effective for promoting recovery from a stressful situation. It is also apparent that energetic music may actually increase arousal levels. Linnemann et al. (2015) found that saliva alpha-amylase, indicating ANS activity, increases upon exposure to energizing music and decreases in response to more relaxing music.

Musical Consonance. Participants completing standardized questionnaires, as well as a focus group of advanced music students asserted the importance of how harmonious and predictable music is for producing anxiety-reducing effects (Elliot et al., 2011).

Musical Medium. Lee et al. (2011), in a clinical trial exploring the medium through which music is transmitted, found that both headphones and stereo speakers are equally effective at reducing anxiety levels. Using a standardized anxiety scale and heart rate variability measuring devices, the researchers found the use of speakers and headphones both contributed to lower anxiety scores, while neither impacted heart rate variability. The results of this study show that anxiety-focused music interventions can be administered in a flexible manner, either to individuals or to groups. This flexibility in delivering music is supported by Bradt and Teague

(2018), who contend that individuals be given the choice between headphones or not to best promote stress reduction.

Valence. In studies, Sandstrom and Russo (2010), as well as Jiang et al. (2016) found that music with a positive valence was associated with a greater reduction of stress levels. These findings are bolstered by the results of Elliot et al.'s (2011) questionnaire study, in which participants and advanced music students alike supported the importance of enjoying music.

Genre. Geethanjali and Adalarasu (2014) found a direct relationship between musical genre and anxiety reduction, as they measured a greater reduction in anxiety scores among female Indian college students in response to traditional Indian music than other genres. However, the results of several other studies indicate that musical genre has little influence over anxiety levels (Cooke et al., 2005; Elliott et al., 2011; Panteleeva et al., 2018). In fact, Elliott et al. (2011) assert the importance of selecting music on specific musical characteristics, such as those described above, rather than superficial labels like *relaxing*, *classical*, or *new-age*. In their study, Elliott et al. (2011) found that of 10 *classical* songs presented to participants, only three were deemed relaxing, while two were rated as un-relaxing. Therefore, basing music selections on genre alone will limit the anxiety-reducing benefits of musical interventions.

Characteristics of Anxiety-Reducing Music Interventions

Intentional Music Listening. Juslin et al. (2008) postulated that an individual's intention or motive for engaging in music listening may influence their associated experience. For example, listening to music in the pursuit of excitement may, therefore, not produce the same results as listening for the purpose of relaxation. Supporting this are Linnemann et al.'s (2015) findings that one's intentionality when listening to music, for example reasoning with oneself that the music is intended to reduce anxiety, contributes to the reduction of stress. Listening to

music with the intention to promote relaxation can help facilitate a reduction in both physiological and subjective measures of stress (Linnemann et al., 2015). Interestingly, Linnemann et al. (2015) found that in contrast, when individuals engage in music listening with an intention toward distraction, rather than relaxation, experiences with music resulted in increased states of stress.

Live Versus Recorded Music. The literature is discrepant as to whether live or recorded music listening is more effective at reducing anxiety levels (Klassen et al., 2008). Most studies covered in this literature review included the use of recorded music. The use of recorded music has a number of inherent advantages, including: ease of use, ease of access, portability, affordability, and a potentially wider selection of repertoire. However, it is important to note that live music is also an effective means of positively effecting anxiety levels. Sand-Jecklin and Emerson (2010) found that live relaxing music can reduce reports of pain, anxiety, as well as muscle tension, and promote a reduction in systolic blood pressure and respiratory rate. In their experimental study, researchers administered rating scales to assess anxiety, pain, and muscle tension in hospital patients following 20 minutes of live Celtic harp music. Similarly, Longhi and Pickett (2008) found that live instrumental guitar music supported anxiety reduction with hospitalized children. Thus, both live and recorded musical interventions exhibit efficacy in reducing symptoms and reports of childhood anxiety.

Group Versus Individual Interventions. A number of issues related to the use of individual versus group musical interventions exist. The valence of selected music, which is pertinent to its anxiety-reducing benefit, can be a matter of musical preference, and therefore, is more easily managed in individual-based music interventions. Additionally, control over musical selections can, again, be more readily facilitated in individual interventions. Outside of music-

based interventions, it is apparent that most people interact with music on an individual basis. In a questionnaire-based study assessing peoples' music listening habits, North, Hargreaves, and Hargreaves (2004) found that most participants reported listening to music primarily alone. Unfortunately, given the associated costs, as well as logistical and time constraints, one-on-one music-based interventions may not always be feasible (Pelletier, 2004).

Pelletier (2004), through a meta-analysis reviewing 22 quantitative studies pertaining to the efficacy of music in stress reduction, found that individual music interventions were more effective than group interventions at reducing anxiety levels. However, the researcher noted that the impact of music in decreasing stress remains significant in a group setting (Pelletier, 2004). Therefore, despite some downsides, group-based music interventions remain an effective means of facilitating anxiety-reducing music interventions.

Indeed, some stress the inherent social nature of musical experiences. Juslin et al. (2008) found that many participants contended that they listened to music so as to experience a social presence. In fact, there are advantages to shared experiences during music interventions. The results of Juslin et al. (2008) study support the notion that music listening in the presence of others facilitates an enhanced experience of positive emotions over individual music listening. Similarly, Boer and Abubakar (2014) found that participants of their questionnaire study associated music listening in the company of others with a greater sense of wellbeing. Specific to anxiety-reduction, Linnemann, Strahler, and Nater (2016) exhibited that listening to music in the presence of others promotes a greater reduction of anxiety levels. The researchers found that music listening with others reduced anxiety levels more effectively than strictly the social presence of others (Linnemann et al., 2016). Therefore, opportunities for group interventions or

listening to music in the presence of others may enhance both the benefits derived from one's social interactions, as well as the benefits associated with the music listening experience itself.

To summarize, both group and individual music interventions have proven effective for reducing anxiety levels. Additionally, it is apparent that both individual and group-based music interventions are associated with particular advantages.

Control. Chanda and Levitin (2013) contend that one's sense of control contributes to their overall sense of wellbeing. Bradt and Teague (2018) also contend that client control over the volume of the music may both promote a sense of control and alleviate potential discomfort. There is evidence that self-selecting music may grant people a sense of control and familiarity in situations in which they do not have a great deal of control (Mok & Wong, 2003; Nguyen et al., 2010). In fact, researchers have suggested that control over music selection is preferred by participants and, most importantly, may play a role in reducing anxiety levels (Jadavji-Mithani et al., 2015; Kleiber & Adamek, 2013). Further, Chanda and Levitin (2013) contend that given the relationship between a sense of choice and client motivation, the opportunity to independently select music may improve the efficacy of music interventions directed at anxiety reduction. Therefore, fostering a sense of choice and control in music interventions aimed at anxiety reduction, even if it is limited, may support efforts toward promoting welfare.

Given logistical restrictions inherent in some musical interventions, such as in group music listening, it is not always possible to promote high-levels of client control. As such, it is important to note that positive results have also been garnered from musical interventions in which participants did not select the music (Kazemi et al., 2012, Longhi & Pickett, 2008; Pelletier, 2004). So, while promoting client control over music selection may hold the greatest

efficacy in reducing anxiety, interventions in which the facilitator selects music still promote significant anxiety reducing benefits.

Active Engagement. Evidence suggests the effect that music interventions have on one's anxiety levels probably depends on the individual's level of engagement with music (Nguyen et al., 2010), as distractions from music have been shown to reduce its positive influence (Kwekkeboom, 2003). As such, efforts should be made on the part of music intervention facilitators to both stress the importance of active involvement in music-based anxiety reduction efforts and support efforts in this regard through interactions, engagement, and/ or instruction.

Duration. There is a paucity of information in the literature regarding the recommended length of music-based interventions to maximize efficacy of reducing anxiety (Linnemann et al., 2018). Most studies discussed in the current literature review did not make reference to the duration of music interventions or discuss its relevance to their results. Linnemann et al. (2018) found a relationship between the duration of music listening experience and their effect on stress reduction, suggesting that longer periods of music listening contributed to lower levels of reported stress. Based on their results, the researchers contend that music listening experiences must be at least 20-minutes in length to provide anxiety-reducing benefits (Linnemann et al., 2018). This is in line with Korhan et al.'s (2011) findings that suggest that musical engagement may have a cumulative effect, progressively reducing the experience of anxiety over time, with longer listening experiences, therefore, contributing to enhancing anxiety relief.

Experience with Musical Interventions. Following a review of a relevant studies, Pelletier (2004) concluded that participants experienced greater reduction of anxiety in follow-up sessions than do those on their initial encounter. This suggests that increased experience and/ or training with musical interventions supports greater efficacy of music interventions aimed at

anxiety reduction. Pelletier (2004) postulated this may in part be due to the individuals becoming increasingly less distracted by musical selections in subsequent sessions, and thus, more readily relaxed by their musical experiences.

Temporal Relationship Between Music Administration and Stressor. Research indicates there may be a relationship between the timing of a musical intervention in relation to a stressor and its efficacy in reducing symptoms of anxiety. Nguyen et al. (2010) found that music may reduce anticipatory anxiety and facilitate reduced anxiety more quickly following an anxiety-provoking event. In a randomized clinical trial, the researchers measured pediatric oncology patients' anxiety during lumbar puncture procedures via validated anxiety scale, physiological measures, and open-ended questions. Nguyen et al. (2010) found anxiety scores, as well as heart rates to be lower both before and after the procedure in participants receiving musical intervention. In interviews, participants asserted their preference for having music during the procedure, often stating that it provided something upon which to focus, so as to become distracted from the procedure. The results of Chen et al.'s (2019) study exhibited that listening to music before the occurrence of a stressor resulted in significantly lower stress levels, as measured through heart rate variability, than the administration of music following a stressor. This seems to indicate that music may be more effectively utilized as a preventive measure against the anxiety provoking impact of stressors (Chen et al., 2019). Taken together the results of both studies suggest that the use of music prior to stressful situations may be an effective means of preventing significant anxious responses, while the administration of music following an event may aid in reducing physiological symptoms of anxiety.

The results of studies assessing the impact of music on anxiety, as measured through salivary cortisol levels, indicate slightly differing results. Thoma et al. (2013) found that

participants engaging in music listening prior to exposure to a stressor actually produced higher cortisol levels than those not taking part in the music listening condition. The researchers suggest the potential for a combination effect, in which music listening associated arousal compounds the impact of the stressor, thus producing a greater stress response (Thoma et al., 2013). Khalifa, Bella, Roy, Peretz, and Lupien (2003) found that listening to music following the presentation of a stressor proved effective in reducing stress levels. Taken together, these results suggest that music listening interventions may be more effective following exposure to stressors, supporting one's recovery.

The studies reviewed in this section explored the impact of music listening on anxiety levels through several different means of assessment. While the results were diverse, a common finding was that music listening following a stressful situation reduced anxiety levels. Therefore, while the potential for the preventive use of music listening requires further research, there is evidence to support the efficacy of music to reduce anxiety following a stressor.

Culturally Relevant Music. While musical appreciation is universal across the human experience, it is apparent that diverse interpretations, styles, and behaviours exist across cultural groups (Trehub, Becker, & Morley, 2015). The predominance of studies referenced throughout this review have been conducted with culturally western participants and have utilized predominantly culturally western musical selections. Given that musical style, form, and instrumentation may, in some cases, differ between cultures (Trehub et al., 2015), it is important to note the potential for culturally relevant music to be an influential factor in promoting the efficacy of musical intervention. Mohan and Thomas (2020) found that the task performance level of adolescents was improved when background music is played. The researchers found that performance improvement was especially pronounced when music consistent with participants'

cultural background was played (Mohan & Thomas, 2020). Similarly, results by Geethanjali and Adalarasu (2014), in which Indian students responded more favorably to traditional Indian music than other genres seem to indicate the importance of culturally relevant music.

Iso Principle. The *Iso Principle* is loosely defined in the literature as the matching of music to present mood and then shifting the music to facilitate a shift in the individual's mood (Heiderscheit & Madson, 2015). Key to this technique is matching the music to the client's present mood-state, so that they can connect. When the client is engaged they are more readily entrained by the music, accompanying shifts in tempo and arousal. This principle may explain why some music interventions work, while others do not. If music is out of sync with the child they may not actively connect with it, and thus, may not garner the intended benefits. Research evaluating the use and efficacy of the Iso principle is minimal (Heiderscheit & Madson, 2015). However, Heiderscheit and Madson (2015) provide a description of its use and potential efficacy through a clinical case study, in which the technique is effectively used to support greater emotional regulation for an individual with depression.

Musical Preference. There is evidence that playing preferred music can help promote anxiety reduction (Jiang et al., 2016). In fact, listening to the music preferred music often produces greater happiness and positive experiences (Jiang et al., 2016) than unknown music. However, when selecting music for anxiety reduction purposes, one should strive to ensure that the chosen music is in line with the musical characteristics associated with relaxation, previously described.

Promoting Self-Awareness. As noted, school-age children have the capacity to identify and interpret anxious states, as well as independently implement strategies. However, it is important for caregivers and caretakers to teach children when to use or request music

interventions. Helping children tune into self-awareness and to name, as well as describe internal and external experiences can help promote self-regulation efforts (Short, Mazmanian, Oinonen, & Mushquash, 2016). Further, Wilson and Lyons (2013) contend that it can be benefit self-regulation efforts to support children in distinguishing between anxiety cues linked to objective stressors and those that may be labeled ‘false-alarms’. To foster active involvement in anxiety-reduction, it is important for children to learn skills related to anxiety detection, build understanding of anxiety responses, and practice using interventions, such as positive self-talk (Wilson & Lyons, 2013).

As part of this process, it may benefit caregivers and educators to engage in mental health education efforts, addressing stigmas that may be associated with mental health. Mental health education, as well as interacting with positive role models advocating for mental health and interventions can help reduce stigma associated with mental health issues and reaching out for support (Climie & Altomare, 2013).

For Whom are Musical Interventions Particularly Effective?

Children with some musical training may be good candidates for musical interventions, as research suggests they may process music at a higher level than individuals without training, and thus, garner greater benefits from music listening. Musical training may be associated with greater benefits garnered from musical interventions (Elliott et al., 2011; Vanderark & Ely, 1993). Supporting this, Schmithorst and Holland (2003), through an fMRI study, found that individuals with musical training exhibit more expanded neural processing of musical harmony and melodies than do non-musicians. This suggests that musical training impacts one’s ability to processes musical elements in a more integrated manner (Schmithorst & Holland, 2003).

Precautions with Musical Interventions

As previously noted, Thoma et al. (2013) found that in some cases music listening before the onset of a stressor can lead to increased stress responses, while Gerra et al. (1998) found that techno music increases arousal levels. Taken together, these results indicate that music that promotes an arousing response in the listener may actually prime them for a more significant stress response. As such, care should be taken when administering music interventions to ensure that listeners experience neutral to relaxing responses, rather than increased agitation. Further, given the potential for music to be closely associated with memories (Belfi, Karlan, & Tranel, 2014), there is potential for stress provoking memories to be stimulated by music listening experiences. Should the memories and/ or feelings evoked by music be of an arousing nature, the use of music may promote agitation rather than relaxation. Such a response will not only render music interventions ineffective, but could serve to increase anxiety. As such, Bradt and Teague (2018) assert that it is important the music used for anxiety reduction purposes not be associated with memories that are inconsistent with an aim toward relaxation.

While there is evidence to support the use of musical interventions in reducing anxiety, it is important to note that severe symptoms of anxiety or diagnoses of anxiety disorders warrant more intensive treatment (Leahy et al., 2012). There is evidence to support the efficacy of individual and group-based psychotherapeutic treatments, as well as pharmacotherapy for significant anxiety (Leahy et al., 2012). There is also preliminary research supporting the effectiveness of working with a specially trained music therapist (Gutiérrez & Camarena, 2015). While music interventions may be used in tandem with such approaches, it is crucial that individuals receive appropriate professional treatment when indicated.

Examples of Interventions for Anxiety Reduction

School-Based Music Interventions

Children spend an extensive amount of time in school environments. These environments can include a number of stress provoking experiences, such as academic evaluation, peer interactions, and bullying. An inability to or lack of opportunities for processing negative experiences and resulting emotions can negatively impact academic achievement (Akombi, 2013). Given the extensive amount of time that children and adolescents spend in school environments, it is also apparent that school-based interventions may be effective in addressing anxiety concerns for many individuals. Based on the results of their study spanning 42 countries across Europe and North America, Inchley et al. (2016) contend that experiences in school impact the development of one's self-perception, self-esteem, and health behaviours. Research has supported the efficacy of brief school-based interventions with children and adolescents in reducing and/ or preventing anxiety later in adolescence and adulthood (Burckhardt, Manicava-Sagar, Batterham, & Hadzi-Pavlovic, 2016). Herzig-Anderson et al. (2012) contend that school-based interventions are well suited to treating anxiety, because they can support identification of anxious youth, provide opportunities for supporting confrontation of avoided school-based anxiety triggers, and promote generalization. Providing school-based interventions may enable greater access to services by removing potential barriers for some, such as: socio-economic barriers associated with service cost, difficulties associated with scheduling or transportation, and potential stigma for children associated with seeking outside professional support (McLoone, Hudson, & Rapee, 2006). School-based interventions may also ensure that children from lower socio-economic backgrounds receive psychological services (Herzig-Anderson et al., 2012).

Community music programs, which are defined as group music lessons taken in or out of school, can help to reduce anxiety levels, foster positive socialization, and improve self-esteem (Akombo, 2013; Rickard et al., 2013). Community music programs within the school environment can take the form of music classes, school band programs, or African drumming groups. Through his study, Akombo (2013) demonstrated the potential for a community music program, a group African drumming program, to reduce state anxiety in youth. Given that community music programs are often low in cost and available to most schools (Akombo, 2013), the benefits of such anxiety-reducing music programming may be more readily accessible to youth from lower socio-economic backgrounds (Rickard et al., 2013).

Uhlig, Jansen, and Scherder (2018) provide a model for an in-school music program aimed at improving emotional regulation in youth. Music therapists worked with grade 8 students in a group format across 16, 45-minute sessions. Participants prepared individual and group rap songs through which the expression of feelings and modulation of negative emotions was facilitated. Additionally, participants engaged in psychoeducation regarding the interrelationship between thoughts, emotions, and behaviours, with an aim toward increasing awareness of emotional states and behaviours. Researchers found that participation in these therapeutic programs improved participant wellbeing, including their self-esteem and emotional regulation (Uhlig et al., 2018).

Beyond specific in-school music-based programming, there is evidence to support the use of atmospheric music as a measure to reduce anxiety and arousal in youth. Through their study, Ziv and Dolev (2013) exhibited that the use of relaxing atmospheric music during recesses may help to reduce arousal level and occurrence of bullying in elementary school students. Participants reported that calm music played during recess time helped reduce agitation and

improved positive perceptions of their experiences. Additionally, given the connection between being bullied and anxiety (Sourander et al., 2007), it is apparent that musical interventions targeting arousal and bullying may serve to reduce anxiety levels in children.

As discussed earlier, childhood-anxiety can contribute to disruptive classroom behaviours. Research by Whitehead (2017) suggests that musical interventions may be effective in promoting adaptive classroom behaviour with children in special education settings. The researcher found that employing background music during classroom activities for students of a special education class resulted in a marked increase in in-seat behaviour, as compared to conditions in which background music was not present. While the sample size of three students was relatively small, the results are promising and warrant further research.

Multisensory environments, sometimes referred to as Snoezelen rooms, are spaces designed to provide calming sensory stimulation through a variety of equipment targeting an individual's different senses. Multisensory environments usually include lower-lighting, visual stimulation (for instance bubble tubes, coloured light devices), tactile feedback (interactive panels, cushions, speakers providing vibrations), pleasant scents, and soothing music (Haegele & Porreta, 2014). Shapiro, Melmed, Sgna-Cohen, Eli, and Parush (2007) exhibited that the principles of multisensory environments can be adapted to facilitate a reduction of anxiety in children undergoing dental procedures. The environment consisted of dimmed lighting, slow-moving coloured-light projections, loudspeakers played relaxing music, while speakers placed in the chair conveyed vibrations and a heavy X-ray vest was placed on participants to convey a "hugging-sensation". Replacing harsh and stressful stimuli with soothing cues was contended to have conveyed a sense of safety (Shapiro, et al., 2007). Skin conductance measures, as well as psychological and behavioural measures all indicated a lower level of anxiety than traditional

dental environments (Shapiro et al., 2007). Similar results were exhibited across a 16-week case study, in which the use of a multisensory environment promoted a reduction in negative emotions and behaviours, while subsequently increases positive emotions and behaviours in a young child Lee & Li, 2016).

Guided Imagery and Music

Guided Imagery and Music (GIM) is a form of music therapy, in which relaxation techniques and music listening are combined to provide musical interventions that can be applied to a number of clinical issues and contexts (Bruscia, 2002). GIM usually takes the form of one-to-one work, with treatment efforts taking place across a number of sessions (Bruscia, 2002). However, group sessions, in which the therapist takes a more directive tone speaking throughout the session to verbally guiding participants through a sequence of relaxing imagery, can occur (Bruscia, 2002). Group work usually occurs in a single one-off session, rather than through a series of sessions (Bruscia, 2002). Participation in GIM work has been found to reduce cortisol levels, and by extension HPA activation, in healthy individuals (McKinney, Antoni, Kumar, Tims, & McCabe, 1997).

Recreational and Community-Based Music

Recreational music making and/ or participation in community-based music programming (ie. Choirs; community music groups) have been proposed as a means of stress reduction (Chanda and Levitin, 2013). An example of such programming is group drumming, in which participants perform rhythmic sequences usually through the use of hand-drums and other small percussion instruments. Beyond the music playing itself, sessions involve social interactions among participants, yielding positive benefits associated with socialization (Chanda and Levitin, 2013). Thus, engagement in recreational music programs can offer the anxiety-

reducing benefits of active music listening and engagement, as well as other benefits associated with musical competency, performance, and group socialization.

Creating Personalized Music Playlists

There is support for creating personalized music playlists for relaxation as an effective means of promoting anxiety reduction (de Witte et al., 2020). The goal of such work is to enable individuals to develop a personalized means of relaxation and stress reduction that can be applied proactively throughout their day-to-day lives, enabling greater autonomy in one's self-care (de Witte et al., 2020). Given the importance of control and positive valence in music interventions aimed at anxiety reduction, it is apparent that enabling individuals to select their preferred music for relaxation may be beneficial to anxiety-reduction efforts. Further, the majority of studies reviewed for this project involve the use of listening to recorded music for anxiety reduction, thus, this method of musical intervention may be effective for many individuals.

In particular, research studies have exhibited the efficacy of the following songs in reducing anxiety: *Intermezzo* by Bizet (Sandstrom & Russo, 2010), *Miserere* by Allegri (Thoma et al., 2013), and *Trio Sonatas* played by James Galway (Korhan et al., 2011). Khalfa et al. (2003) highlight that music by contemporary artists Enya, Vangelis, and Yanni can be effective in promoting relaxation. Kemper, Hamilton, McLean, and Lovato (2008) exhibited the album *HeartZones* by Doc Childre to be effective in reducing children's experience of anxiety.

Music Therapy

Music therapy is the evidence-informed use of music-based interventions within the context of a therapeutic relationship by a certified Music Therapist with an aim toward achieving specific non-musical, therapeutic goals (de Witte et al., 2020). Music therapy work can be conducted in one-to-one or group-based sessions, take place in a variety of clinical and non-

clinical settings with a variety of client populations, and be used to address a spectrum of domains of wellbeing (emotional; physical; cognitive; social) (de Witte et al., 2020). A key characteristic of therapeutic work with a music therapist is their responsivity to clients, providing a supportive and empathic therapeutic relationship (de Witte et al., 2020). Gutiérrez and Camarena (2015) found that music therapy can be an effective means of reducing anxiety levels in individuals with Generalized Anxiety Disorder. Additionally, McPherson, Berger, Alagapan, & Fröhlich (2019) found that music therapy work is positively correlated with physiological changes associated with relaxation responses. Taken together, these results support the efficacy of music therapy for reducing anxiety levels in both clinical and non-clinical populations.

Music therapy interventions can be divided into two broad categories: active and passive. Active music therapy interventions are typified by interactive engagement between the music therapist and the client(s), and involve music creation and/ or movement to music activities (McPherson et al., 2019). Passive music therapy interventions are typified by engagement in the form of receptive listening by the client, rather than active involvement in the music creation process (McPherson et al., 2019). Specific to anxiety reduction, music therapists may employ interventions aimed at musical entrainment, in which the music therapist plays music that matches the client's level of arousal and then progressively changes certain musical qualities in their playing (for example slowing the tempo) to support client relaxation (McPherson et al., 2019).

Summary

Based on the review of the literature, this writer posits that music interventions promote reduced anxiety levels, support reduced perception of pain, and cause physiological changes associated with relaxation. Individuals may experience the beneficial effects of music

interventions well after the intervention itself. On an experiential level, music interventions have been reported to reorient people's attention away from anxiousness to more positive stimuli, provide emotional support, and enhance people's ability to cope with stressful conditions. The current literature focuses almost exclusively on the relationship between music and anxiety within medical settings. These environments can be unfamiliar and involve stressful conditions (O'Callaghan, Baron, Barry, & Dun, 2011), including the prospect of major medical procedures, unfamiliar medical personnel, as well as intrusive light and sound stimuli. Further, many of the conditions within medical settings are outside the control of the child. Studies conducted within these settings contain a combination of stressful situations, stimuli, and loss of control that support the study of stress and anxiety responses within real-world settings. Therefore, samples taken within these settings may be representative of individuals experiencing anxiety in diverse 'real world' settings.

Given what is known about the detrimental effects of anxiety on children's social and academic performance, development, and overall well-being, it is important for those working with and caring for children to utilize and promote anxiety-reducing activities. While there are a number of effective treatments for anxiety, they may be indicated for individuals with advanced symptoms. Further, there exist a number of barriers to accessing traditional services. Music for anxiety reduction may be used prophylactically, while awaiting intervention from other professionals, and is proven to be effective in combination with traditional interventions or strategies.

Stressors that trigger feelings of anxiety can be both universal and individual, as well as both internal and external in nature. The day-to-day lives of children encompass a number of stressors in the home, in the community, and at school. A review of the neurobiological

processes and physiological symptoms involved in the experience of anxiety highlight the complexity of this whole body response, revealing the potential negative impact of anxiety on developmental and behavioural outcomes. Research indicates the efficacy of musical interventions to promote change at neurobiological, physiological, and psychological levels, rendering it an effective tool to reduce feelings of anxiety.

Evidence indicates that music with a slow tempo is most effective in reducing anxiety. Harmoniousness, one's level of enjoyment, as well as control over music selection and delivery may contribute to the efficacy of music interventions in reducing anxiety. Genre of relaxing music does not appear to impact one's anxiety. Both live and recorded music are reportedly effective in both individual and group formats, which suggests that the use of recorded music to support intervention does not require extensive training and can be administered in a flexible manner, to groups or individuals. Evidence indicates the use of musical engagement within the school setting to reduce anxiety is useful and to be cost effective. Finally, the ability of school-aged children to identify feelings of anxiety, to attend to instruction, and to initiate the use of strategies makes this an optimum age group with whom to promote the use of music to reduce anxiety.

The literature and research reported within this review are synthesized and presented in an accessible manner in the manual, *The Use of Music to Reduce Childhood Anxiety: An Information Manual for Caregivers and Educators*. The manual offers educators, caregivers, and parents an accessible overview of the impact music can have on children's anxiety levels and promote strategies for implementing musical interventions within informal settings to ameliorate the negative impact of anxiety on developmental processes and children's life experiences.

Chapter III: Methodology

Method

The process of creating the manual, *The Use of Music to Reduce Child Anxiety: An Information Manual for Caregivers and Educators*, has involved a thorough examination of the literature. All articles included in the literature review are written in English. Articles pertaining to the relationship between music and anxiety have been collected via several methods:

1. A search of PsychINFO, University of Lethbridge's Library database, EBSCO, ProQuest, and GoogleScholar using multiple variations of the following terms: *music, anxiety, stress, worry, rumination, excessive worrying, children, music therapy, stress, school-based interventions, regulation, music-listening, music intervention, relaxation, HPA axis, stress-response, community music, and comfortability*.
2. I have searched the complete tables of contents of the following journals within the allotted timeframe: *Journal of Music Therapy, Canadian Journal of Music Therapy, Music Therapy Perspectives*, and *The British Journal of Music Therapy*.
3. Relevant literature has been identified through a manual search of bibliographies from all retrieved articles.
4. Information has been garnered through correspondence with local music therapists and teachers who have implemented anxiety-focused music programming.

In the literature review is a qualitative synthesis of the relevant evidence-based literature including a variety of measures used to assess anxiety, the spectrum of physiological measures associated with anxiety, various definitions of music listening and anxiety, as well as the different population samples included in studies. My final project does not include any formal

meta-analytical or quantitative review methods. Instead, I have provided a qualitative synthesis of the relevant evidence based literature.

As the aim of the manual is to provide people with a resource regarding the use of anxiety-focused music interventions, I have synthesized relevant information from the literature to address four topics:

1. Explanations about the relationship between music and anxiety.
2. Research findings regarding the relationship between music and anxiety.
3. Physiological and neurological responses to music.
4. Best practices and strategies for implementing anxiety-focused music interventions.
5. Resources available to those wishing to utilize or learn more about anxiety-focused music interventions.

Manual Creation

Artistic editing for the final project manual, *The Use of Music to Reduce Child Anxiety: An Information Manual for Caregivers and Educators*, was conducted in collaboration with Tye Dandridge-Evancio. Illustrated images were procured from *Shutterstock.com*, photographic images were procured from *Unsplash.com*, and the likert image was illustrated by Tye Dandridge-Evancio.

Chapter IV: Manual Development

Overview of the Final Project Manual

Manual Objective

The aim of this final project is to create a user-friendly manual for parents, caregivers, and professionals working with children who report feelings of anxiety. The manual, *The Use of Music to Reduce Childhood Anxiety: An Information Manual for Caregivers and Educators*, provides an overview of current research findings regarding the relationship between music listening and anxiety and strategies for delivering anxiety-focused music interventions. Reducing the experience of anxiety in children is associated with a variety of benefits, including improved academic and social performance (Wood, 2006).

Overview of the Manual

The manual is organized in a manner that presents concrete strategies for music activity implementation prior to the presentation of scientific and theoretical explanations. The intention is to enable immediate access for readers, who are seeking practical strategies for program implementation.

In the section *Music to Reduce Anxiety: Step by Step Instruction Example Activity*, the reader is presented with instructions outlining a step-by-step example for implementing a music intervention to reduce anxiety. Included within this example are instructions and suggestions for implementation, as well-as example dialogue readers may choose to use when engaging children in recommended activities. Strategies are representative of best practices outlined across the literature reviewed for the creation of this manual.

The next section, *Music Interventions*, includes music interventions and activities proven effective in reducing anxiety across a number of settings, specific musical selections,

recommendations for implementing music activities, and cautions around the use of music interventions with school aged children. The reader is presented with a review of music interventions, in-school programming, and activities that are supported within the literature as being effective for reducing anxiety in school-age children. The intention is to enhance the awareness and understanding of readers, who may be new to the implementation of musical programming. Key characteristics of anxiety reducing music, is important as it equips readers with information necessary to identify, select, and filter musical selections for effective programming. Information regarding the implementation of music interventions, across a variety of settings and modalities is intended to provide clarity. Finally, information regarding precautions with the use of music intervention strategies is presented, listing potential associated risks, so as to ensure greatest efficacy and appropriate use of music as an intervention.

The section, *Approaching the Topic of Anxiety with Children*, provides clarity on the definition of anxiety and neurobiological and physiological processes involved in the experience of anxiety. To enhance understanding among those caring for children, a summary of the impact of anxiety on academic and social performance and the developmental risks posed by chronic or intense anxiety is included. Greater insight may enable readers to recognize the symptoms of anxiety more effectively, engage children in dialogue regarding anxiety, provide more effective supports, and foster a more sophisticated appreciation for the experiences of children. Children will benefit from normalizing their experiences of anxiety, increased self-awareness, basic strategies for self-regulation and experiencing a greater sense of mastery and control.

In the section *Why Music for Anxiety?*, The intention of this section is to provide support for the use of music as an intervention for childhood anxiety, while-raising awareness of-existing limitations. Music used to reduce anxiety, prophylactic use of music, use of music while

awaiting intervention from other professionals, and music used in combination with traditional interventions or strategies is discussed. Other modalities of anxiety reduction are reviewed, including known strengths and the social stigma that may be associated with traditional mental health interventions.

At the conclusion of the manual, the reader is presented with online resources, specific to Canadian-based organizations and agencies, regarding anxiety interventions. The final section of the manual presents end-noted references to literature cited throughout the manual.

Chapter V: Review and Discussion

Review

Discussion

Given the detrimental effects children with feelings of anxiety may experience and the potential for music to reduce anxiety or to help cope with anxiety provoking situations, compiling a compendium of information on current musical interventions and best practices may enable caregivers and families to access anxiety reducing activities best suited to supporting some children. Given that anxiety can manifest in oppositional behaviours, as well as difficulty in social and academic situations, caregivers and professionals working with children who report feelings of anxiety will be able to implement these methods successfully. Following consistent information regarding anxiety reducing music interventions promotes consistent practices amongst caregivers and professionals. Individuals subsequently make informed decisions as a team to program effectively, resulting in a calmer environment overall for the child.

Implications of the Project

As anxiety can manifest in oppositional behaviours, as well as difficulty in social and academic situations, caregivers and professional working with children who are anxious may also benefit from this manual. Providing information regarding anxiety-focused music interventions would promote familiarity amongst parents, caregivers and professionals with such programming and would allow these individuals to make informed decisions when it comes to anxiety reduction programming. Tools that would enable caregivers or professionals to promote a calmer environment would allow them to engage in more effective programming or familial activities.

Given the detrimental effects anxiety can have on children the primary aim of this project is to benefit children experiencing anxiety by making anxiety-reducing music interventions broadly accessible. The use of music as an intervention for anxiety is cost effective and is proven to be a strategy effectively learned and implemented by school-age children making this non-invasive option more easily available to most populations of people.

Intended Readership

The Use of Music to Reduce Childhood Anxiety: An Information Manual for Caregivers and Educators has been developed, so as to be most applicable to caregivers, parents, and educators who work and/ or care for children experiencing anxiety. The manual may be useful to school guidance counsellors who liaison with parents, community shareholders, and educators to provide resources that benefit children. It can be used to inform the implementation of music interventions, while also providing interested parties with information and insight into available services and opportunities that they may have yet to appreciate as beneficial to their children.

Considerations

Accessibility

Options for future use of the manual include, but are not limited to, submission to the *Canadian Association of Music Therapists* for publication or an open-access form available to readers via free digital download. Through these open access sources, interested parties may access the manual both individually and as a resource to distribute to relevant others.

Readability

Though examples of dialogue useful for interacting with children are included throughout, the manual itself is intended for an adult audience. Topics are presented in a manner and language most relevant to those working with or caring for children.

The language used within the manual includes reference to specific musical terms, as well as terms relating to neurobiological structures and processes that may not be readily accessible to everyday readers, let alone individuals for whom English is a second language. Specific efforts were made throughout the manual to elucidate the meaning of these terms and advanced processes. Of note, simple language and metaphorical imagery were included in a number of instances, so as to enhance understanding and dialogue between readers and children.

Adapting the Manual

The manual is inclusive of a number of recommended programs, interventions, and means of implementing activities, so as to allow the greatest amount of flexibility for readers. Reference is made to both live and recorded music listening in both one-on-one and group formats, through personal music listening devices and speakers. Reference is also made to simple activities that can be implemented by many individuals (such as music listening on personal devices) regardless of location (rural and urban), as well as more advanced means of programming and intervention (such as accessing music therapists or community-based music programming). Presenting a wide array of implementation modalities and resources is intended to support users in finding a means of program implementation adaptable to their circumstances. Specific cultural considerations were reviewed, so as to support more effective implementation for individuals of non-Euro-Western cultural backgrounds.

Critical Review and Future Directions

Strengths

The comprehensive search method for articles and research ensured that a plethora of significant and relevant literature was included in the creation of this manual. Research and articles procured through the review of literature were not limited by a particular professional

discipline or journal. Instead, a multidisciplinary approach was taken to the procurement and review of articles, spanning published journals of medicine, nursing, music therapy, psychology, and education. This not only ensures that the content of the final project manual is reflective of a broad range of professional perspectives, but also supports the validity and generalizability of results and recommendations therein.

The research examined within the literature review spanned a broad range of methodologies. Studies reviewed included experimental designs, qualitative and quantitative studies, as well as meta-analyses. The multiple avenues of research provide a rich account of the relationship between musical interventions and childhood anxiety, across a multitude of settings and from multiple perspectives. For example, research by Elliott et al. (2011) garnered information from both randomly selected participants, as well as individuals with advanced musical education, while research by Korhan et al. (2011) enlisted a nurse to procure results from physiological measures. Synthesizing a broad spectrum of research findings in this way ensures that the results are not isolated to a particular set of circumstances, but are instead generalizable, and thus, relevant to the intended readers of the final project manual.

Limitations

While the articles and studies examined were predominantly published in the past decade, the scope of the literature review was expanded to include some literature from the late 1990's and 2000's, so as to inform a broad overview of the literature covering all relevant topic areas. As a result, not all studies reviewed may be reflective of contemporary societal trends or research findings. This may impact the current validity of research data, potentially limiting how generalizable some elements and recommendations of the final project manual are. However, efforts were made to ensure that most literature included in this document is contemporary.

Another potential limitation is that studies examined in the literature review utilized a variety of measurement methods to assess the impact of music listening on anxiety. For example, research by Linnemann et al. (2015) garnered self-reports of subjective stress from participants using Likert scale measurements, while Cooke et al. (2005) utilized a standardized anxiety measurement scale to procure data. Given the disparity in data procurement, it is difficult to compare results from each of these studies. Similarly, a number of studies reviewed utilized pre-selected music, based upon “relaxing” or “calming” qualities, or had participants select their preferred music (without indicating these selections). When researchers specified musical selections, it was often not uniform with music used in other studies. As a result, it is difficult to compare the music listening procedures and experiences between most studies. The reduced ability to compare results and conditions between much of the research on music and anxiety reduces the generalizability of results, as they have not been directly replicated by other researchers or in other settings.

It is important to note that most of the literature referenced in the creation of the final project manual has been produced by European and North American scholars, and therefore, may be reflective of western cultural norms, values, and experiences. A number of studies support the efficacy of musical interventions for reducing anxiety in individuals of non-western cultural backgrounds. However, specific recommendations pertaining to specific musical characteristics, intervention characteristics, and song selections may reflect mainstream Euro-American cultural norms, as they are based on the work of scholars of primarily western cultural backgrounds and have been reviewed by the writer, who is of a Canadian background.

Recommendations for Future Research

As noted, the literature is discrepant with regard to the efficacy of particular musical selections in reducing anxiety levels. Some studies, like Thoma et al. (2013), used pre-selected classical music to reduce anxiety, while others, such as Nguyen et al. (2010), had participants select their own music. Sandstrom and Russo (2010) only used short clips of certain sections of songs during musical interventions. To enhance the efficacy of musical interventions, it will be beneficial for researchers to examine the impact and efficacy of specific songs and/ or playlists for reducing anxiety levels.

Yehuda (2011) notes that one's familiarity with certain songs may influence the impact of this music on anxiety levels. More research is needed into this dimension of musical interventions. As Jiang et al. (2016) have already exhibited that musical preference can impact the efficacy of music interventions in reducing anxiety, it will be important to distinguish between the relative impact of musical preference and familiarity. Does all familiar music influence anxiety levels in a pronounced manner or just those that the listener prefers? This information will enhance the administration of music interventions, providing insight into the relative benefit of providing 'relaxing and familiar' playlists versus user selected playlists.

A component involved in the administration of musical interventions that was not discussed in the literature reviewed to develop this final project manual is the relative importance of maintaining set musical playlists. Specifically, to best promote the efficacy of anxiety-focused musical interventions, is it more important to maintain set musical playlists or allow flexibility over time? The time-constraints involved in conducting research likely contributed to this omission. Going forward, research into this question will support more effective delivery of musical interventions.

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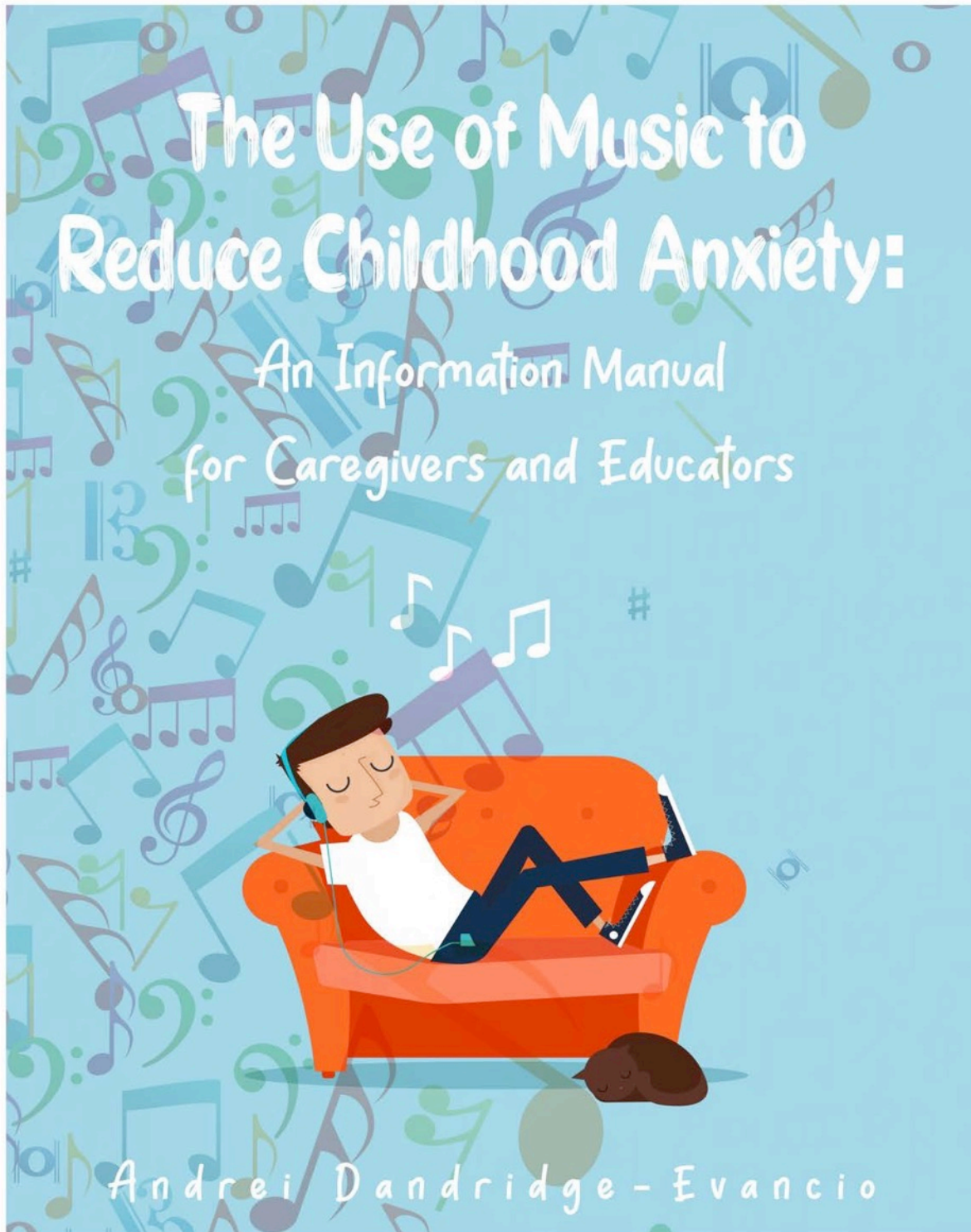
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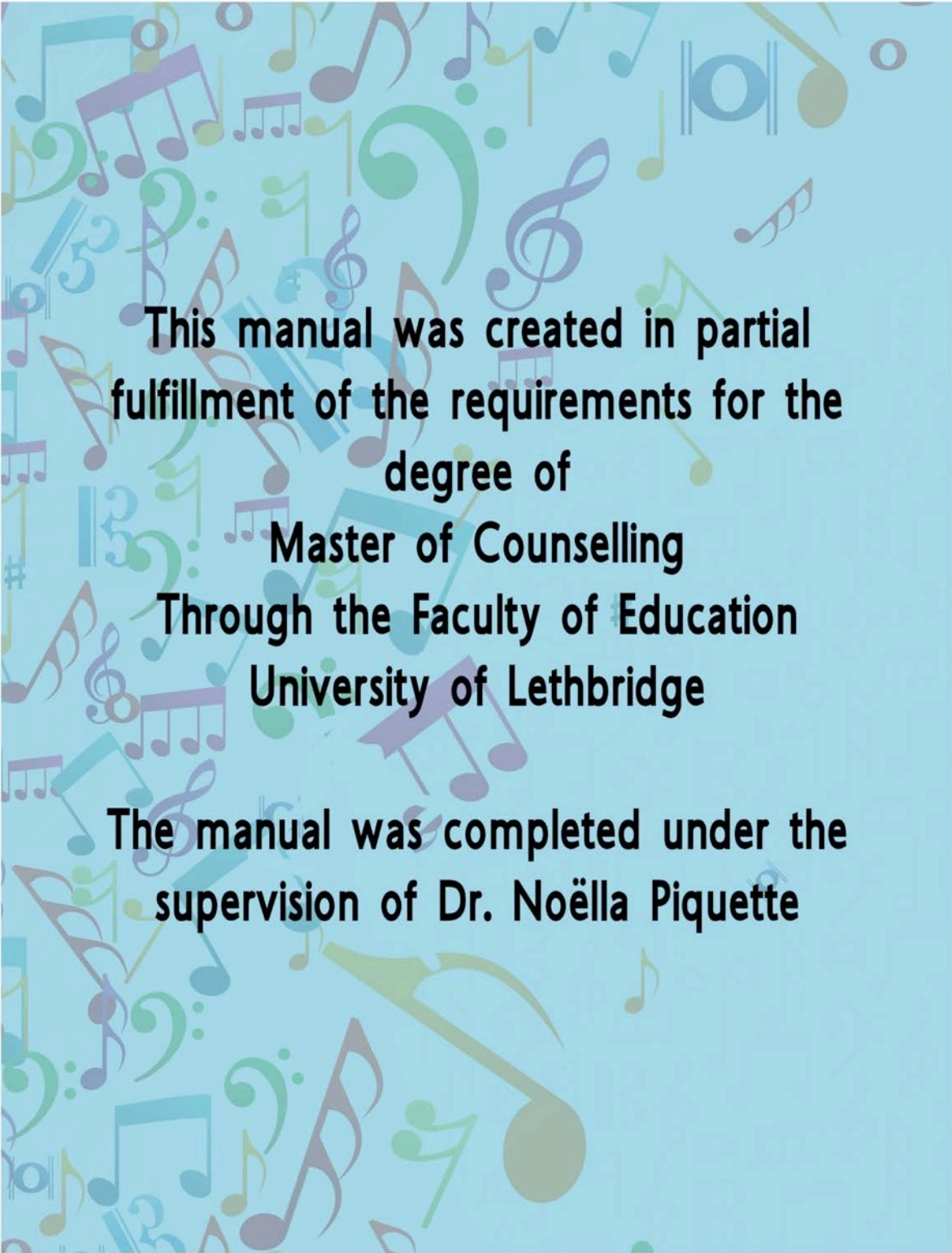
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**Appendix: The Use of Music to Reduce Childhood Anxiety: An Information Manual for
Caregivers and Educators**





**This manual was created in partial
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**The manual was completed under the
supervision of Dr. Noëlla Piquette**

Table of Contents

Letter to the Reader	2
Purpose of this Manual	3
Music to Reduce Anxiety: Step by Step Instruction Example Activity	4
Music Interventions	8
Music in the School and in the Classroom	8
Other Music Interventions	10
Recommended Songs	12
What Makes for an Anxiety Reducing Song?	13
How to Make Music for Anxiety Activities More Effective	14
Precautions with Musical Interventions	18
Approaching the Topic of Anxiety with Children	19
Defining Anxiety	19
Childhood Anxiety: Health, Development, and Behaviour	26
Why Music for Anxiety?	30
Anxiety Interventions	30
Music and Anxiety	34
Other Anxiety Resources	37
References	38

Letter to the Reader

Dear Reader,

You are reading this manual because your child or a child for whom you care is experiencing the negative results of anxiety. You are a trusted position in their life and you can to help. Here is how...

When searching for effective supports or interventions for children who are living with the negative effects of anxiety, caregivers recognize results as proof of the effectiveness of any intervention. As such, this handbook is organized in a manner that presents concrete strategies for music activity implementation prior to scientific and theoretical explanations. Please 'jump in', putting some of the suggestions and strategies presented within this manual to use. Consistently use the strategy that is the best fit for your situation over perhaps a four-week period of time. Record or make a note on the calendar of your progress then take a look at how well you've done.

When the strategies in this handbook work, and for many they will, please read the explanations detailed in the later chapters of the manual. Learn more and increase the way in which you use your new understanding of anxiety, musical interventions, and coping to support the child or children for whom you care.

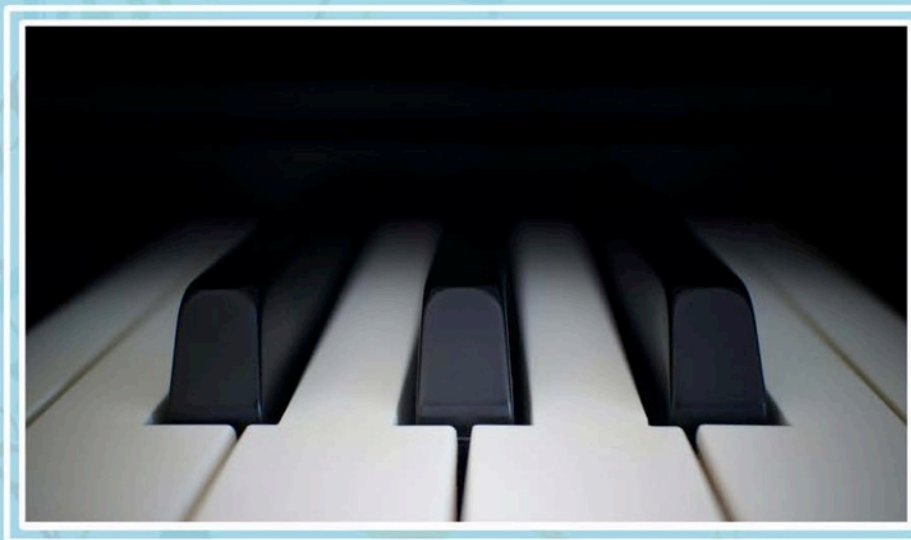
Regards,

Andrei Dandridge-Evancio

Purpose of this Manual

Given the detrimental effects children with feelings of anxiety may experience and the potential for music to reduce anxiety or to help cope with anxiety provoking situations, compiling a compendium of information on current musical interventions and best practices may enable caregivers and families to access anxiety reducing activities best suited to supporting some children.

Given that anxiety can manifest in oppositional behaviours, as well as difficulty in social and academic situations, caregivers and professionals working with children who report feelings of anxiety will be able to implement these methods successfully. Following consistent information regarding anxiety reducing music interventions promotes consistent practices amongst caregivers and professionals. Individuals subsequently make informed decisions as a team to program effectively, resulting in a calmer environment overall for the child.



Music to Reduce Anxiety: Step by Step Instruction Example Activity

Individuals or groups can follow these steps....

a) Set the stage for learning a strategy to deal with feelings of anxiety.

- Normalize the feeling of anxiety – it's normal to have anxiety or to be worried.
- Engage children in a discussion regarding identifying anxiety – what does it feel like in our bodies (stomach, chest, shoulders, neck), our heads, and our hearts?
 - o The use of pictures can support identification of feelings.
- Share that there are different things that people can do to help reduce anxiety – one of them is to listen or play music in a special way.
 - o Discuss focusing on music – it's important to listen to the different sounds of the song.
 - o Discuss holding an intention to relax or let go of worries.
- Discuss the end-goal, reducing anxiety through musical interventions, so that children know what you are intending to happen.

b) Give step-by-step instructions that may be supportive in use of music:

- Dim the lights (if possible)
- Turn off other sounds
- Put your feet flat on the floor
- Sit still or lie down
- Close your eyes
- Adjust the volume
- Guide the children's practice.
 - o It is important that the caregiver model the behaviour expected of the child. Caregivers, model the behaviours that are comfortable for you and invite the child to mirror their behaviours. You can also invite the child to sit/lie down in a manner that's comfortable for them.

Music to Reduce Anxiety (Continued)

c) Set a timer for 5 minutes – increase to desired length for best benefit.

- Listen together – caregiver's choice of music.
- Talk about how this felt....
 - o Were you able to imagine things as you listened?
 - o Were you able to just listen to the music?
 - o Inquire if there's other music they might suggest listening to.
 - o Ask if there is other music child might suggest about the activity.
 - o Repeat the experience based on their feedback.

d) Once 20 minutes is achieved, ask the child how they feel – make reference to their body (stomach, chest, shoulders, neck), breathing, feelings, and thoughts.

- Upon their feedback, highlight indicators of reduced anxiety and/ or increased relaxation – “those are the signs that the music helps you to relax”.
- Inquire as to what was in the music/ activity that helped the child to relax?

e) Review and repeat these steps over again, so that you are defining the best way to use music to reduce stress/ anxiety with the child.

f) Discuss and identify how the child could use music interventions independently. Encourage independent, practice, promote, and support independent use.

- “So, now that we know that some of the best music for helping you relax is ____ (provide examples) and best way to hear the music is ____ (provide examples: lights dim, sitting cross-legged, etc.), do you think that you could do this by yourself sometime?”
- “What do you need in order to do this by yourself?” – inviting discussion regarding noticing anxiety, preparing necessary resources (music player), and engaging in the process described above.
 - o Act on their feedback. You may need to provide support in order for them to use music interventions on their own (packing music devices, communicating about these interventions with teachers, reminding children of their use, etc.)
- “Do you think that you could tell your teacher/ group leader that you need to do this?” – inviting discussion as to how to communicate that they use music interventions for anxiety and/ or that they are experiencing anxiety.
- Discuss where and how to use music independently. Validate their use.
- Question to the reader: What supports do you need to put in place for the child to independently use music interventions? – communicate with teachers and/ or activity leaders, equip students with music playing devices, provide reminders regarding their use, etc.

g) Discuss and encourage the use of music interventions as a preventive measure.

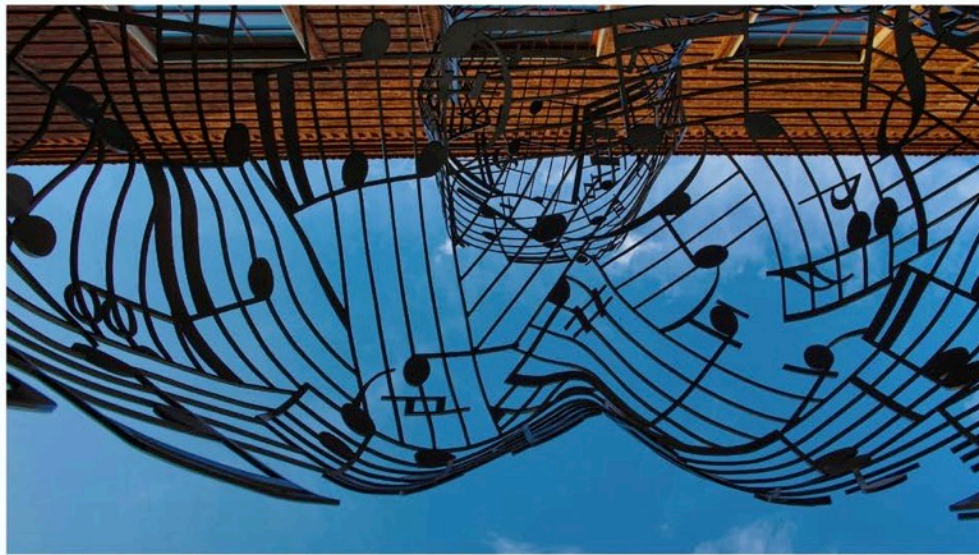
- “Now that you’re able to use this as an intervention independently, do you think there are times you could use this before your body becomes anxious, so that we could reduce anxiety before it grows?”
- Review anxiety-cues (thoughts, bodily-sensations, emotions). “What are signs in the body, your thoughts, or your feelings that might tell you you’re starting to feel anxious?”
- Review and discuss situations that normally cause anxiety.

Music to Reduce Anxiety (Continued)

h) Review, practice, and modify.

- Check in with the child. What needs to be changed, modified, and/or what supports need to be in place to better facilitate the use of music interventions?
- Act on feedback.

f) Review practice & modify or reteach as needed.



Music Interventions

Music in the School and in the Classroom

Children spend an extensive amount of time in school environments. These environments can include a number of stress provoking experiences, such as academic evaluation, peer interactions, and bullying. School experiences impact the development of self-perception, self-esteem, and health behaviours¹. An inability or lack of opportunity to process negative experiences and resulting emotions can negatively impact academic achievement². Given the extensive amount of time that children and adolescents spend in school environments, it is apparent that school-based interventions may be effective in addressing anxiety concerns for many individuals. In fact, research has supported the efficacy of brief school-based interventions with children and adolescents in reducing and/or preventing anxiety later in adolescence and adulthood³. Providing school-based interventions may enable greater access to services by removing potential barriers for some, such as: socio-economic barriers associated with service cost, difficulties associated with scheduling or transportation, and potential stigma for children associated with seeking outside professional support⁴. School-based interventions may ensure that children from lower socio-economic backgrounds receive psychological services⁵.



Music Interventions (Continued)

Community Music Programs:

Community music programs, which are defined as group music lessons taken in or out of school, can help to reduce anxiety levels, foster positive socialization, and improve self-esteem^{2,6}. Community music programs within the school environment can take the form of music classes, school band programs, or African drumming groups. Given that community music programs are often low in cost and available to most schools², the benefits of such anxiety-reducing music programming may be more readily accessible to youth from lower socio-economic backgrounds⁶.

In-School Group Rap-Music Program:

Researchers provide a model for an in-school music program aimed at improving emotional regulation in youth⁷. Music therapists worked with grade 8 students in a group format across 16, 45-minute sessions. Participants prepared individual and group rap songs through which the expression of feelings and modulation of negative emotions was facilitated. Additionally, participants engaged in psychoeducation regarding the interrelationship between thoughts, emotions, and behaviours, with an aim toward increasing awareness of emotional states and behaviours. Researchers found that participation in these therapeutic programs improved participant wellbeing, including their self-esteem and emotional regulation.

In-School Atmospheric Music:

There is evidence to support the use of atmospheric music as a measure to reduce anxiety and arousal in youth. The use of atmospheric music played during recesses has been shown to help reduce arousal level and the occurrence of bullying in elementary school students, while promoting positive perceptions of activities⁸. Given the connection between being bullied and anxiety⁹, it is apparent that musical interventions targeting arousal and bullying may help reduce anxiety levels in children.

In-Class Music to Promote In-Seat Behaviour:

Childhood-anxiety can contribute to disruptive classroom behaviours. There is evidence that employing background music during classroom activities for students of a special education class resulted in a marked increase in in-seat behaviour, as compared to conditions in which background music was not present¹⁰.

Multisensory Environments:

Sometimes referred to as Snoezelen rooms, these are rooms or spaces designed to provide calming sensory stimulation through a variety of equipment targeting an individual's different senses. Multisensory environments usually include lower-lighting, visual stimulation (for instance bubble tubes, coloured light devices), tactile feedback (interactive panels, cushions, speakers providing vibrations), pleasant scents, and soothing music¹¹. There is evidence to support the anxiety-reducing efficacy of multisensory environments¹².

Other Music Interventions

Recreational and Community-Based Music Programs:

Recreational music making and/or participation in community-based music programming (ie. Choirs; community music groups) have been proposed as a means of stress reduction¹³. An example of such programming is group drumming, in which participants perform rhythmic sequences usually through the use of hand-drums and other small percussion instruments. Beyond the music playing itself, sessions involve social interactions among participants, yielding positive benefits associated with socialization¹³. Thus, engagement in recreational music programs can offer the anxiety-reducing benefits of active music listening and engagement, as well as other benefits associated with musical competency, performance, and group socialization.

Music Interventions (Continued)

Music Therapy: :

Music Therapy: Music therapy is the evidence-informed use of music-based interventions within the context of a therapeutic relationship by a certified Music Therapist with an aim toward achieving specific non-musical, therapeutic goals¹⁴. Music therapy work can be conducted in one-to-one or group-based sessions, take place in a variety of clinical and non-clinical settings with a variety of client populations, and be used to address a spectrum of domains of wellbeing (emotional; physical; cognitive; social)¹⁴. A key characteristic of therapeutic work with a music therapist is their responsivity to clients, providing a supportive and empathic therapeutic relationship¹⁴. Music therapy has been shown to be effective for reducing anxiety levels in both clinical¹⁵ and non-clinical¹⁶ populations.

Music therapy interventions can be divided into two broad categories: active and passive. Active music therapy interventions are typified by interactive engagement between the music therapist and the client(s), and involve music creation and/ or movement to music activities¹⁶. Passive music therapy interventions are typified by engagement in the form of receptive listening by the client, rather than active involvement in the music creation process¹⁶. Specific to anxiety reduction, music therapists may employ interventions aimed at musical entrainment, in which the music therapist plays music that matches the client's level of arousal and then progressively changes certain musical qualities in their playing (for example slowing the tempo) to support client relaxation¹⁶.



Recommended Songs

The following are some songs/ artists that have proven to be effective in reducing anxiety levels.

Research suggests the following songs may be effective in promoting relaxation:

- Intermezzo (from the Carmen Suite) by Bizet¹⁷
- Miserere by Allegri¹⁸
- Trio Sonata's (19) by J.S.Bach, played by James Galway (flute)¹⁹

Music by the following contemporary artists have been shown to promote relaxation²⁰:

- Enya
- Vangelis
- Yanni

The following resources offer compilation discs/ playlists with music that matches the anxiety-reducing characteristics outlined above:

- Room 217 (<https://www.room217.ca/who-we-are>)
- HeartZones by Doc Childre²¹



What Makes for Anxiety Reducing Music?

There are musical characteristics that make certain music or songs better at reducing anxiety levels than others. Here is a list of things to keep in mind when selecting music for anxiety reduction:

Tempo:

Research suggests that slower music, between 60 – 100 beats per minute is most effective for reducing anxiety^{22,23}. There is evidence that upbeat techno music actually increases stress hormone levels²⁴.

Arousal Level of Music:

There is evidence that low-arousing, “relaxing” music is most effective at reducing anxiety levels^{25,26} and that arousing music may increase stress levels²⁷. Therefore, music that particularly emotionally arousing may not be the most effective at reducing anxiety levels.

Musical Consonance:

Music that is harmonious and predictable is most effective for promoting anxiety reduction²².

Positive Valence:

Whether or not listeners think the music they are listening to is enjoyable or nice-sounding impacts anxiety reduction^{17,26}.

Genre:

Basing music selections on genre alone will limit the anxiety-reducing benefits of musical interventions, as most research suggests the impact of music on anxiety is more about the characteristics listed above, rather than musical style^{22,28}.

How to Make Music for Anxiety Activities More Effective

Developmentally Appropriate:

Most school-age children are developmentally capable of recognizing physical symptoms associated with stress as an indication of their anxious state²⁹. They have the capacity to learn and remember to independently utilize tools and strategies associated with stress relief when experiencing anxiety or as preventive measures. When efforts toward stress-reduction are initially frustrated they have some capacity to maintain efforts toward reducing their anxious state. Finally, the developing capacity of school-age children to appreciate the incremental improvement of their skillsets³⁰ make this age group optimal for the implementation of education and training involving the use of anxiety reducing interventions, such as musical activities.

Teaching Children When to Use or Request Music Interventions:

As noted, school-age children have the capacity to identify and interpret anxious states, as well as independently implement strategies. We just need to help hone the skills involved in anxiety detection, build understanding, and help them practice using interventions. Helping children tune into self-awareness and to name, as well as describe internal and external experiences can help promote self-regulation efforts³¹.

Intentional Music Listening:

Research suggests that listening to music with the intention to promote relaxation (rather than distraction or some other purpose) can help facilitate a reduction in both physiological and subjective measures of stress^{32,27}. Therefore, participants in musical interventions should be supported in beginning musical interventions with an aim toward relaxation.

How to Make Music for Anxiety Activities More Effective (Continued)

Control:

Control over musical selections and even volume can enhance motivation, one's sense of wellbeing¹³, and promote anxiety reduction^{35,36}. However, it is important to note that research shows musical interventions to still be effective when participants do not select the music^{37,38}. So, while promoting client control over music selection may hold the greatest efficacy in reducing anxiety, interventions in which the facilitator selects music still promote significant anxiety reducing benefits.

Live and Recorded Music:

Both live and recorded musical interventions exhibit efficacy in reducing symptoms and reports of childhood anxiety^{38,39}. The advantages of recorded music include: ease of use, ease of access, portability, affordability, and a potentially wider selection of repertoire. Live music can involve impromptu musical adjustments to accommodate participants and circumstances.

Group and Individual Interventions:

Both group and individual music interventions have proven effective for reducing anxiety levels, with each being associated with particular advantages. Listening to music in the presence of others is not only associated with a greater sense of wellbeing^{33,40}, but also a reduction of anxiety levels⁴¹. However, music listening on an individual level can better facilitate control and musical preference⁴².

Duration:

Research suggests that music interventions need to be at least 20-minutes in length to effectively provide anxiety-reducing benefits⁴³. There is evidence that musical engagement may have a cumulative effect, progressively reducing the experience of anxiety over time¹⁹.

Experience with Musical Interventions:

There is evidence to suggest that anxiety reduction garnered through musical interventions becomes greater the more times an individual engages in them⁴². With increased experience, individuals may become less distracted, more engaged, and therefore, more readily relaxed by their musical experiences.

Culturally Relevant Music:

While musical appreciation is universal across the human experience, it is apparent that diverse interpretations, styles, and behaviours exist across cultural groups⁴⁴. Given that musical style, form, and instrumentation may, in some cases, differ between cultures⁴⁴, it is important to note the potential for culturally relevant music to be an influential factor in promoting the efficacy of musical intervention^{45,46}.

Interventions Before or After the Stressor:

There may be a relationship between the timing of a musical intervention in relation to a stressor and its efficacy in reducing symptoms of anxiety. At this time, research indicates that musical interventions used after a stressor promote anxiety reduction^{18,20,32}.

There is some evidence to suggest that some music played prior to the onset of a stressor may actually increase stress response¹⁸, while other research indicates preventive musical interventions can significantly reduce the impact of stressors⁴⁷. Therefore, care must be taken to ensure that preventive musical interventions ‘hit the mark’ and promote relaxation, rather than arousal.

For Whom are Musical Interventions Particularly Effective:

The use and enjoyment of music is a near universal human experience. However, musical interventions may be particularly well suited for some children. Children with some musical training may be good candidates for musical interventions, as research suggests they may process music at a higher level than individuals without training⁴⁸, and thus, garner greater benefits from music listening²².

How to Make Music for Anxiety Activities More Effective (Continued)

The Iso Principle:

The Iso Principle is loosely defined in the literature as the matching of music to present mood and then shifting the music to facilitate a shift in the individual's mood⁵¹. Key to this technique is matching the music to the client's present mood-state, so that they can connect. When the client is engaged they are more readily entrained by the music, accompanying shifts in tempo and arousal. This principle may explain why some music interventions work, while others do not. If music is out of sync with the child they may not actively connect with it, and thus, may not garner the intended benefits.

Musical Preference:

There is evidence that playing preferred music can help promote anxiety reduction²⁶. This makes sense, as listening to the music we enjoy often produces greater happiness and positive experiences²⁶ than unknown music. However, it is important to note that to produce the most effective anxiety reduction, we should select and/ or offer preferred music that is in line with the musical characteristics associated with relaxation – for instance, offering slower preferred music, rather than upbeat techno selections one enjoys.



Precautions with Musical Interventions

There is evidence that some music, such as upbeat techno music, increases arousal levels²⁴. There is also evidence that in some cases, listening to music prior to a stressor can increase a stress response¹⁸. Taken together, this means that music that promotes an arousing response in the listener may actually prime them for a more significant stress response. As such, care should be taken when administering music interventions to ensure that listeners experience neutral to relaxing responses, rather than increased agitation.

Additionally, it is important the music used for anxiety reduction purposes not be associated with memories that are inconsistent with an aim toward relaxation⁴⁹. Given the potential for music to be closely associated with memories⁵⁰, there is potential for stress provoking memories to be stimulated by music listening experiences. Should the memories and/ or feelings evoked by music be of an arousing nature, the use of music may promote agitation rather than relaxation. Such a response will not only render music interventions ineffective, but could serve to increase anxiety.

While there is evidence to support the use of musical interventions in reducing anxiety, it is important to note that severe symptoms of anxiety or diagnoses of anxiety disorders warrant intensive treatment. There is evidence to support the efficacy of individual and group-based psychotherapeutic treatments, as well as pharmacotherapy for significant anxiety⁵². There is also preliminary research supporting the effectiveness of working with a specially trained music therapist¹⁵. Music interventions outlined in this manual may be used in tandem with such approaches, but it is crucial that individuals receive appropriate professional treatment when indicated.

Approaching the Topic of Anxiety with Children: Defining Anxiety

Anxiety is a reaction to perceived danger that involves a number of neurological, psychological, and physiological responses⁵³. This makes the experience of anxiety multifaceted, encompassing various emotional states such as fear and panic, worried thoughts, as well as a host of bodily responses, including elevated heart rate, sweaty palms, and muscle tension. Essentially, an anxious person's body is preparing them to do something about the stressor – to attack it or run away from it. This is what some call the fight or flight response. The anxious person is emotionally and physically keyed up, focusing on the stressor⁵⁴. Anxiety can be triggered by a person's present circumstances or memories of past experiences⁵³. Some triggers can be universal, such as sudden loud noises, while others are more particular to a person's experiences and memories, for instance loud noises made by an individual they fear⁵⁴. A number of typical childhood experiences can cause anxiety. From striving for social inclusion to physical development to academic success, the lives of children involve stress. For some children growing up in disadvantaged circumstances, socio-economic factors can negatively impact their overall health and wellbeing⁵⁵. For others, cultural differences, racism, and acculturation can be a source of stress and anxiety⁵⁶.

For children, anxiety can have a negative impact on academic performance⁵⁷, problem solving⁵⁸, self-confidence, and social interactions⁵⁹. Further, anxiety can be mistaken for aggression or hyperactivity⁶⁰, which may disrupt learning or social environments. The development of school-age children is responsive to their environment and experiences; meaning they are, therefore, particularly prone to the negative impact of chronic or intense stress and anxiety⁵⁴. The presence of pronounced symptoms of anxiety in childhood are predictive of risk for problematic anxiety later in life⁶¹. As such, activities and interventions that help children maintain lower levels of anxiety may enhance their quality of life and promote adaptive development.

Talking with children about their anxiety:

When discussing a child's experience of anxiety, let them take the lead. Allow the child to inform you of their experience and not the other way around. Ask questions:

- Do you ever have worries? Or feel mixed up inside?
- Can you tell me what things worry you?
- Do you think about them a lot?
- Do your worries cause you to stay away from some activities? Or favourite activities? Or engage in typical activities (play, sleep, eat, etc.)?
- Do your worries cause you to do things that you don't usually do (arguing with others, leaving classroom seat, etc.)? Or feel good about doing?

Asking questions similar to these can go a long way to understanding what may trigger a child's anxiety, how pervasive it may be, as well as how and the degree to which it is impacting their life.

If a child, shares an unusual or unexpected level of worrisome thoughts, they have just invited you to participate in problem solving around their area of worry. Below is a sample script for continuing the discussion with them. Feel free to use or modify the script or to use it as a starting point for your own discussion.

Sometimes people worry about things or they feel that something bad might happen to themselves or someone that they care about. This can be a tough feeling to have inside of us. Sometimes when people worry, their bodies try to tell them something upsetting is happening. People can feel their heart pumping faster, their lungs breathing faster, and their muscles feeling tight. These can be ways our bodies tell us we're worried. Do you know that everyone feels worried from time to time? Even though it's not a very nice feeling, worry and anxiety are a normal part of our lives. There are things we can do to help ourselves when we feel anxious and worried. We can go to our caregivers or other adults we trust for a to talk about how we're feeling and for a hug. We can try some deep breaths and remembering a favourite memory or place or activity. We can also use music to calm us when we're feeling anxious and worried.

Approaching the Topic of Anxiety with Children: What Happens Internally When We Experience Anxiety?

Anxiety involves a number of neurobiological and physiological responses. Let's take a look at what actually happens in our brains and our bodies when we experience anxiety:

Neurobiological Processes

Behind the sensations associated with the experience of anxiety, is a complex and interconnected system of neurobiological processes involving a number of areas of the brain, organs, and nervous system. A person's "stress response system" includes activity in limbic system, hypothalamic-pituitary-adrenal axis, and the autonomic nervous system⁶². So, what are these systems and what do they do?

Limbic System:

This refers to a group of basic mammalian brain structures, importantly the amygdala and hippocampus, that process social and emotional information, making memories out of experiences that we like and don't like⁶³. The limbic system recognizes threats and sounds fear response alarms faster than a person's capacity for conscious perception of danger or lack thereof⁶³. Alternatively, cues related to memories of safety inform signals indicating the absence of threat. Together, the limbic system appraises and responds to emotional information, informing the hypothalamus as to the presence of threats or safety cues⁶⁴.

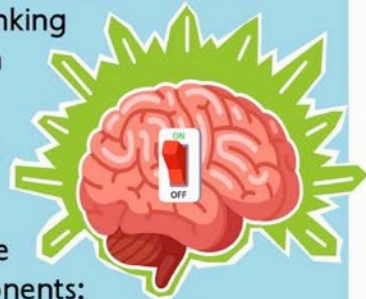


Hypothalamic-Pituitary-Adrenal (HPA) axis:

Together, the hypothalamus (a brain structure), the pituitary gland (a gland in the brain), and adrenal glands (glands located atop the kidneys) make up the HPA axis, which is the lynchpin to exciting or inhibiting the physiological responses involved in the experience of anxiety. Essentially, the hypothalamus acts as the “command centre” of the brain’s stress-response system⁶³. It receives threat/ safety signals from the limbic system and conveys them to the nervous system (discussed below) and the pituitary gland. Once stimulated, the pituitary gland communicates with the adrenal glands, instigating the production and release of the stress hormones epinephrine (adrenaline) and cortisol⁶⁵. The circulation of stress hormones throughout the body, prepare one’s cardiovascular and muscular systems for increased activity⁶⁶.

Stress hormone levels require 60-90 minutes following a stressor to return to normal⁶⁷

The HPA axis is regulated by three brain structures: the amygdala, which switches it on, the hippocampus, and the prefrontal cortex (the part of our brain used for higher order thinking and controlling our behaviours/emotions), which switch it off⁶⁴



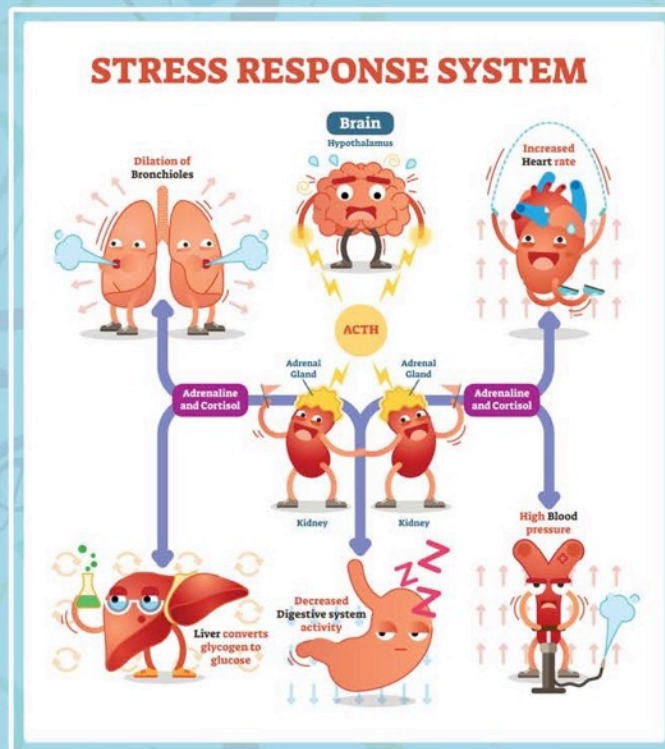
The Autonomic Nervous System (ANS):

This is the branch of the nervous system that controls involuntary bodily functions, such as the cardiovascular system. The ANS has two components: the sympathetic nervous system (SNS), which revs one’s bodily systems up for activity, and the parasympathetic nervous system (PNS), which calms the body down⁶³. Basically, the SNS and PNS act as the gas and brake pedals, respectively, for the physiological arousal involved in stress response. When responding to potentially stressful triggers, the hypothalamus signals the SNS to get the body into a state of hyper-arousal (fight or flight) or hypo-arousal (freezing in place)⁶³. Normal stress throughout the day involves a fluid oscillation between activation of the nervous system’s brake and gas pedals, however, prolonged activation of the SNS, gas pedal, can lead to difficulties⁶⁹.

Approaching the Topic of Anxiety with Children: Physiological Responses

When the SNS, gas pedal, is stimulated, it triggers an increase in heart rate, blood pressure, respiratory rate, and sweat-gland activity⁷⁰. The heart begins beating 4-5 times harder and faster to deliver more blood and energy to muscle groups involved in movement⁶⁶. To support this, blood-flow is diverted from the digestive system, effectively shutting it down and causing the ‘butterflies’ in the stomach sensation⁶⁶. As a result of all this, a person will experience increased muscle tension, heart-palpitations, and increased respiratory rate⁷¹.

Activation of the stress response system is associated with perceptual changes, including increased hyper-vigilance for threats, increased emotional arousal, and hyper-reactivity and defensiveness^{54,66}. The increased arousal associated with the experience of anxiety can contribute to difficulties in concentration and focus, as well as difficulties with sleep⁷¹.



Approaching the Topic of Anxiety with Children:

Talking to children about their brains

The big takeaway when communicating with children is that anxiety starts in our brains and can be felt in our bodies. When people experience something through their senses (they see something, hear something, etc.) and/or think of something that is worrying or frightening, their brain sounds an alarm bell. When someone's brain-alarm starts ringing, it tells their body to get ready so that it can push the scary thing away, run away from it, or to hide from it – we call this the fight, flee, or freeze response. Different people's bodies get ready for fight, flee, or freeze in different ways, but some of the most common are:

- Making the heart pump faster and the lungs breathe faster to feed our muscles blood and oxygen.
- Preparing our muscles for action (in our arms, legs, shoulders, neck, etc.) by making them tense.
- Giving us butterflies in our stomachs, so that our other muscles have more blood.

It can be helpful to ask children to identify which parts of their bodies are associated with the experience of anxiety and worry.

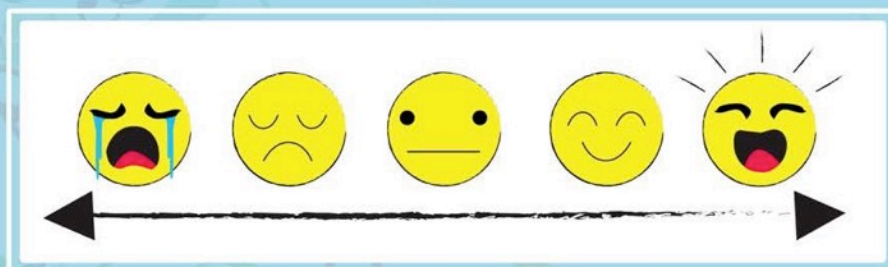
When our brains and bodies sound the alarm, the feelings we experience seem stronger than usual. It can sometimes be harder to stop ourselves from doing things or saying things that we would not usually do or might be sorry for later. When we're feeling anxiety like this, it can be harder to concentrate on things (like schoolwork), harder to remember things, and harder to go to sleep. Our brain's alarm bells and our body's fight, flee, or freeze response are a normal part of life. It is normal to feel some anxiety.

Approaching the Topic of Anxiety with Children: Talking to children about their brains (Continued)

It can be helpful for caregivers and educators to teach children to identify and work through low level frustration, worry, and anxiety. This allows children to gain confidence and to build skills, as well as resilience. Doing this also builds understanding that worry and anxiety are a normal part of daily living. When greater levels of anxiety are suspected to be impacting young children or children with developmental or communication differences, the use of image-based Likert scales (such as the one provided at the end of this section), or pointing to one's own body is recommended to identify where they experience tension. Using these tools with children can enable self-identification of anxiety symptoms and promote greater self-awareness and understanding.

There are times when our brains sound the alarm bell by mistake – for instance, perhaps we see a shadow and think it's a bear instead. It can be beneficial to talk with children about helpful or unhelpful alarm bell reactions – differentiating between the two⁷². Here are some useful reminder statements to help children 'deactivate' their brain-alarms. Children can learn to use them as a self-talk to support calming themselves⁷².

- I Can tell my brain-alarm is ringing, but I can also tell it's just a false alarm.
- I know that I'm feeling this way because my brain-alarm is going off, but I can show my brain that it is OK.



Childhood Anxiety: Health, Development, and Behaviour

Adaptive Stress Experiences

Children spend an extensive amount of time in school environments. These environments can include a number of stress provoking experiences, such as academic evaluation, peer interactions, and bullying. School experiences impact the development of self-perception, self-esteem, and health behaviours¹. An inability or lack of opportunity to process negative experiences and resulting emotions can negatively impact academic achievement². Given the extensive amount of time that children and adolescents spend in school environments, it is apparent that school-based interventions may be effective in addressing anxiety concerns for many individuals. In fact, research has supported the efficacy of brief school-based interventions with children and adolescents in reducing and/or preventing anxiety later in adolescence and adulthood³. Providing school-based interventions may enable greater access to services by removing potential barriers for some, such as: socio-economic barriers associated with service cost, difficulties associated with scheduling or transportation, and potential stigma for children associated with seeking outside professional support⁴. School-based interventions may ensure that children from lower socio-economic backgrounds receive psychological services⁵.



Health, Development, and Behaviour (Continued)

Health Impact of Intense or Chronic Stress

In contrast to experiences where adaptive responses are successfully developed, hyper-arousal of their stress-response system can become a consistent part of some individuals' lives⁶⁶. As a result of persistent environmental stressors, individual characteristics, and/ or lack of protective factors, individuals may experience extended, chronic states of anxiety. Prolonged activation of the stress-response system and resulting hormones in the absence of protective factors can be harmful, potentially changing the neurobiological responses to stress described before⁷³. Significant stress during childhood can promote overdevelopment and hyper-responsivity of one's amygdala, resulting in increased anxiety⁶⁹. Chronic stress diminishes the capacity of the hippocampus to regulate the HPA axis⁶⁹. Further, chronic stress has been linked to a number of negative long-term health outcomes⁷⁴, including suppressing immune functioning⁵⁴. Beyond the health toll associated with chronic stress, adults with a history of adverse childhood experiences may be more likely to develop anxiety disorders⁷⁵.

Developmental Risk to Children

People's capacity for neurobiological, as well as behavioural change and flexibility is highest during the early years of their life, supporting early growth and development adaptive to their environment, and progressively declining thereafter with age⁵⁴. A reason that childhood anxiety may be particularly detrimental is that children's potential for developmental flexibility makes them particularly vulnerable to the maladaptive impact of chronic stress⁵⁴. However, by the same principle, childhood may be a prime time to target anxiety reduction and to build self-regulating skills, as children's neurobiological and behavioural systems are not hardwired, and therefore, may be more pliable to adaptive change⁵⁴.

Behavioural Outcomes

The impact of childhood anxiety on functioning is influenced by the nature of the stress children experience and, therefore, may result in a number of behavioural outcomes⁵⁴. Behavioural patterns typical of chronic anxiety and stress include: hyper-vigilance, difficulties with emotional self-regulation, difficulty concentrating, and poor social functioning⁷⁶. Some children respond to stressors through internalizing their anxiety, producing shy, inhibited states of being that lead to their anxiety often going unnoticed⁷⁷. Others externalize their anxiety, leading to hyperactivity and other conduct difficulties, which may cause disruptions in their environments⁷⁷. In either case, the behavioural patterns associated with chronic anxiety have the potential to negatively impact both a child's academic performance, as well as their social interactions⁵⁴. Helping children to develop skills for coping with everyday stressors can support prevention efforts with regard to the behavioural symptoms described above⁷⁸.

Note to the reader:

Adaptive experiences with anxiety are largely determined by the responsiveness of important adults. Responding to children experiencing anxiety, not just physically, but with attention and empathy can go a long way toward supporting them. Simply being a safe presence for children can help calm the alarm bells ringing in their brains. In fact, there is evidence to suggest that spending time with loved ones can help release the hormone oxytocin, which is a natural stress reliever⁷⁹. This produces a 'tend and befriend' effect, which can be thought of as being the opposite of the fight, flee, or freeze response. Additionally, receiving support from others has been shown to have a stress reducing effect⁸⁰. Specifically, positive physical contact, in particular hugging, has been shown to go a long way toward making people feel they are supported⁸⁰. So, being there for children experiencing anxiety with a caring hug, a compassionate ear, and encouraging them to share and discuss their experience can help reduce their experience of anxiety.

Health, Development, and Behaviour (Continued)

Beyond providing a calming and supportive presence, those tending to anxious children can support them in using a few simple strategies to help reduce their anxiety. Breathing exercises can help reduce immediate symptoms of anxiety, while distracting children from anxiety provoking thoughts/situations⁷².

- One such exercise can simply be to encourage the child to focus on taking several deep breaths in through the nose and out through the mouth. It is useful for caregivers to both model and engage in the exercise with children⁷².
- Another exercise can be to encourage the child to take a deep breath and then count breaths up to 10⁷².

When parents and caregivers are not around, coping cards, providing helpful thoughts/prompts, can be useful in supporting anxiety coping⁸¹. Coping card thoughts can include positive self-talk, such as:

- “I can do this!”
- “I am feeling anxiety, I can use music and breathing to help.”

Coping card thoughts can also include reminders for children about their brain-alarm, such as:

- “When my brain-alarm rings, I know I can do things to help deactivate it.”
- “If my brain-alarm is ringing, I can check to see if it is a false alarm.”

The use of some of these approaches and exercises can help calm children to a point after which the use of music interventions may be even more effective.

Caregivers and educators can also support anxiety reduction through promoting a positive environment for children. Environments that are perceived by children as being safe, orderly, and predictable can help them to regulate themselves more effectively⁸¹. This may mean tidying and organizing living spaces or classrooms, creating a day-to-day routine and/or schedule of activities, and ensuring that these environments encompass limited stressful sensory sources (loud noises, flashing lights, etc.)

Why Music for Anxiety?

Anxiety Interventions:

Anxiety can have significant negative impacts on current functioning as well as the long-term development of children. While there are effective treatments currently available, they can be associated with social stigma and are, therefore, not accessed by all those who may benefit from them⁸². Further, these treatment options may predominantly serve children with pronounced symptoms of anxiety, failing to treat those for whom anxiety is moderate or less apparent. Therefore, there is a need for an effective means of reducing childhood anxiety that avoids stigma, may be accessed by a broad range of children, and is affordable. The use of music has proven effective for reducing childhood anxiety, is cost effective and relatively easy to employ, may be well suited as an intervention to the developmental milestones of school-age children, and is pleasurable and familiar to many children.



Why Music for Anxiety? (Continued)

Currently, the go-to treatment for problematic anxiety is cognitive behavioural therapy (CBT)⁸³, which involves one-on-one and/ or group-based psychotherapeutic treatment aimed at restructuring problematic cognitions (such as excessive worry), promoting awareness of one's instinctive cognitive, emotional, and behavioural reactions to stress, and enhancing effective coping strategies⁵². Other notable intervention strategies include: mindfulness-based activities (such as meditation)⁸⁴, relaxation training – such as progressive muscle relaxation⁸⁵ - and individual counselling⁸⁶.

However, it is apparent that a number of individuals experiencing psychosocial difficulties do not reach out for psychotherapeutic support⁸⁷. Many young people may feel too embarrassed to reach out for support, including accessing in-school counselling services⁸². Thus, although effective treatment and services may be available, children that require or could benefit from such services may not necessarily access them. For some individuals, there may be cultural barriers, including a sense of shame, to using psychological services⁸⁸. Individuals from low-socio-economic backgrounds may face barriers to accessing services, and thus are often less likely to attain psychological services⁸⁹. A barrier for individuals in rural areas can be the long distances they are required to commute in order to access services⁸⁹. Children with less pronounced symptoms of anxiety may be more likely to go unnoticed by caregivers and educators⁷⁷, and thus may not receive beneficial services.

The services previously described are often considered treatments for problematic anxiety. The use of preventive measures may help children avoid reaching a state of distress or discomfort, in which more intensive treatment services are necessary. The use of music as an intervention may help avoid some social stigma, is also a tool some children are already confident and comfortable using independently or in groups, and that can be employed as a preventive and/ or early intervention technique.

Note to the reader:

Mental health education, as well as interacting with positive role models advocating for mental health and interventions can help reduce stigma associated with mental health issues and reaching out for support⁹⁰.

The Role of Music in Childhood Anxiety Treatment:

For many people, music offers enjoyable stimuli they can connect with in a meaningful way across a variety of situations and for a variety of purposes. However, beyond general enjoyment, music can promote a sense of familiarity, support the experience of positive feelings, and reduce negative emotional experiences across a variety of settings²³. Music has been shown to be effective at reducing symptoms and reports of anxiety, while also providing a distraction from rumination and other stress-elevating thoughts¹³.

Given the universality of technology in our modern world and through it, ease of access to music, individuals are increasingly capable of using personal music listening devices to help modulate their mood; and children are no exception. It is apparent that many children already have an existing understanding and comfortability with the use of music to regulate their emotional state⁴⁷. Additionally, given their developmental stage, school-age children may respond better to nonverbal techniques, such as musical interventions, rather than talk-based therapy⁹¹. The use of music as an intervention for childhood anxiety can support coping efforts⁹².

In Combination with Other Interventions

Music can be used effectively in combination with, and thereby supporting, other forms of treatment for anxiety. For example:

- **Counselling:** There is research supporting the use of music within group-based cognitive behavioural therapy (CBT) counselling programs^{7,93}. Some suggest that music can help counsellors in emotional externalization, reframing ideas, and deepening experiences⁹⁴.
- **Mindfulness and Meditation:** Beyond formal counselling, music has been shown to effectively support and perhaps enhance mindfulness-based meditation and other activities⁹⁵.
- **Music and Relaxation Training:** Research shows that the use of music in combination with Progressive Muscle Relaxation can be an effective means of reducing anxiety⁹⁶.

Note to the reader:

The use of music to support work with children does not need to be reserved for mental health professionals or music therapists. Whether to strike up a conversation, accompany relaxation time, or to set a calm mood in a room, playing music can support caregiver and educator interactions with children too.

Why Music for Anxiety? (Continued)

Research Support for Musical Interventions and Anxiety:

In medical settings, music has been shown to reduce patient anxiety prior to medical procedures⁹⁷, as well as during^{35,98,99} and after medical procedures^{100,101}. Similar results have been exhibited with children, as researchers have found music to be effective at reducing anxiety in hospitalized children³², as well as those undergoing medical procedures³⁷. Research shows that the stress-reducing effects of music listening extend beyond laboratory and clinical settings, enabling individuals to access the calming effects of music when experiencing everyday stressors²⁷.



Introducing music as an intervention for anxiety to children

When discussing music interventions to reduce anxiety, it can be useful to introduce music as being more than a pleasant listening experience. Rather, describe it as sometimes being a useful tool. Highlight that not all music can be helpful for this purpose. Instead, certain types of music are particularly helpful when we are feeling worried. Music that we think sounds nice, that is slow, and is not too loud is the most helpful for anxiety. Given that musical preference promotes anxiety reduction, inquire with children as to what songs they know that might match these requirements.

Music and Anxiety

Theoretical Explanation for Why Music Works:

A common theoretical foundation used to explain the efficacy of music in reducing anxiety is that music serves as a distractor, diverting attention away from anxiety provoking stimuli and providing something more pleasant and potentially familiar on which to concentrate^{32,35,99}. Others suggest that the pleasurable emotional states produced by music¹⁰² or its ability to bring up autobiographical memories may underlie its ability to reduce anxiety²⁸. As of now, there is not a definitive understanding of the neurobiological processes underlying these positive effects⁴¹. However, this theoretical explanation is in line with the function of the stress response system previously described. By diverting attentional focus away from threatening stimuli, thereby reducing the triggering effect on one's amygdala, activation of the stress response system may be reduced. The presentation of pleasurable or relaxing musical stimuli may further support self-regulatory efforts, presenting one with cues indicating safety and pleasure, thus contradicting signals of stress.

In addition to the above, the successful use of music to reduce stress and promote regulated states can, in part, be attributed to the capacity of music to induce brainstem responses¹³. Brainstem neurons typically fire sympathetically, exhibiting synchrony with the tempo of music¹⁰³. This, in effect, produces increased cardiovascular activity when stimulating music is played and decreased activity when relaxing music is played¹⁰⁴. As brainstem activity also impacts sensory and motor function, music may influence neurotransmissions at the root of cardiovascular and motor function¹³.

Note to the reader:

Music is effective for reducing anxiety when it diverts our attention away from stressful thoughts, stimuli, and events and onto pleasant memories and sensations. To be most effective as an intervention for anxiety, it is important to highlight for children the need to prepare themselves for relaxation and to actively engage in listening to the music. Introduce music as less a magic-wand solution and more of an activity for which children prepare themselves with the intention of relaxing and self-soothing.

Music and Anxiety (Continued)

Neurobiological Impact of Music on Anxiety:

Research has found that music listening can promote a reduction in both HPA axis activity and ANS activity²⁷, while also helping to expedite ANS recovery after a stressor¹⁸. This suggests that the use of music promotes a reduction in some of the brain and nervous system activity that causes the bodily sensations and emotions associated with anxiety. There is evidence to suggest that musical interventions can promote a reduction of epinephrine levels¹⁰⁵. Further, research has found music listening to be linked to an increase in pituitary growth hormone, which is associated with a decrease in the inflammatory bodily response associated with stress¹⁰⁶.

Essentially, research results suggest that music listening can promote a reduction in the HPA axis activity typically associated with anxiety and stress. Further, music listening may promote neurobiological processes involved in the recovery from one's stress response.

Physiological Impact of Music on Anxiety

Anxious states are associated with a number of physiological symptoms, including: increased heart rate, blood pressure, respiratory rate, and sweat gland activity. The results of numerous studies support a connection between music listening and a change in physiological symptoms associated with relaxation or deactivation of one's stress response. Specifically, a connection between music listening and lowered diastolic blood pressure¹⁰⁷, reduced respiratory rates³², reduced sweat gland activity¹⁷, and increased blood oxygen levels³⁸ has been exhibited.

Psychological Impact of Music on Anxiety:

Beyond promoting neurobiological and physiological changes associated with relaxation, music can contribute to one's psychological wellbeing, bolstering their sense of resilience in the face of anxiety provoking circumstances. Music-based interventions have been found to assist with children's decreased ability to cope with distress associated with clinical procedures, with some research suggesting music provides emotional support¹⁰⁸. In one study, hospitalized children undergoing cancer treatment created their own music using software, which was recorded onto a CD to be played during radiation procedures. The researchers discovered that the music intervention offered a medium for social interaction, helps children use more social and potentially positive coping strategies⁹².

Introducing music interventions to children:

When introducing music interventions for anxiety reduction to children, make connections to some of the imagery you have used to explain anxiety in our brains and our bodies. Highlight that listening to calming music can be helpful when we would like to deactivate our brain-alarms. Whether it is a false alarm or a real one, once we have identified that the alarm is going off, listening to music can be helpful in turning down our brain-alarms.

It may be useful to remind children of the signs of anxiety/ the fight, flee, or freeze response in their bodies (muscle tension, heart and respiratory rates, sweatiness). Playing calming music can help tell our bodies that we are actually OK and that we do not need to get ready to fight, flee, or freeze. “I know my body really wants to fight, flee, or freeze right now. Playing music can help soothe it”.

Work with children to highlight some of the ways they can help deactivate their brain-alarms and soothe their fight, flee, or freeze response. Create a list, for instance: talk to trusted adults, engage in breathing exercises, remember the calm cards, play or ask for help to play calming music.

Final note to the reader:

Caring for a child is not always an easy task and no one is completely prepared. There are situations where support from others is not only warranted, but also desired. Use the techniques suggested in this handbook. However, remember that you know your child or the child for whom you are caring best. Do not be afraid to ask for help and to reach out to trusted friends and professionals. Remember the proverb, “It takes a whole village to raise a child”.

Other Anxiety Resources:

Online Resources

- **Anxiety Canada**
<https://www.anxietycanada.com/>
- **My Health Alberta**
<https://myhealth.alberta.ca/Health/Pages/conditions.aspx?hwid=anxty&>
- **Canadian Mental Health Association: Alberta Division**
<https://alberta.cmha.ca/anxiety-disorders/>
- **Anxiety Disorders Association of Manitoba**
<https://www.adam.mb.ca/>
- **Canadian Mental Health Association: Saskatchewan Division**
<https://sk.cmha.ca/documents/anxiety-disorders/>



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