# Exploring the Efficacy of Acceptance and Commitment Therapy for Tinnitus: A Neurobiological Perspective

By

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**Abstract**

Tinnitus is a chronic condition with no known cure and is comorbid with anxiety, depression and insomnia for millions of people worldwide. There is also a lack of awareness regarding the etiology and prevalence of tinnitus which contributes to misconceptions, stigmatization and a lack of specialized treatment options. While Cognitive Behavioral Therapy (CBT) and Tinnitus Retraining Therapy are the standard interventions for managing tinnitus, Acceptance and Commitment Therapy (ACT) has demonstrated potential as an alternative treatment modality. ACT for tinnitus helps patients shift their focus on values-based living by reducing experiential avoidance through acceptance and mindfulness practices. In this capstone, the neurobiology of tinnitus is explored, followed by a review of four randomized controlled trials (RCTs) that investigate the effectiveness of ACT in reducing distress and enhancing the quality of life for individuals experiencing tinnitus. Low to moderate evidence showed that ACT played a positive immediate role on anxiety and depression and improved sleep for patients with chronic tinnitus; however, due to methodological limitations more RCTs are recommend to confirm the effectiveness of ACT. This capstone concludes with a proposal to develop an online course aimed at patients, counsellors, and healthcare clinicians, with the goal of expanding the scope and reach of tinnitus awareness beyond this project.

*Keywords:* Tinnitus, subjective tinnitus, neuroplasticity, acceptance and commitment therapy, habituation

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## Chapter One: Introduction

My interest in tinnitus, a ringing, roaring or hissing noise perceived only by the listener and not caused by an external source (Han et al., 2009) began with a new client I will call Aaliyah. During our intake session, Aaliyah asked if there was anything I could do to help her. She said she had not felt as depressed and frightened in her life. When I asked her to explain what was going on she said she has had the sound of ringing in her head for two years that she had gotten used to for a period, but it had recently become ten times worse. She described not wanting to get out of bed, being unable to sleep because of non-stop anxious thoughts keeping her awake, scrolling for hours on the internet looking for a solution and feeling hopeless. She explained that her doctor told her she just had to get used to it and that there was no known cure. It was after the doctor's appointment she said she had serious thoughts of ending her life and that this was when she made the decision to seek counselling. She confessed, "I'm only 22 years old and all I see in my future is many years of suffering with no end in sight. I wish this was terminal so I wouldn't have to take my life by my own hand."

Aaliyah's feelings of despair, struggles with insomnia, and suicidal ideation are not uncommon for the 10-25% of the population who report having tinnitus (Hoare et al., 2011; Seo et. al, 2016). A systemic review and meta-analysis on the psychological impact of tinnitus found 1-3% of the population with tinnitus report tinnitus-related distress as having a severe impact on quality of life (Baguley et al., 2013; Hoare et al., 2011). While many people are unbothered by tinnitus, some, such as Aaliyah, find it severely life-limiting. Why tinnitus is debilitating in some but not others is still not understood. As with other chronic medical conditions, research shows that adjustment to tinnitus is not correlated with the severity of the condition (Budd & Pugh, 1996, Han et al., 2009; Kojima et al., 2019). While tinnitus adjustment is not correlated with how

loud the sound is or other acoustic characteristics, there is a significant correlation with psychological symptoms (Cima et al., 2011; Han, 2009; Kojima et al., 2019). Furthermore, those who seek help for tinnitus may have lower levels of tinnitus but higher levels of mental health concerns, such as depression and anxiety than those who do not seek help (Langguth et al., 2013).

One theory that explains the difference between people simply perceiving tinnitus and others like Aaliyah, who have suicidal ideation, is the activation of the limbic and autonomic nervous systems (Cima et al., 2011; De Ridder et al., 2011). The limbic and autonomic nervous systems are activated when there is a perceived threat of harm. Over time, the persistent activation of threat-related neural circuits becomes deeply embedded in the brain's neural network, resulting in the brain fixating on that neural pathway. Much like chronic conditions and pain, the more attention and focus attributed to the tinnitus, the more it affects the perception of discomfort (Ausland et al., 2021). Psychosocial factors play an essential role in understanding how tinnitus affects individuals, and research has consistently demonstrated that these factors are more influential than audiological characteristics in explaining tinnitus disturbance (Ausland et al., 2021). Therefore, evidence-based treatments that address tinnitus distress's neurological and psychosocial factors may offer a potential alternative path to reducing comorbidities and improving the quality of life of those who suffer.

Mindfulness-based interventions that encourage being present even in the presence of distressing thoughts and physiological sensations have shown promise in treating chronic pain and tinnitus-related distress (Hesser, 2009; McKenna et al., 2017; Reiner et al., 2013; Roland et al., 2015). Research has shown that mindfulness has neuroplastic effects on the brain, particularly related to attention and emotion regulation, which are commonly affected in both

chronic pain and tinnitus (De Jong et al., 2016). A cognitive behavioural therapy that incorporates the neuroplasticity effect of mindfulness is Acceptance and Commitment Therapy (ACT). ACT explicitly does not try to modify thoughts or physiological reactions; rather, it changes the relationship to them by proposing that individuals willingly take in what is there without reaction or judgment (Hayes et al., 1999). This emphasis on cultivating an accepting attitude towards distressing experiences indicates that ACT is a viable approach for managing a condition often accompanied by a fear-avoidance response (Kleinstäuber et al., 2013). Furthermore, the mindfulness-based principles of ACT and its emphasis on living a values-based life offer a holistic alternative to the more traditional ways of treating tinnitus distress and improving quality of life.

## Purpose Statement

There are three main purposes of my research. Firstly, to investigate the effectiveness of ACT in reducing tinnitus-related distress in individuals with chronic tinnitus. Secondly, to raise awareness of this condition that affects millions of people worldwide. Tinnitus is often misunderstood, and many people are not aware of the profound mental health impact on an individual's life, leading to stigma and discrimination, especially when seeking help from healthcare providers (Joachim & Acorn, 2000). Finally, my research aims to develop an accessible online course that healthcare providers and tinnitus patients can use for educational purposes. This course will be a resource for delivering care and raising awareness of this often overlooked and misunderstood population by offering clear evidence-based information.

## Guiding Framework

The guiding framework for my research is the neurophysiological model of tinnitus. This model puts forward that chronic tinnitus is caused by conditioned fear responses to the tinnitus

acoustics and that these responses trigger a bothersome perception of the sound (Jastreboff, 1990). The model breaks down tinnitus into three stages: generation, detection, and perception-evaluation, and is primarily focused on the neurophysiological mechanisms underlying tinnitus generation and detection (Jastreboff, 1990). The neurophysiological model also suggests that several brain systems, particularly the limbic and autonomic nervous systems, play a significant role in tinnitus perception and reactions such as annoyance, anxiety, depression, and difficulty concentrating (Cima, 2018; Jastreboff, 1990). This model emphasizes that tinnitus arises from sustained activation of the limbic and autonomic nervous systems, specifically the sympathetic part of the autonomic nervous system (Cima, 2018). The neurophysiological model is particularly compatible with ACT because ACT interventions focus on accepting the presence of tinnitus and managing reactions instead of trying to eliminate the perception of tinnitus thereby lessening the conditioned fear response that drives the autonomic nervous system.

**Contribution to the Field**

The proposed literature review on the effectiveness of ACT in treating tinnitus distress can significantly contribute to the existing literature on this chronic condition. By identifying individuals who may benefit from ACT as a treatment option, including those who have not responded well to traditional treatment approaches, the study can provide new insights into managing tinnitus distress. Moreover, the review can help increase awareness and understanding of tinnitus, reduce the stigma associated with invisible chronic conditions, and promote evidence-based interventions like ACT that can improve the quality of life of tinnitus sufferers and those who support them.

The study can also provide healthcare workers and counsellors with evidence-based recommendations for using ACT to treat tinnitus distress, which can inform their decisions about

treatment options and improve the quality of care for their patients or clients. Finally, the study aims to increase interest and appreciation for tinnitus sufferers by highlighting the real impact of this invisible condition on their lives and providing hope through effective interventions like ACT.

**Reflexivity and Positionality Statement**

I approach this research with opinions and worldviews shaped by the intersecting parts of my identity, including my gender, race, social class, geographic location, and mental and physical abilities. Not acknowledging the role my social location plays in how I understand the topic of tinnitus distress would compromise the credibility of the research, as readers may question whether I have considered my biases and assumptions when gathering and interpreting the literature. I hope that by positioning myself within this research topic, the reader has a transparent understanding of my review and its limitations, which can help assess the relevance and validity of my findings.

I am an able-bodied individual who has never lived with chronic tinnitus or any other chronic health condition. Since I do not have the lived experience of someone with this challenge, I do not fully understand the daily obstacles, limitations, and emotional impact that comes with it, nor the toll it can take on one's mental health and well-being. However, I have become more cognizant of the condition and its significance on one’s life through my client Aaliyah and my husband, who recently shared he has had chronic subjective tinnitus for years. Hearing their stories has given me valuable insight and enriched my understanding of the condition. It was important during this project's research and analysis phase, however, that I maintained a critical and reflective stance to minimize the risk of any bias that may unintentionally develop due to my connection to the subject matter.

Another potential bias readers should be aware of is that I have extensive training in ACT and have found the interventions to be life changing. ACT is also the framework I draw from when conducting case conceptualizations with clients. This may lead me to favour studies that support the effectiveness of ACT interventions over those that do not. Additionally, my pre-existing knowledge and beliefs about ACT could make it more difficult to critically evaluate studies that challenge or contradict my understanding of the approach. To mitigate this potential bias, I included peer-reviewed studies of other treatment options and used a critical lens while evaluating the research on ACT. Adopting this strategy ensured a more comprehensive and balanced review and analysis of the literature.

## Definition of Terms

### *Acceptance and Commitment Therapy (ACT)*

A cognitive behavioural therapy approach that incorporates mindfulness techniques whose aim is to support individuals in changing the relationship they have with their thoughts, emotions, and physiological responses, allowing them to coexist without being dominated by them (Hayes et al., 1999).

### *Habituation*

Describes an action whereby an individual's response to a stimulus decreases after repeated exposures (Schmid et al., 2015). In the context of tinnitus, the ringing, buzzing, and whirring noise of tinnitus refers to the stimulus and habituation occurs when the noise no longer elicits a response (Jasterboff & Jasterboff, 2000).

### *Hexaflex*

A visual representation of the six interconnected core processes of ACT that enhances psychological flexibility (Hayes et al., 1999). These six processes are Acceptance, Cognitive

Defusion, Contact with the Present Moment (i.e. mindfulness), Self as Context, Values and Committed Action (Hayes et al., 1999).

***Hyperacusis***

A condition where the auditory pathways in an individual's brain overreact to moderate sound exposure, resulting in an abnormally strong response. This can cause the affected individual to have a reduced tolerance for louder sounds (Jasterboff & Jasterboff, 2000).

***Mindfulness***

A mental state achieved by bringing awareness to the present moment without judging one's thoughts, feelings, or bodily sensations that emerge (Kabat-Zinn, 2003).

***Neuroplasticity***

The ability of the nervous system to adapt its activity in response to internal or external stimuli by restructuring its functions, connections, or overall organization (Puderbaugh & Emmady, 2022).

***Objective Tinnitus***

Tinnitus that is audible to another person as a sound emitting from the ear canal and is often referred to as somatosound (Han et al., 2009).

***Psychological Flexibility***

A concept central to ACT referring to the capacity to persist and change behaviour according to one's values even in the presence of difficult or challenging thoughts, emotions, or sensations (Hayes et al., 2002).

***Quality of Life (QOL)***

Refers to a term introduced by the World Health Organization (WHO) to describe an individual's perceived quality of life across several domains, including physical, psychological,

social, and environmental (The Whoqol Group, 1998). The WHO created a measurement called the WHOQOL based on these domains to assist policymakers and healthcare providers in making decisions about interventions and monitor trends in quality over time (The Whoqol Group, 1998).

### *Subjective Tinnitus*

The most common form of tinnitus, with its most distinguishing feature from objective tinnitus is that the sound is audible only to the patient (Han et al., 2009). For brevity and clarity, I use the term 'tinnitus' throughout this paper to refer specifically to subjective tinnitus.

### *Tinnitus*

The perception of sound in the absence of an external acoustic source and is a symptom not a disease (Han et al., 2009).

### *Tinnitus Retraining Therapy*

A treatment for tinnitus based on the neurophysiological model of tinnitus with the primary goal being habituation to the stimuli associated with subjective tinnitus (i.e. the ringing, buzzing, whirring sounds) (Jasterboff, 2011).

## Prevalence

It is difficult to identify the prevalence of tinnitus because there is no standard diagnostic criterion for the symptom, except for some clinical self-report assessments that disclose patient complaints (McCormack et al., 2016). According to a study by Bhatt et al. (2016) which conducted the most extensive North American epidemiology analysis to date, tinnitus affects approximately 8-25% of the adult population, with adults above 50 years of age having the highest prevalence of tinnitus (Hoffman, 2004). Another recent systemic review and meta-analysis that looked at the global prevalence and incidence of tinnitus found 14.4% of the

population affected, with a range of 4.1% to 37.2%. For 3% of adults, tinnitus strongly affects quality of life to such an extent that the disability leads many people to seek help (Milerová et al., 2013). There are mixed results on whether tinnitus is more common among men or women (Hoffman, 2004), but some studies have found more women than men experience tinnitus distress (Seydel et al., 2013). Although tinnitus prevalence rates vary depending on the study and diagnostic criteria used, it is clear it is a condition that affects millions of adults across the globe and has a significant negative impact on quality of life on a substantial portion of the population.

**Etiology of Tinnitus**

Subjective tinnitus is a condition where a person hears sounds in their ears or head that does not come from an external sound source (Han et al., 2009). The cause and mechanisms of tinnitus are still not well understood. However, the production of sound without an external trigger is believed to be caused by irregular neural activity at any point along the hearing pathway, starting from the inner ear to the auditory cortex (Seidman et al., 2010). Some of the causes of the irregular neural activity include hearing loss due to damage to the hair cells in the inner ear, ear infections or blockages in the ear canal, head or neck injuries, and certain medications such as pain medications, antibiotics, cancer drugs and antidepressants (Han & Kim, 2009). When the hair cells are damaged, they can leak random electrical impulses to the brain, causing the ringing sensation of tinnitus (Han & Kim, 2009).

**Etiology of Tinnitus Distress**

The perception of tinnitus does not necessarily lead to tinnitus distress. Many factors can lead to tinnitus-related impairment including cognitive, emotional, neurological, and developmental aspects. Cognitive elements also play a part in the development and persistence of tinnitus distress, with maladaptive thinking, attentional bias, and catastrophizing being

significant contributors (Fackrell et al., 2016; Pinto et al., 2016). Emotional factors such as anxiety, depression, and stress also exacerbate the negative effects of tinnitus on an individual's quality of life (Ziai et al., 2017). In addition, psychological factors such as personality traits, coping mechanisms, and social support can influence the level of distress caused by tinnitus (Fuller et al., 2020).

Growing evidence suggests a connection between adverse childhood experiences (ACEs) and tinnitus distress (Aazh et al., 2019; Belli et al., 2020; Fuller et al., 2021). ACEs refer to stressful or traumatic experiences during childhood, such as abuse, neglect, and household dysfunction (Boullier & Blair, 2018). Studies show that individuals with a higher number of ACEs report elevated levels of tinnitus distress compared to those without traumatic childhood histories (Fuller et al., 2021). Furthermore, Belli et al. (2020) discovered a higher prevalence of childhood traumatic experiences among individuals with tinnitus, including a family history of migration, early parental loss, and lower-income status. These results suggests a potential causal relationship between tinnitus, its severity, and adverse childhood experiences while also indicating an increased susceptibility to developing depression and anxiety. Although the research strongly implies that ACEs may contribute to the development and persistence of tinnitus, further investigation is required to fully understand the link.

**Research Question**

What do randomized controlled trials reveal about the effect of ACT on reducing tinnitus-related distress and improving quality of life among individuals with chronic tinnitus?

**Outline of the Remainder of the Paper**

The remainder of the paper is structured into two main chapters. In chapter two, a comprehensive literature review is presented to provide a detailed analysis of the relationship

between tinnitus and neuroplasticity and an overview of ACT processes. The chapter will also cover the common symptoms associated with subjective tinnitus, the available methods for measuring tinnitus, and the most used treatment approaches. Concluding the chapter will be an evaluation of four randomized controlled trials on the effectiveness of ACT on tinnitus distress.

Chapter three builds upon the research findings of chapter two and presents an actionable recommendation in the form of an eight-week online course. This course is tailored for patients and healthcare professionals, offering evidence-based techniques to effectively manage tinnitus distress. The course is designed to empower patients to cultivate a different relationship with their symptoms and reduce the impact of tinnitus on their quality of life. At the same time, healthcare professionals will have access to practical tools and information to support their patients in effectively managing their tinnitus.

## Chapter Two: Literature Review

This literature review aims to explore the relationship between tinnitus and psychological distress and assess the effectiveness of ACT as a treatment option to improve the quality of life for tinnitus sufferers. Specifically, chapter two provides an overview of tinnitus and its impact on the brain, a summary of common psychological disorders associated with tinnitus, and an overview of the more common treatment options. In addition, the chapter describes the six core processes of ACT and reviews four studies investigating its effectiveness as a statistically viable treatment in reducing psychological distress and improving the quality of life in tinnitus patients.

### The Persistent Challenge of Tinnitus

Tinnitus is a medical condition characterized by the perception of sound in the absence of any external auditory source (Dalrymple et al., 2021). It is often described as a ringing, buzzing, hissing, or whistling sound, and can be constant or intermittent. An estimated 37% of Canadians (9.2 million people) have experienced tinnitus in the past year (Ramage-Morin et al., 2019). For approximately 3% of those affected, tinnitus is perceived as extremely distressing, making everyday activities severely impacted by problems such as insomnia and depression. (Han et al., 2009; Hesser et al., 2011; Milerová et al., 2013). Emphasizing the seriousness of the distress tinnitus can cause in individuals, several studies found a significant association between tinnitus and suicidal ideation/attempts (Aazh & Moore, 2018; Seo et al., 2016). Seo and colleagues also found the risks of experiencing tinnitus were significantly associated with suicidal ideation/attempts, even after adjusting for other factors (Seo et al., 2016). The debilitating impact on the lives of those who suffer highlights the need for effective management and treatment options for tinnitus. However, before treatment options can be considered, it is important to

distinguish between the two types of tinnitus as they have significantly different underlying causes, diagnostic and treatment options.

The two types of tinnitus are objective tinnitus and subjective tinnitus. Objective tinnitus is rare and is caused by a physical sound source that can be detected by a healthcare provider placing a stethoscope around a patient's head and neck region (Dalrymple et al., 2021). It can be caused by various conditions such as a vascular abnormality, neurologic or auditory tube dysfunction (Dalrymple et al., 2021). Objective tinnitus can often be treated by addressing the underlying condition and does not tend to cause the same level of distress as subjective tinnitus (Hackenberg et al., 2023). This is likely because there are reliable treatment options for objective tinnitus, whereas there is no cure for subjective tinnitus, which may contribute to individuals' feelings of hopelessness and frustration knowing there is no way to alleviate their symptoms.

Subjective tinnitus is the most common form of tinnitus and most associated with the ringing, buzzing, hissing, or shushing sounds that characterize this condition (Martz, et al., 2018). Unlike objective tinnitus where a healthcare provider can hear the sounds with the aid of a stethoscope, subjective tinnitus is characterized by the person perceiving an acoustic sound in the absence of a corresponding acoustic source which leads to discomfort, pain and other psychological problems already discussed (Bhatt et al., 2017; Boecking et al., 2020). Many treatment alternatives have been developed and tested for the millions of people looking for relief, but there continues to be a lack of effective, validated treatments to remove or diminish tinnitus for good (McFerran et al., 2019). What about tinnitus makes it a pervasive and debilitating issue for millions of individuals with still no cure in sight? Part of the answer lies in the fact that although tinnitus can be heard, it is not an auditory problem. It is a brain problem (De Ridder et al., 2011). As a result, many researchers have redirected their efforts toward

understanding the underlying neural mechanisms of tinnitus as they seek to develop effective treatments for this condition.

**Tinnitus and the Brain: Reimagining its Nature and Implications**

In 1981, a study conducted on tinnitus patients who underwent surgery to cut their auditory nerves showed that 45% experienced an improvement in their tinnitus, while 55% experienced the same or worsened symptoms (House & Brackman, 1981). This suggested the perception of sound was not solely from the ear, even after the nerve responsible for hearing was severed. Research shows tinnitus involves many neural networks, including neurocognitive and neuro-emotional networks (Siomnetti & Oiticica, 2015). These networks are responsible for higher-level brain functions, such as attention and emotion regulation, which can influence the perception of tinnitus (Siomnetti & Oiticica, 2015).

In addition, tinnitus can also be affected by abnormal interactions between different sensory systems in the body, such as somatosensory, sensorimotor, and visual-motor systems (Sanchez & Rocha, 2019). These interactions can cause a reorganization of neural networks in the brain, contributing to tinnitus's development and chronic nature (Saunders, 2007). It has been demonstrated that an individual’s emotional state and how much they focus on something can make their perception of tinnitus worse or better (Boecking et al., 2020; McKenna, et al., 2017; Roberts, et al., 2013; Saunders; Trevis et al., 2016). This happens because the signals in the brain that create tinnitus can be affected by how much attention an individual is paying to it or how the person is feeling emotionally (Shore et al., 2016). Brains are highly adaptable and can change structure and function based on experience and focus (Shaffer, 2016). The brain's adaptable and changing nature is referred to as neuroplasticity (Shaffer, 2016).

In the context of subjective tinnitus, neuroplasticity has been suggested to play a crucial role in the development and maintenance of the condition (Langguth et al., 2011; Schlee et al., 2009). Research has shown that individuals with subjective tinnitus exhibit changes in the neural activity of auditory and non-auditory brain regions (Li et al., 2016; Vannestte & De Ridder, 2012). These changes are believed to reflect maladaptive neuroplasticity, where the brain adapts to tinnitus by increasing the sensitivity of specific neural pathways and decreasing the activity of others (Vannestte & De Ridder, 2012).

Another factor that leads to an increased risk of depression and anxiety in individuals with tinnitus is the overactivity in the auditory system that causes tinnitus is thought to be generated near the limbic or emotional system of the brain (Galazyuk et al., 2012). The limbic system is a group of structures in the brain responsible for processing emotions, memories, and motivation (Queensland Brain Institute, n.d.). It is the system used for survival and is often referred to as the “flight or fight” part of the brain. When the overactivity associated with tinnitus spills over into the limbic system, it can activate the emotional center of the brain, leading to the experience of added anxiety or depression for some clients (Galazyuk et al., 2012). Research suggests whether tinnitus is perceived, causes mild annoyance or severe handicap depends exclusively on activating the limbic and autonomic nervous systems (Han et al., 2009). If research is pointing to an association between subjective tinnitus and maladaptive neuroplasticity, then modulating neural activity in auditory and non-auditory brain regions may be an appropriate course of treatment for this condition (Lagguth et al., 2013; Roberts et al., 2013; Roland et al., 2015;). Before deciding on treatment interventions, however, measuring tinnitus distress is an important first step to establishing a baseline for a patient's tinnitus-related

symptoms. This will allow for more targeted and effective treatment interventions tailored to everyone's needs.

**Tinnitus Distress Measures**

Several measurements have been developed and validated to evaluate tinnitus distress. The Tinnitus Functional Index (TFI), Tinnitus Handicap Inventory (THI), and Tinnitus Questionnaire (TQ) are all self-report measures that assess the impact of tinnitus on a person's quality of life, emotional well-being, and daily activities (Shoushtarian et al., 2020). The TFI is a comprehensive measure that assesses multiple domains, including emotional, cognitive, and sleep-related aspects of tinnitus (Gos et al., 2021). The THI focuses on the degree to which tinnitus interferes with a person's daily activities, communication, and emotional well-being. The TQ assesses the severity of tinnitus and its impact on a person's quality of life (Shoushatarian et al.).

In contrast, the *Visual Analog Scale* (VAS) and *Hyperacusis Questionnaire* (HQ) are more focused measures that assess specific aspects of tinnitus (Jacquemin et al., 2022). The VAS measures the intensity and annoyance of tinnitus, while the HQ assesses the degree to which a person is bothered by sounds that are typically not annoying to others (Jacquemin et al., 2022).

The THI is the most widely used measurement for tinnitus distress out of them all (Shoushtarian et al., 2022). It is a valid and reliable 25-item assessment measuring tinnitus severity on a 0-100 scale. Different score ranges correspond to different levels of intensity (e.g. 0-16 for slight tinnitus, 58-76 for severe tinnitus (Shoushtarian et al., 2022). The responses to these questions provide valuable information about the severity of tinnitus-related distress and how it affects an individual's quality of life. Specifically, the questions aim to assess the degree to which tinnitus interferes with an individual's ability to perform certain activities, how it affects

their emotions, and how it affects their ability to get a good night's sleep (Shoushtarian et al., 2022). By analyzing the THI responses, healthcare providers better understand the individual's tinnitus-related distress and develop personalized treatment plans to help alleviate symptoms.

## Tinnitus Distress and Impact on Quality of Life

The World Health Organization (WHO) defines quality of life (QOL) as how individuals perceive their position in life and how they evaluate their health, social and occupational status (Whogol Group, 1998). This perception is influenced by contextual factors such as culture and value systems in which they live and their goals, expectations, standards, and concerns (Whogol Group). High QOL ratings can indicate symptom reduction and self-evaluation on overall improvement of their health. Looking at the consequences of tinnitus distress through the lens of QOL brings a broader perspective on the significant impact this disorder has on the daily lives of the people it affects, which can influence the way healthcare professionals assess and address patients' needs leading to more effective treatment and management of the condition (Langguth et al., 2011). The comorbidities most commonly associated and for which are the most debilitating on QOL are anxiety, depression and insomnia (Langguth et al., 2011).

### *Anxiety*

Anxiety is a significant contributor to the distress tinnitus sufferers experience. Anxious thoughts about tinnitus can lead to feelings of despair and hopelessness and significantly impact QOL (Pattyn, et al., 2016). Research indicates that up to 45% of individuals with tinnitus also present with anxiety symptoms (Pattyn et al, 2016). Another study examined the prevalence of depression, anxiety, and stress in individuals with tinnitus compared to those with hearing loss only and those with no hearing problems (Gomaa et al., 2014). The results showed that 24.4% of individuals with tinnitus reported anxiety symptoms compared to 14.3% without tinnitus.

Specifically, males with tinnitus were more affected by depression and anxiety, while females were more affected by stress. The severity of depression, anxiety, and stress was also found to be correlated with the duration of tinnitus. The study suggests that depression, anxiety, and stress should be considered in the treatment of patients with tinnitus (Gomaa et al., 2014).

Anxiety is a broad spectrum of feelings from worry to panic (Greeson & Brantley, 2009). It is an overreactive, irrational, unwanted and unwarranted emotional fear response (Greeson & Brantley, 2009). The emotional fear response is often a reaction to physiological symptoms associated with anxiety, such as an elevated heartbeat, sweating, nausea, shivering, dizziness, restlessness, breathing difficulties, and sleep disruptions (Greeson & Brantley, 2009). Often what follows are protective or safety-seeking behaviours such as avoidance or distraction of something that in reality, is not a danger (Greeson & Brantley, 2009). In the case of tinnitus and other chronic conditions, anxiety can lead to a magnification of symptoms. The negative anxious thought patterns are believed to fuel the neural networks of the brain that keep those suffering from tinnitus in a cycle of distress and fear, keeping the nervous system on high alert each time the tinnitus ringing is perceived (Boecking et al., 2020).

### *Depression*

Like anxiety, the relationship between tinnitus and depression is complex and bidirectional and is also one of the most common comorbid conditions associated with the condition (Salazar et al., 2019). In a systematic review from 2019, researchers found that 31.4% of tinnitus patients also suffered from depression. The impact of this co-occurrence on an individual's QOL can be significant, as negative thoughts associated with tinnitus-related depression can create a self-perpetuating pattern and exacerbate both conditions (Salazar et al., 2019). The constant presence of the ringing sound can be intrusive and difficult to ignore,

leading to feelings of hopelessness and despair. This is when avoidance behaviours may present themselves such as declining invitations to social events or other environments where tinnitus is more noticeable (Cima et al., 2011). Social isolation worsens depression symptoms and leads to the development and persistence of tinnitus (Langguth et al., 2011). Another article found parallels in the pathophysiology of tinnitus and depression, suggesting a complex interplay between the two conditions rather than a mere coincidence of comorbidity (McFerran & Baguley, 2009). Treatment that addresses this negative feedback loop may lead to an improvement in overall patient outcomes.

### *Insomnia*

Difficulty falling asleep or staying asleep is one of the most common concerns among tinnitus patients seeking treatment (Richter et al., 2021). Research shows that comorbid insomnia is prevalent in 10-80% of patients, with most reports showing a 40% recurrence (Asnis et al., 2021). Insomnia is often comorbid with other psychological disorders, with anxiety being the leading cause of sleep problems in about half of the cases. At the same time, depression can also be a significant underlying factor (Horne, 2006). In much the same way depression and anxiety impacts tinnitus patients, the longer the tinnitus and insomnia persist, the more severe both symptoms become and the more impact on QOL (Crönlein et al., 2016). Empirical evidence indicates that treatments targeting these underlying psychological processes may be the key to reducing tinnitus-related distress and improving QOL for individuals with chronic tinnitus.

## Overview of Treatment

A substantial number of treatment options for chronic, subjective tinnitus exist, but despite many scientific advances, there is still little to no evidence of efficacy for the removal or improvement of subjective tinnitus (Hesser et al., 2011; McFerran et al., 2019). Often when

people are suffering so acutely the search for a pill to make it go away is an understandable and common desire. However, to date, there is no single drug that has proven consistent to relieve or cure the auditory perception of tinnitus and improve QOL. A most recent meta-analysis of 36 randomized controlled trials involving 2,761 participants found that pharmacologic interventions with brain-acting effect were associated with statistically significant improvement in tinnitus severity and response rate compared to placebo/control (Chen et al., 2021). Specifically, oral amitriptyline was the most effective in reducing tinnitus severity and response rate. Amitriptyline is an antidepressant believed to work on tinnitus by reducing the sensitivity of the central nervous system to auditory stimuli, which may help reduce the perception of tinnitus sounds (Chen et al., 2021). While these drugs proved effective in reducing the severity of tinnitus symptoms, they were not associated with changes to QOL compared to placebo/control (Chen et al., 2021). This suggests there is a potential role for pharmacological interventions with brain-acting effects but that it is not enough to address the comorbid conditions that directly affect QOL for so many with this condition.

Treatments that tackle the comorbid conditions that exacerbate the perception of tinnitus, such as anxiety, depression and insomnia, have shown promise at reducing tinnitus impact on the patients' lives (Hesser et al., 2011; McFerran et al., 2019). Following is a summary of the most used evidence-based treatment options.

***Tinnitus Retraining Therapy (TRT)***

Tinnitus Retraining Therapy (TRT) is a long-term (12-24 months +) treatment using a combination of sound therapy and counselling to help patients habituate to the sound of tinnitus. A meta-analysis and systemic review of TRT showed that TRT was an effective treatment, but

the authours also noted the studies were of low quality with a high risk of bias and that more research was needed (Han et al., 2021).

### *Sound Therapy*

Sound Therapy's aim is to make the intrusiveness less noticeable and ultimately to shift the focus off tinnitus (Wang et al., 2020). Hearing centres that offer the treatment cite two-three months to notice any changes and up to 12 months for the tinnitus to not be noticeable (Clason, 2021). There are numerous sound therapy devices that exist to mask the tinnitus just enough to provide relief from the condition. However, despite their popularity, there is not much evidence to support the efficacy of sound-based masking approaching to improving QOL and in fact some studies have shown that it can worsen the tinnitus sufferer's condition (Ibarra-Zarate et al., 2022; Wang et al., 2020).

### *Cognitive Behavioral Therapy (CBT)*

CBT is one of the earliest and most significant contributions to tinnitus research (Hallam, et al., 1988). CBT is a structured approach that promotes habituation, and programs typically run 6-10 weeks (Beukes et al., 2021). The treatment has clinician and patient teaming up to test whether the automatic negative thoughts and beliefs about the condition are valid (Jun & Park, 2013). A systemic review of 28 randomized controlled studies with 2733 participants on the effectiveness of CBT versus no intervention on tinnitus distress showed some effectiveness in reducing the negative impact and improving QOL (Fuller et al., 2020). Studies show that CBT directly targeting tinnitus-related insomnia is associated with significantly improving sleep quality (Marks et al., 2019). Although CBT studies show short-term effectiveness at reducing the negative impact of tinnitus on QOL, there is an absence of evidence of its effectiveness at 6-12 months (Fuller et al., 2020).

Treatments to date have focused on having the patient learn to habituate to the sound by teaching relaxation techniques, challenging cognitive distortions, masking the sound, or deliberately shifting the attention away from the perception of tinnitus to other stimuli or activities. More recently, acceptance has been studied in several empirically oriented treatment approaches. This method can be considered particularly useful when dealing with chronic conditions, such as tinnitus where the most frequently used strategy for many distressed patients is avoidance (Hesser, et al., 2009; Meijers, et al., 2020).

**Acceptance and Commitment Therapy (ACT)**

Experiential avoidance has been suggested as a core mechanism when conceptualizing harmful psychological processes active in tinnitus distress (Hesser et al., 2009). Experiential avoidance is a behaviour where an individual tries to avoid unpleasant personal experiences such as negative thoughts, emotions, and sensations. This can prevent them from participating in situations that may pose a risk of such unpleasant experiences occurring. (Hayes et al., 1999). The opposite of experiential avoidance is often described as acceptance. Therefore, increasing acceptance where the individual can participate in a valued direction of life even in the presence of unpleasant personal events is a goal in most ACT protocols (Backledge & Hayes, 2001; Eifrit, 2009). With regards to the treatment of tinnitus, this means interventions aimed at promoting goal-directed behaviours in valued life domains through the help of mindfulness and acceptance training (Wang et al., 2022). Unlike other tinnitus treatments where the objective is to habituate or reduce anxiety, ACT's purpose is to develop psychological flexibility in the presence of the stimulus (i.e., ringing, buzzing, hissing, etc.) through ACT's six core processes (Hayes et al., 1999). Habituation and anxiety reduction often occur, but it is not the main purpose.

### *ACT's Six Core Processes*

ACT was founded in 1986 by Steven C. Hayes, a Professor of Psychology in the Behavior Analysis program at the University of Nevada. Hayes did his graduate-level work in Behavior Analysis in Los Angeles and was very influenced by the hippie counter-culture of the 1960's, which accounts for the inclusion of the many mindfulness-based interventions in ACT (Hayes, n.d.). The therapy was further developed by two of Hayes' cofounders, Kirk Strosahl and Kelly Wilson. ACT is rooted in the philosophy of functional contextualism, and its underlying theoretical foundation is relational frame theory (RFT); a behavioural approach to language and cognition (Hayes, 2002). In the years since, thousands of published studies including, over 1000 randomized controlled trials, have shown ACT's effectiveness for numerous human concerns, including PTSD, depression, anxiety disorders as well as substance use and chronic pain (Karekla, 2021).

ACT relies heavily on mindfulness techniques: consciously bringing awareness to the here-and-now experience with openness, curiosity, and flexibility (Harris, 2009). ACT provides a philosophy and set of techniques for helping clients open up to painful experiences and shift behaviours toward their values. ACT starts with the premise that a healthy mind is often destructive and creates suffering (Prochaska & Norcross, 2014). As mentioned, reducing pathology symptoms is not a goal of ACT, and in fact, focusing on getting rid of symptoms can create clinical disorders in the first place (Stoddard & Afari 2014). Instead, the goal of ACT is to increase psychological flexibility and allow the patients' goals and values to guide the process of behaviour (Harris, 2009).

ACT helps individuals to increase psychological flexibility and live a more meaningful life through six core processes reflected in a visual model called the "hexaflex". The six core processes are described below.

**Acceptance.** This process involves acknowledging and accepting one's thoughts, feelings, and sensations without trying to change or control them. It does not mean liking them or wanting them. The premise is if individuals learn not to avoid unpleasant experiences, they can reduce the struggle against them and experience less psychological distress (Harris, 2009).

**Cognitive Defusion.** This describes a mindfulness approach that takes people out of the world of language and back into the present moment (Assaz et al., 2018). Cognitive defusion asks an individual to notice their self-talk like a curious outsider instead of automatically believing the content to be true and making decisions from there. Instead of changing the content of the thoughts, as is the case in CBT, cognitive defusion techniques change the function of the thought (Assaz, et al., 2018). For example, an individual believes their tinnitus is a sign of a serious medical condition and that they are broken. They feel anxious and frustrated whenever they hear the ringing, and want to stay home and not see anyone. This client is “fused” with their thoughts about tinnitus and has difficulty seeing them as just thoughts, rather than facts. Cognitive defusion techniques would help change their relationship with their thoughts instead of accepting them as objective reality.

**Self-as-Context.** The most common meaning of self-as-context is the “noticing self” or “observing self” (Harris, 2009). It is the idea of recognizing ourselves as a constant observer and experiencer of thoughts, feelings, and sensations rather than being defined by them. It is a particular way of experiencing ourselves separate from our private experiences instead of being those experiences. Many changes happen throughout life- the body changes, thoughts and

feelings change, roles in life change, but the one thing that does not change is the "you" that notices all the changes. Self as context for someone who thought, I am broken, would sound like, "I notice I am having a thought I am broken." This small shift of observing/noticing their thoughts instead of identifying with them may help the person make decisions from a place of neutrality rather than from fear or despair. This is an important step in increasing psychological flexibility.

**Values.** Identifying values or what is most important and meaningful in life can act as a compass and motivator, especially during unpleasant experiences (Harris, 2009). By focusing on values and using them to guide behaviour, individuals can increase their motivation and commitment to pursue actions consistent with their values, even in the face of unpleasant experiences. If a client identified "family" as a value, a therapist could ask if not leaving the house to see their brother brings them closer or away from their values. If the client said it takes them away from their values, that may be enough to motivate them towards values guided action. However, they will likely require additional support by drawing on other processes of the hexaflex.

**Committed Action.** Committed action is continuously aligning one's behaviour with their defined values to encourage the development of flexible and effective patterns of action (Harris, 2009). Its central focus is reorienting an individual's beliefs and objectives and reducing behaviours that impede progress toward these goals. This intentional adaptation facilitates meaningful change (Hayes et al., 2012). An important part of tinnitus treatment with ACT will mean mobilizing a client's values by taking values-guided action towards the life they want to lead. Through committed action, they will learn to focus on what they can control and take steps toward building a rich and fulfilling life, even when difficult thoughts or feelings arise. The

assumption is that this will help them break free from the patterns of avoidance and lead to greater psychological flexibility and life satisfaction (Harris, 2009).

**Contact with the Present Moment.** While past and future thoughts have a purpose, such as learning from mistakes, understanding current behaviour, and looking forward to exciting events, the ACT model postulates that problems occur when an individual chooses not to make contact with the present moment (Harris, 2009). Being present requires contact with internal private experiences and environmental events as they occur and observing them in a non-reactive and non-judgmental way (Baer, 2006). One of the skills therapists teach in ACT that help clients stay in the present moment and out of the downward spiral of past and future rumination is mindfulness (Baer, 2006). Studies show rumination is a longitudinal mediator between mindfulness and depression; therefore, clients who struggle with rumination about their tinnitus may find mindfulness-based therapies like ACT beneficial in reducing racing thoughts and symptoms of depression (Jury & Jose, 2019).

The model suggests that patients can alleviate their tinnitus distress and improve QOL if they shift their focus away from attempts to control or eliminate their tinnitus symptoms and instead cultivate psychological flexibility, acceptance, and a sense of purpose and meaning in their lives. A small but growing body of literature has explored the potential benefits of ACT and related approaches for tinnitus patients, and initial results are encouraging.

## Studies Testing the Efficacy of ACT on Tinnitus Related Distress

Four studies were selected to investigate the effectiveness of ACT in reducing tinnitus-related distress and improving quality of life. The criteria used in the selection process included relevance to the research question, randomized controlled trials, reported data on validated outcomes such as hearing-related distress, depression, anxiety, insomnia, or quality of life.

Additionally, criteria considerations included peer-reviewed studies and involvement of adults who had tinnitus.

Study one by Westin et al. (2011) compared the effectiveness of two treatments, ACT and TRT, in reducing tinnitus impact in individuals with normal hearing and tinnitus. The study focused on two of the most common comorbidities of the condition, sleep problems and anxiety. The study included 64 normal hearing subjects with tinnitus who were randomly assigned to one of the active treatments or a wait-list control (WLC). The ACT treatment consisted of 10 weekly 60-minute sessions, while the TRT treatment consisted of one 150-minute session, one 30-minute follow-up, and continued daily use of wearable sound generators for a recommended period of at least eight hours per day for 18 months. The assessments were conducted at baseline, 10 weeks, six months, and 18 months. The main outcome measure used in the study was the Tinnitus Handicap Inventory (THI). Study results indicated a statistically significant impact of ACT compared to the WLC in reducing tinnitus problems with sleep and anxiety at the 10-week assessment with the mediating factor being tinnitus acceptance. Furthermore, the comparison between the active treatments revealed significant differences in favor of ACT regarding tinnitus and problems with sleep, including all assessment points. At the six month assessment, reliable improvement on the main outcome measure was found for 54.5% of the subjects in the ACT condition and 20% in the TRT condition.

This study has several limitations which moderate the findings. First, the duration of the treatment and control conditions differed, with ACT lasting for 10 weeks and TRT for 18 months. Second, the external validity of the findings is constrained because of participant self-referral, potentially provoking a sample selection bias towards more motivated individuals. Additionally, the study did not provide any indication of the ethnic composition of the sample

population. Finally, ACT therapists were clinically inexperienced and particularly in using the treatment with tinnitus patients, which could have led to underestimating the effect of ACT on tinnitus distress.

Study two by Hesser et al. (2009) examined the effectiveness of an acceptance-based treatment program for tinnitus distress. The program included mindfulness and acceptance training, exposure exercises, changing tinnitus-related behaviors, working with values and life goals, and psychoeducation regarding tinnitus. The study included 19 clients between the ages of 34 and 72, and the program consisted of up to 10 weekly sessions. The main outcome measure used was the THI, and the study found a statistically significant difference in the primary outcome measure between pre-treatment and six month follow-up. The reduction in tinnitus distress appeared to occur rapidly, with more than half of the total mean change in THI score happening by session four. The study suggests that acceptance and cognitive defusion may be effective in reducing tinnitus distress in patients over a longer-term follow-up period. However, the generalizability of results is limited due to the homogeneity of the participants, and researchers noted the selection of the middle 30 minutes of each session for ratings may not have been optimal for capturing clients' acceptance and defusion behaviours (Hesser et al., 2009).

Study three by Molander et al. (2018) examined the feasibility and effectiveness of an 8-week internet-based ACT treatment for psychological distress related to hearing problems. Participants were randomly assigned to the intervention or wait-list control group, and the intervention focused on experiential avoidance and activity engagement. The main outcome measure was the *Hearing Handicap Inventory for Elderly Screening Version* (HHIE-S), which assesses the social and emotional impact of hearing loss. Results showed that the intervention was effective in reducing distress associated with hearing problems in older adults, as evidenced

by significant improvements in HHIE-S, PHQ-9, and QOLI scores in the intervention group compared to the wait-list control group. However, there was no significant difference in GAD-7 scores based on group allocation. Limitations of the study included a self-referred and a homogenous sample, a small sample size, and the lack of active controls or comparative treatments.

Study four by Riedl, et al. (2015) examined the relationship between tinnitus acceptance and psychological distress in patients with chronic tinnitus. A total of 97 participants were recruited, and the German Tinnitus Acceptance Questionnaire (CTAQ-G) was used to measure tinnitus acceptance. The study found that patients with higher tinnitus acceptance had better psychological QOL and less psychological distress compared to those with lower tinnitus acceptance. There was no significant difference in physical QOL between the two groups. The study also found a significant negative correlation between acceptance and tinnitus distress. However, the sample size was small, and the participants were self-referred, limiting the generalizability of the findings. The study still contributes to a body of research highlighting the importance of tinnitus acceptance in improving the psychological well-being of patients with chronic tinnitus.

### *Discussion on Study Results*

Regarding the aim of this capstone project to investigate the effectiveness of ACT in reducing tinnitus-related distress and improving quality of life (QOL), the results from the four randomized controlled studies indicate promising evidence. Across all four studies, there is some evidence suggesting that ACT can help alleviate symptoms of depression, anxiety, and insomnia. Furthermore, study four by Riedl, et al. (2015) also demonstrated improvements in QOL. However, methodological limitations impact the generalizability, validity, and applicability of

these findings. Those limitations include small sample sizes, selection bias due to most participants being self-referred as well as homogenous samples consisting of primarily white, Western European participants.

Another limitation of the studies is there is no mention of the clinical experience of the therapists hired to administer ACT in the case of studies one through three (Hesser et al., 2009; Molander et al., 2018; Westin et al., 2011) or their experience treating tinnitus with the therapy. ACT intentionally chooses not to have a certification process as it "could create a hierarchical and closed process which would be antithetical to our values" (Long, n.d). The challenge of not having a certification process when testing the therapy as a mediating factor in RCT's is the lack of standardization can impact the quality of the treatment making it difficult to compare results across studies. There is also a potential problem with replicating research findings using ACT, as different therapists may use different techniques and approaches.

To establish the effectiveness of ACT on tinnitus-related distress and understand the potential impact of broader implementation, larger sample sizes, including participants from diverse populations, and higher-quality studies are needed. In addition, establishing training standards for ACT practitioners used in research (e.g., developing a list of competencies and training requirements) may improve the therapy's quality, consistency, and credibility which in turn would strengthen the validity and reliability of research outcomes. Compared to CBT, the most empirically established form of psychotherapy used for tinnitus, ACT is in the earlier stages of empirically supported treatments (Jun & Park, 2013). Even though research is promising it is still preliminary to a certain degree.

While the studies did not touch on the underlying mechanisms through which ACT alleviates tinnitus distress, others have begun to study the phenomena. Specifically, recent

research is investigating the neuroscientific processes that underlie the therapeutic effects of ACT for individuals with chronic health conditions. A study by Aytur et al. (2021 assessed the neurologic mechanisms underlying ACT and found that the therapy's mindfulness-based interventions had a statistically significant impact on health outcomes for patients suffering from chronic pain. Post-treatment assessments showed that participants exhibited reductions in brain activation that decreased depression, less pain and increased participation in social roles (Aytur et al., 2021). This study and others suggest that neuroimaging and other objective measurements can provide valuable insights into the mechanisms of ACT and other mind-body therapies, which can pave the way for developing more targeted and effective treatments for chronic conditions such as tinnitus.

### *Ethical Considerations*

Informed consent is critical when deciding to use ACT with a client. ACT is an experiential therapy that uses a range of interventions including mindfulness exercises, cognitive defusion techniques, and value-based goal setting. Without informed consent clients may not fully understand the nature and purpose of the interventions which could negatively impact the therapeutic alliance and result in poorer treatment outcomes. ACT is also an active and collaborative therapy where there is an expectation to practice skills between sessions. If a therapist fails to adequately inform clients about the structured and homework-based nature of the therapy and the need for practice outside of the session, clients may feel coerced or pressured into participating in a therapy that does not align with their personal values or lifestyle, compromising their autonomy and right to make informed decisions about their own treatment. Adjustments to the interventions can always be made to tailor to the needs of the clients, but

failure to obtain informed consent and engaging in a dialogue about expectations can lead to misalignment and pose serious risk to the therapeutic process (Harris, 2022).

Another ethical consideration is related to competent caring. ACT is a relatively new therapeutic approach without a standardized certification process, but it still requires specialized training and expertise. Therapists should have sufficient knowledge and skills in ACT and in assessing and managing tinnitus-related distress before treating clients to ensure they are providing ethically informed care to all their clients. For example, ACT uses metaphor, imagery and mindfulness practices which may be difficult for clients with cognitive challenges or who are neurodivergent. If a therapist is not adequately trained or experienced in adapting ACT interventions to meet the unique needs and abilities of diverse clients, there is risk of unintentional harm or even re-traumatization. Informed consent and proper training are critical to managing risk and maximizing treatment outcomes with clients.

### *Application to Clinical Practice*

Research outcomes from the studies on ACT's effectiveness in reducing tinnitus-related distress have immediate application in clinical practice. Since chronic tinnitus is comorbid with anxiety, depression and insomnia, therapists will want to ask clients, especially older clients, if they have tinnitus or other auditory issues. In addition, screening for suicidal and self-harm ideation for clients who present with tinnitus-related distress is also important, especially for those with comorbid depression. Therapists will also want to flag clients who share that the chronic nature of the tinnitus has begun to impact their QOL as early intervention is associated with improved therapeutic outcomes, especially with regard to sleep impairment (Xu et al., 2016).

Educating clients on how fear-avoidance exacerbates the condition can be empowering for some clients but a sensitive issue for others. Resistance from clients around the psychological aspects of chronic conditions such as tinnitus is typically due to continued stigma from the public who believes discomfort in the body is only a physical sensation, despite years of research that supports the contrary (Perugino et al., 2022). Furthermore, individuals suffering from chronic conditions such as tinnitus are often concerned about being judged and the potential risk of opening up to these psychological concepts. This resistance can make therapists reluctant to provide this necessary and potentially life-altering education. Therapists who gently persist by showing compassion and sensitivity when talking about the subject will have more success at reaching these clients.

# Chapter 3: Future Directions

There were three purposes for this capstone project: First, to explore the effectiveness of ACT as a means of reducing tinnitus-related distress; second, to bring attention to the severe mental health consequences of tinnitus for affected individuals; and third, to create an online course aimed at patients, counsellors, and healthcare clinicians to broaden the scope and reach of tinnitus education and treatment offerings. The research findings suggest ACT may be a promising intervention for mitigating tinnitus-related distress and enhancing the quality of life for individuals with tinnitus. Nonetheless, further research with larger sample sizes and more diverse populations is recommended to enhance the findings' generalizability and reliability. Additionally, further investigation into the less-explored areas of tinnitus is recommended to enhance knowledge and understanding of this complex and often misunderstood condition. This paper is merely a starting point for increasing awareness of tinnitus and its potential treatment options. Therefore, the following chapter will propose further research recommendations discuss clinical implications and introduce an online course that would expand the accessibility of information and treatment choices for individuals suffering from tinnitus.

## Further Research Recommendations

The research demonstrates that tinnitus is a complex and multifactorial condition that affects individuals differently. Several other research areas are recommended to develop an enhanced understanding of the condition and assist in developing more effective interventions.

### *Help Seekers versus Non-Help Seekers*

One area that merits further investigation is the experiences of individuals who do not seek professional help for chronic tinnitus. Tinnitus affects up to 25% of the global population; however, only a small proportion of those affected reach out for treatment (Hoffman, 2004). By

exploring the experiences of individuals who have not sought help for tinnitus, researchers can gain insights into the condition's natural history and the coping strategies used by those affected. Understanding the factors that may affect tinnitus' progression can inform the development of more effective interventions tailored to the needs and preferences of individuals with tinnitus, particularly those who may be hesitant to seek professional help.

In addition, research into those individuals who do not seek help for the condition may illuminate the barriers to care and inform the development of strategies to promote help-seeking behaviour. For example, fear of stigmatization or a lack of awareness about available treatments may be factors that prevent individuals from seeking help for their tinnitus. By identifying and addressing these barriers, researchers can promote more widespread access to effective treatments and reduce the burden of tinnitus-related distress.

### *Neurological Mechanisms of ACT*

Another research area worth further exploration is the neurological processes that occur during ACT. Research into this area can help identify the brain regions and networks involved in the therapeutic response to this treatment. This can inform the development of more effective and targeted interventions tailored to the specific needs of individuals with tinnitus. In understanding the biomarkers of ACT, healthcare providers can use the information to predict treatment response and monitor progress which can facilitate the development of personalized treatment plans optimized for everyone's unique needs and preferences.

### *Relationship between Childhood Trauma and Tinnitus*

Further investigation into the role of childhood trauma in developing and maintaining chronic tinnitus is another important area of research. As discussed in Chapter One, research suggests a link between ACEs and chronic tinnitus, reflecting the findings of trauma's impact on

other chronic health conditions (Koetting, 2016; Mock & Arai, 2011). By investigating the mechanisms by which childhood trauma contributes to developing and maintaining chronic tinnitus, healthcare providers can be alerted to the importance of adopting a trauma-informed approach to treatment. This would involve recognizing the potential impact of trauma on an individual's tinnitus and tailoring treatment to their specific needs and experiences. For example, a trauma-informed treatment for tinnitus might involve integrating a safe and supportive environment for the individual to explore and process traumatic experiences that may have contributed to their tinnitus. A clinician could ask the client if they can find any connections between the onset of the tinnitus and a life event that was meaningful to them. Research into the role of childhood trauma in chronic tinnitus can provide valuable insights into the underlying mechanisms of the condition and inform the development of more effective, personalized treatments that consider an individual's trauma history. This could ultimately lead to improved outcomes and quality of life for individuals with chronic tinnitus.

**Development of an Online Course**

To enhance the reach and accessibility of the information presented in this paper, I am proposing an evidence-based, therapist-guided online course for mental health providers and individuals struggling with tinnitus-related distress. The course will be informed by the four research studies on ACT and tinnitus while also incorporating additional areas of interest such as neuroscience education, sleep hygiene, and trauma. The inclusion of these modules is supported by my research in chapter one and two, and as such, specific course modules dedicated to each of these topics is included in the course.

The decision to offer an online course versus an in-person offering is to increase accessibility. In addition, study three by Molander et al. (2018) had comparable outcomes to in

person ACT interventions which is compatible with other research on cognitive behavioural treatment programs (Büscher et al., 2022; Kaldo, et al., 2008; Regar & Gahm 2009). Additionally, online courses can provide anonymity, reducing stigma associated with the condition. For these reasons, the decision to create an online course was made versus an in-person format.

### *Course Description*

The eight-week course, "Living with Purpose: An ACT-Based Approach to Thriving with Tinnitus," is designed for individuals experiencing tinnitus and healthcare professionals seeking resources and education to better serve their clients/patients with tinnitus. Before registering, individuals with tinnitus must confirm with a doctor that their tinnitus is not objective tinnitus, as the treatment approach differs from that of subjective tinnitus, which is what the course is designed for. Additionally, participants must read and sign a consent form that explains the ACT model and the course objectives, emphasizing the experiential nature of the therapeutic modality and the importance of completing in-class activities and homework. This ensures participants provide informed consent before joining.

The course is facilitated by a therapist trained in ACT and will be synchronous in that participants will meet at the same time each week. The choice to offer a synchronous course versus an asynchronous course which will allow for more flexibility, is based on research that shows synchronous mental health courses foster a sense of community and collaboration (Li et al., 2021). Tinnitus can be an isolating and distressing condition, and therefore connecting with others who understand the experience may make for a more enriching experience and enhance treatment outcomes.

The course will consist of a series of weekly modules spanning 90 minutes (see Table 1). The facilitator will begin each module by presenting psychoeducation to the group, followed by educational videos, in-class activities, and homework assignments to be completed between sessions (see Appendix A for Content of Modules). There will be a cap of 25 individuals per course to ensure a high-quality experience for participants. The course will be conducted in a group format to facilitate peer collaboration and learning. Additionally, the therapist leading the course will provide ongoing check-ins between sessions to offer extra support and guidance to participants.

### *Outline of Weekly Modules*

#### *Module 1: Tuning in to Tinnitus: An Introduction to Therapeutic Neuroscience Education*

Module 1 is designed to provide participants with a comprehensive understanding of the brain's fear system and how it influences the perception and experience of tinnitus. Research shows that neuroscience education improves outcomes for individuals with chronic conditions such as tinnitus, as it enhances their understanding of the underlying neurophysiology and reduces fear, anxiety, and catastrophizing related to their condition (Louw et al., 2011). Participants will learn to identify common responses that activate the brain's danger system and those that deactivate it, bringing a sense of safety. This module also includes a practical activity where participants can identify their own danger and safety responses. By actively engaging in this exercise, participants can begin to replace one common danger response with a safety response, promoting a sense of control and potentially alleviating tinnitus-related distress. Reflecting on this process through journaling or recording their experiences after class further enhances self-awareness and facilitates the integration of therapeutic neuroscience education into daily life.

### *Module 2: Finding Your Inner Voice: Exploring Values*

Module 2 introduces values identification to participants. Integrating values into treatment can foster motivation and guide individuals towards enhancing their quality of life (Harris, 2009). When people can identify, harness, and cultivate their own resources, it can empower them to make and sustain desired changes and improvements in their lives (Trindade, et al., 2016). Through a values exploration exercise, participants will identify their top five values, gaining clarity on what truly matters to them. They will also assess the areas of their life where they are currently living in line with these values and where discord exists. The module will specifically address the ways in which tinnitus interferes with living according to one's values. By integrating values-based principles and activities from ACT into their lives, participants have the potential to cultivate psychological flexibility, resilience, and well-being, ultimately contributing to their healing journey from tinnitus distress.

### *Module 3: Acceptance and Mindfulness for Tinnitus Distress*

In Module 3 course participants will learn about the significance of integrating acceptance and mindfulness techniques in managing the psychosocial symptoms associated with tinnitus. Learning to differentiate between acceptance and experiential avoidance will be a key component of this module. Acceptance involves willingly engaging with the distressing thoughts and emotions related to tinnitus, without attempting to avoid or suppress them (Hallam et al., 1984). Experiential avoidance, on the other hand, involves engaging in behaviors aimed at escaping or distracting oneself from tinnitus (Hesser et al., 2009). Adopting mindfulness practices in the face of painful thoughts and emotions empowers individuals to develop a compassionate relationship with their tinnitus experiences, fostering emotional resilience and reducing psychological distress (Westin et al., 2011).

### *Module 4: Cognitive Defusion Strategies for Tinnitus*

The fourth module in the course teaches cognitive defusion strategies to help participants lessen their thoughts' grip on their behaviour. This module aims to equip individuals with practical techniques to notice, acknowledge, and observe their thoughts from a distance rather than being dominated or fused with them (Hayes et al., 1999). To begin, participants explore the distinction between defusion and fusion. Defusion creates a sense of separation between oneself and one's thoughts, allowing for a more objective observation of the content of the mind (Harris, 2009). Fusion, conversely, refers to becoming completely absorbed or identified with one's thoughts (Harris, 2009). When participants recognize that thoughts are merely mental events and not necessarily accurate reflections of reality, it can empower them to respond more effectively to challenging situations (Hayes et al., 1999). With practice, liberating the mind from fusion offers a different way of looking at the same challenges, cultivating hope for a better life.

### *Module 5: Sound Sleep, Sound Mind: Techniques for a Good Night's Sleep*

In Module 5, participants learn evidence-based techniques to improve their sleep. When individuals with tinnitus experience sleep disturbances, their symptoms worsen, leading to heightened distress and impaired psychological well-being (Crönlein et al., 2016). To optimize sleep quality and effectively manage tinnitus-related distress, participants are introduced to six evidence-based strategies based on Acceptance and Commitment Therapy for Insomnia (El Rafihi-Ferreira et al., 2021). These strategies include mindfulness-based techniques, cognitive defusion, acceptance, commitment to sleep, adopting a sleep schedule, and sleep environment optimization. The aim of prioritizing sleep hygiene is to ease tinnitus symptoms and improve quality of life.

### *Module 6: Create A Life Worth Living*

The objective of this module is to enable participants to differentiate between workable and unworkable actions and empower them to make values-guided choices toward the life they desire. Workable and unworkable actions refer to the distinction between behaviours that align with an individual's values and lead to meaningful outcomes (workable) versus actions that are driven by avoidance, rigid rules, or short-term relief and hinder progress towards valued living (unworkable) (Hayes et al., 2012). To facilitate the process of distinguishing between workable and workable actions, the module introduces exercises that encourage participants to engage in values-guided effective action despite the challenges posed by tinnitus. The module further explores the definition of workability and delves into the costs and benefits of unworkable actions, emphasizing the importance of distinguishing between feeling good and doing good. When participants gain insight into the connection between emotions, thoughts, and workability, it is a step towards greater psychological flexibility and enhanced overall life satisfaction navigating life with tinnitus.

### *Module 7: Unraveling the Link Between Trauma and Tinnitus Distress*

Module 7 delves into the relationship between trauma and tinnitus distress. Research indicates a link between significant life experiences, including traumatic events, and tinnitus-related symptoms and therefore it was critical this information was included (Boullier & Blair, 2018). It was intentional to place the trauma-related module near the end of the course to allow participants to establish a foundation of safety, trust, and resilience through prior modules before exploring potentially sensitive and triggering topics related to trauma.

When participants learn how life experiences and trauma influence their tinnitus and its associated distress, painful thoughts and emotions may arise. That is why this module also

introduces the concept of self-compassion, as it can play a pivotal role in the healing process for trauma (Neff, 2003). According to Neff (2003), a prominent researcher in the field of self-compassion, showing one's self kindness, forgiveness, and love provides the foundation for emotional healing by fostering resilience, promoting self-soothing, and facilitating the integration of traumatic experiences into one's personal narrative (Neff, 2003). Integrating opportunities to practice self-compassion during this module will promote its development and enhance participants ability to navigate tinnitus distress with kindness and understanding.

### *Module 8: Looking Back, Moving Forward: Reflections and Strategies for Sustaining Progress*

The course's final module provides participants with an opportunity to summarize and reflect on the progress they have made, acknowledge the challenges they have faced, and develop a plan for the future. Through reflection, participants engage in deeper understanding and meaning-making from their experiences (Moon, 2006). Intentionally reflecting serves as a reminder of their growth and achievements, fostering a sense of accomplishment and empowerment. Furthermore, participants are guided to identify signs indicating a potential return to old behaviours. By normalizing these signs and understanding that setbacks are a natural part of healing, participants can proactively develop a plan to navigate such challenges, remember to be kind to themselves and recommit to the new behaviours they have practiced. Participants will also be encouraged to celebrate their success outside of class to help reinforce a positive mindset and cultivate a sense of accomplishment as they move forward.

## Limitations and Recommendations

This online course, "Living with Purpose: An ACT-Based Approach to Thriving with Tinnitus," provides an accessible and specialized treatment option for individuals suffering from

tinnitus, while also offering counselors and healthcare providers the tools and knowledge to support their clients/patients. Nonetheless, some limitations to the course should be considered. The first limitation is that most individuals with tinnitus are older adults and therefore the potential technical difficulties or lack of interest for an online format may be higher than from a younger demographic that is used to accessing information online. To address this issue, the course could easily be adapted to an in-person group therapy format. The other possible limitation is the eight-week time commitment may pose a risk for dropouts. A response to this possibility is to condense the course into four weeks using focused acceptance commitment therapy (FACT) as a model (Stroshal et al., 2012). FACT is a brief model of ACT that has proven to be successful in group and healthcare settings (Glover et al., 2016). However, I was unable to find research to date on its effectiveness in an online format. Regardless, the course in its current iteration is a starting point for individuals who are suffering with no access to specialized treatment and for the counsellors and healthcare providers who need the tools and knowledge to support them. While researchers continue to search for a cure, managing symptoms of tinnitus distress with ACT is a promising therapeutic approach to cultivate greater psychological flexibility and improve overall quality of life.

## Final Thoughts

Writing this paper gave me a deeper understanding of the profound psychological impact that invisible disabilities like tinnitus can have on individuals. Despite my increased knowledge, I still underestimated its psychological impact on my husband, who has lived 24/7 with constant high-pitched ringing in his head for years without ever saying a word about it. I assumed since he never talked about it and carried on with his life like any other person, he did not suffer like the millions of people who do. After he read my paper, however, he half-jokingly expressed

disappointment that I had not discovered a cure, but I saw the pain cross his face as he spoke, and it revealed the silent burden he carries every day.

My husband's reaction was a poignant reminder that those who have learned to cope with their symptoms and appear to be enjoying their lives may still be impacted by the presence of tinnitus. As a student about to enter the counselling profession, I want always to be mindful of the significant impact chronic medical conditions like tinnitus can have on my clients' well-being, even if they seem symptom-free or have developed effective coping mechanisms. I am humbled by the fact that I can never truly know the full extent of someone's inner experiences. It is a reminder to approach each client's journey with an open mind and heart, asking questions to understand their unique challenges and tailoring interventions to their specific needs. Whether it is a client like Aliyah, who is forthcoming with her suffering, or another who struggles in silence, I am inspired to create a validating environment where people with invisible disabilities feel seen and supported and where hope can grow in the midst of fear.

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**Table 1**

**An Overview of Weekly Course Modules**

Module 1: Tuning in to Tinnitus: An Introduction to Therapeutic Neuroscience Education

Module 2: Finding Your Inner Voice: Exploring Values

Module 3: Acceptance and Mindfulness for Tinnitus Distress

Module 4: Cognitive Defusion Strategies for Tinnitus

Module 5: Sound Sleep, Sound Mind: Techniques for a Good Night's Sleep

Module 6: Create A Life Worth Living

Module 7: Unraveling the Link Between Trauma and Tinnitus

Module 8: Reflections and Strategies for Sustaining Progress

# Appendix A

## Content of Modules

### *Module 1: Tuning in to Tinnitus: An Introduction to Therapeutic Neuroscience Education*

**Objective:** Participants will be able to describe the brain's fear system and how the response to tinnitus directly impacts how it is experienced.

**Content**

- Introductions. Participants invited to talk about their tinnitus story, what brought them to the course and what they have tried so far to alleviate symptoms.
- A brain-based explanation for tinnitus.
- How thoughts and emotions impact tinnitus perception.
- Identify common responses that activate the brain’s danger system and responses that deactivate the system and bring a sense of safety.
- **Activity:** Participants identify up to five common responses that activate their danger system and five responses that bring a sense of safety.

**Homework:** Participants asked to replace one common danger response with a safety response one time during the week. Reflect on the process in a journal or phone**.**

### *Module 2: Finding Your Inner Voice: Exploring Values*

**Objective:** Participants will be able to identify five personal values and understand how to use them to bring more purpose and meaning to their life.

**Content**

- Conduct a values exploration exercise and identify their top five values.
- Identify the areas of their life where they are living those values and where they are not.
- Explore the ways in which tinnitus can interfere with living their values.

**Activity:** Introduce the "Flavour and Savour" values exercise (Harris, 2021). This activity invites participants to identify one value they want to bring into play for the day ahead. For example, if it is kindness, then throughout the day look for opportunities to "sprinkle" that value into whatever they are saying or doing. As they are "flavouring", make sure to "savour" it by noticing the effects of living their value is having.

**Homework:** Pick one value to flavour and savour for the next week. Notice what activities or people make it easier to flavour and savour the value and when it is more difficult. Reflect on the process in a journal or phone**.**

***Module 3: Acceptance and Mindfulness for Tinnitus Distress***

**Objective:** Participants will be able to use a mindfulness-based technique to support moving towards acceptance.

**Content**

- Learn what mindfulness is and its connection to neuroplasticity and tinnitus distress.
- Discuss the difference between acceptance versus "giving up". Acceptance means a willingness to contact the painful thoughts and feelings related to tinnitus without avoiding them.
- Acceptance versus experiential avoidance in relation to tinnitus.

**Activity:** Practice mindfulness-based exercise that requires participants to acknowledge thoughts and feelings, come back into their bodies and engage and notice what they are doing.

**Homework:** Participants will practice mindfulness-based exercise at least once daily when they are feeling calm. Practicing during periods of calm will make it easier to access the skill when it is needed most during times of stress.

### *Module 4: Cognitive Defusion Strategies for Tinnitus*

**Objective:** By learning cognitive defusion techniques, participants will be able to notice, acknowledge and observe from a distance their thoughts instead of being dominated by them (Hayes et al., 1999).

**Content**

- The difference between defusion and fusion.
- Self as Content versus Context explained using the chessboard metaphor. This metaphor asks participants to visualize thoughts and emotions as just pieces on a chessboard that they can observe and make strategic moves with rather than getting caught up in the game (Hayes et al., 1999).
- Introduce two defusion techniques, “Hands as Thoughts” and “Pushing Away Paper” (Harris, 2021).

**Activity:** Participants are supported in creating and using their own personalized defusion technique.

**Homework:** Practice cognitive defusion technique over the next week. Reflect on the experience in a journal or phone**.**

### *Module 5: Sound Sleep, Sound Mind: Techniques for a Good Night’s Sleep*

**Objective:** Participants will be able to apply evidence-based techniques to improve their sleep.

**Content**

- What the research says about a good night’s sleep and improving tinnitus distress.
- The four stages of sleep and how each stage supports the brain and body.

- Six strategies for a good night's sleep based on ACT-I (El Rafihi-Ferreira, et al., 2021).

**Activity:** Quiz testing participant's sleep I.Q.

**Homework:** Track sleep habits for one week using a sleep tracker chart. List bedtime, waketime, hours of sleep, daily activities, and feelings, emotions and/performance. Implement one of the six sleep strategies.

***Module 6: Create A Life Worth Living***

**Objective:** Participants will be able to identify the difference between workable and unworkable actions and know how to make values-guided choices toward the life they want.

- Introduce the "Choice Point" to encourage values-guided effective action despite tinnitus-related challenges (Ciarrochi et al., 2014).
- Definition of workability and explore the costs and benefits of unworkable actions.
- Exploring the difference between feeling good and doing good.

**Activity:** Complete "Choice Point" worksheet by identifying the challenging thoughts, feelings and sensations that arise with tinnitus and how you respond. For example, is the response an "away" move, away from their values, or a "towards" move, toward their values?

**Homework:** Participants are to record on the "Choice Point" when a difficult thought or feeling arises and the response. Notice what thoughts, feelings or situations appeared when choosing an away move vs a towards move.

***Module 7:*** *Unraveling the Link Between Trauma and Tinnitus Distress*

**Objective:** Participants will be able to recognize how significant life experiences affect their tinnitus and how treating themselves with self-compassion and kindness helps with the healing.

**Content**

- What the research says about the link between trauma, the nervous system and tinnitus.
- The art of self-compassion – acknowledging the pain and responding to the self with kindness (Harris, 2021).
- Using mindfulness to build self-compassion.

**Activity:** Facilitator will lead participants through a self-compassion mindfulness meditation.

**Homework:** Recording of self-compassion mindfulness meditation emailed to participants and they are encouraged to practice it at least twice before the next class.

***Module 8: Looking Back, Moving Forward: Reflections and Strategies for Sustaining Progress***

**Objective:** Participants will summarize the progress they have made, the challenges and make a plan for the future.

**Content:**

- Participants reflect on their experience and share what changes they have noticed.
- Identify the warning signs of returning to old behaviours, normalize them, and make a plan for returning to new behaviours.
- Find a support buddy in the group to encourage and support each other beyond the end of the course.

**Activity:** Participants share one takeaway from the course with the group and one thing they still wonder about.

**Homework:** Celebrate your success!