An Investigation Into the Therapeutic Potential of Integrating Binaural Beats And Behavioural Music Therapies for Alzheimer's Symptom Management

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ABSTRACT

This dissertation investigates the therapeutic potential of Binaural Beat Therapy as an integrated tool within music therapy to manage behavioural symptoms in individuals with Alzheimer's Disease. Against a backdrop of growing concern over the side effects of pharmacological interventions for Alzheimer's, this research explores alternative, non-invasive approaches grounded in neuroscience and musicology.

The study analyses existing academic literature and empirical research on both music therapy and Binaural Beat Therapy, with particular focus on brainwave entrainment. It evaluates its efficacy in modulating neural oscillations associated with attention, mood, and memory, areas often disrupted in AD. Primary data were collected through interviews with clinical practitioners, sound healers, and a person living with AD, as well as a survey of non-clinical carers to understand real-world applications of music in Alzheimer's care.

Through this interdisciplinary approach, the dissertation critically assesses claims that BBs can enhance therapeutic outcomes, while addressing scepticism about the robustness of the brainwave entrainment hypothesis. It further examines the role of attention versus familiarity in eliciting autobiographical memory recall and explores how binaural beats might amplify attentional focus within music therapy sessions.

This paper concludes by proposing a combined, flexible framework wherein binaural beat therapy is embedded within music therapy to support attentional engagement and emotional regulation. While acknowledging methodological limitations and individual variability in response, the findings suggest that with careful application, binaural beat therapy could serve as a valuable adjunct in personalised Alzheimer's care strategies. The dissertation calls for further clinical research to substantiate integrating binaural beats into clinical music therapy practice.

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INTRODUCTION

This year, the World Health Organisation recognised dementia as a global public health priority (WHO, 2025). Alzheimer's is a progressive neurological disease, the effects seen in all aspects of the AD patient's life. The most notable symptom is decreased cognitive functioning and autobiographical memory. Alzheimer's disease is rapidly increasing worldwide, with projections estimating 139 million cases by 2050, up from 55 million today, largely due to an ageing population (Barbarino, 2024).

When speaking to the Instant Genius podcast, Dr. Richard Oakley, Head of Research at Alzheimer's Society, described one of the most difficult symptoms of AD as changes to mood and emotions (2025). Around 40–50% of people with Alzheimer's have depression or apathy, compared to just 7% of the general population (Johns Hopkins Medicine, n.d.). Combined with anxiety, these disorders rank among the most prevalent neuropsychiatric symptoms in AD, affecting as many as 75% of patients (Mendez, 2021). These symptoms often go under-treated or are medicated with pharmaceuticals that carry life-altering side effects (NHS, 2025).

Whilst there are drug therapies available in the UK to treat and delay these behavioural symptoms, the root cause of Alzheimer's is incurable (Alzheimer's Society, 2024), and symptom management cannot be left to polypharmaceutical treatment alone. Worryingly, a study released this year warned of the use of antidepressants in AD care, as the use of SSRIs is linked to a faster cognitive decline for the AD patient (Mo et al., 2025). Therefore, alternative, non-pharmaceutical interventions are increasingly recognised as an important area of Alzheimer's patient care and research.

Among these, music therapy has shown promising potential. As a 2019 collaborative review of Music Intervention Approaches for Alzheimer's Disease states, there has been an uptake in research and interest in alternative music therapies for improving cognitive and behavioural symptoms of Alzheimer's in recent years (Barfett et al., 2019). Rooted in neuroscientific and therapeutic traditions, music therapy has been linked to benefits such

as mood enhancement, agitation reduction, and memory recall. One stem of emerging within research studies and popular culture is Binaural Beat Therapy (BBT).

My interest in this topic stems from witnessing a family member live with Alzheimer's. This personal experience has driven me to explore innovative treatments that are often overlooked in clinical settings.

The main goal of this dissertation is to examine the potential of BBT in reducing behavioural symptoms of Alzheimer's. By analysing peer-reviewed studies, systematic reviews, and relevant digital media, this research seeks to add to the growing literature on auditory therapies as supportive treatments. Additionally, it hopes to challenge scepticism and foster an understanding of BBs as a legitimate therapeutic option. Ultimately, this dissertation aims not only to explore the cognitive and emotional effects of binaural beats on individuals with AD but also to position these findings within the wider context of music therapy and neurorehabilitation.

METHODOLOGY

Considering the diverse experiences of AD patients and their carers, I felt it was important to include the perspectives of non-clinical carers in my research. To achieve this, I chose to use qualitative research through an online survey. Hosted on Google Forms and called 'Music Therapy + Alzheimer's Support Survey,' the survey aimed to explore how music is incorporated into the daily lives of people with Alzheimer's. Recognising the importance of hearing from carers, I shared my survey across several Facebook Groups to gather valuable insights from those supporting AD patients. These included:

— Music for Alzheimer's & Dementia
— Dementia / Alzheimer's / Memory Loss / Behaviors & Solutions
— Monthly Alzheimer's & Dementia Caregivers Support Group
— Dementia & Alzheimer's Support Group
— Dementia & Alzheimer's UK Carers Group
— Alzheimer's/Dementia Help & Support Group

I received twenty-one responses. Selected excerpts from the audience survey (full results in the appendix) are referenced in the main body, and only those referenced are counted toward the word count, in accordance with university guidelines.

To gather insights from professionals working in both clinical music therapy and sound healing therapy, I conducted one-on-one qualitative interviews. The participants were selected based on their expertise in clinical music therapy, sound healing, and group facilitation. Additionally, I interviewed one person living with Alzheimer's who regularly attends a group music therapy session to get their first-person experience. All planned questions are in the *Appendix.*

All participants in these interviews were informed about the purpose of the research beforehand. It was also confirmed that they were comfortable with their names being used in this dissertation. Additionally, I reassured them that they were not required to share any sensitive or personal information during the interviews.

The interviewees were as follows:

— Tim Beanland, Head Of Knowledge, Alzheimer's Society
— Mary Gayford, Clinical Music Therapist, Camden Clinic
— Simonē Salvåtici, Sound Therapy Practitioner
— Mieko Shimizu, Electronic Musician, Group MT Facilitator
— Patient M, Living With AD

Secondary research, in the form of academic texts and research studies, has made up the bulk of my research. One of the key advantages of researching a well-established and increasingly relevant topic such as music therapy is the abundance of peer-reviewed academic literature available throughout the research process. Additionally, interest in the therapeutic potential of binaural beats has gained traction over the past decade, with research studies and experiments conducted examining their efficacy. There is also an abundance of online sources, including news articles and podcasts, that contribute valuable perspectives. This combination of academic studies and digital media has been used to build the foundation of secondary research for this dissertation.

CHAPTER 1 — Defining Behavioural Music Therapy

I. HISTORICAL DEFINITIONS

Music therapy has historical roots that span across cultures and civilisations. As Gouk (2000) notes, “since antiquity, music has been used as a therapeutic tool,” often embedded within religious, spiritual, or healing rituals. During the Middle Ages, Boethius’ De Institutione Musica (circa AD 500–523) remains a pivotal text in Western philosophies of music. This text was integral to the medieval liberal arts curriculum. Within this writing, Boethius categorised music into three types: Musica Mundana, Musica Humana, and Musica Instrumentalis. It is ‘Musica Humana’ that shall be of specific interest later in my dissertation, as it proposes the idea that harmony within the human body, and, in turn, its’ soul, can be influenced emotionally and psychologically through vibrations. Whilst this artistic treatise was taught to philosophers, the ‘De Institutione Musica’ was also a staple within medical education and training. Modern clinical music therapy, while now grounded in empirical research and clinical practice, builds upon these ancient understandings of music as a force capable of restoring balance and well-being. I will now examine the integration of music therapy within clinical settings and its progression into a structured therapeutic discipline.

In the post-World War II period, the development of formal music therapeutic practices began to take shape in the Western world. The twentieth-century discipline originated with musicians, both amateur and professional, visiting veterans’ hospitals to provide solace to the thousands of veterans suffering from physical and emotional trauma following the war. (AMTA, 2014). The notable emotional response exhibited by the patients from the integration of music within the hospital wards prompted medical professionals to request the employment of musicians within healthcare facilities. Momentum built throughout the 1940s, leading to the foundation of the National Association for Music Therapy (NAMT) in the US in 1944 and the British Society for Music Therapy in 1958. Kenneth Bruscia, an esteemed academic on music therapy and the Emeritus Professor of Music Therapy from Temple University, describes music therapy as:

> "Music therapy is a systematic process of intervention wherein the therapist helps the client to promote health, using music experiences and the relationships that develop through them as dynamic forces of change." (Bruscia; 1998)

Bruscia's assertions from this pivotal work on music therapy were taken as truth for many years. However, clinical definitions of music therapy have narrowed since its publication. The American Music Therapy Association, which absorbed the NAMT, states music therapy is "the clinical and evidence-based use of music interventions to accomplish individualised goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program" (AMTA, 2005).

II. DEFINING BEHAVIOURAL MUSIC THERAPY

Over the years, music therapy has embraced a variety of theories and philosophies, resulting in the emergence of diverse approaches and models within the field (Bruscia, 1998). One example is Behavioural Music Therapy, which draws on the principles of operant and classical conditioning, and shall be the type I shall focus on throughout my research. This therapeutic approach was based on behavioural psychology observed in the early veteran care (Bunt, 1994). Developed by B. F. Skinner (1998), operant conditioning asserts that behaviour change and learning result from the effects of reinforcement and external stimuli. Therefore, within a Behavioural MT, the patient might play different melodic instruments, sing along with the therapist or backing tracks, or create rhythms with percussion, all with reinforcement and support from the therapist. Research has shown Behavioural MT to be an effective intervention for improving symptoms such as anxiety, agitation, restlessness (Gerdner, 2000; Witzke et al., 2008), depression and disorientation **(**Ashida, 2000; Choi et al., 2009; Kydd, 2001), rapid mood changes (Götell et al., 2000), and both short-term and long-term memory (Larkin, 2001). These routes are active versions of MT. However, it can also be 'passive', such as sitting and listening to music.

In researching established modern definitions of music therapy, it became evident that MT is only seen as legitimate when administered by a registered and trained therapist. In

addressing the clinical objectives of the therapeutic session, music therapy relies on and is built around the patient, the music therapist, and the music itself. When speaking with Tim Beanland, Head Of Knowledge for Alzheimer's Society UK, he defined MT right at the start: "When talking about music therapy, I do mean, one-to-one work with a qualified music therapist with a person with dementia targeting specific symptoms in a quiet, controlled clinical environment". In the US, music therapists undergo academic and theoretical training and accrue 1,200 observed hours before sitting an exam. In the UK, music therapists must hold an approved Master's degree and be registered with the Health and Care Professions Council.

This chapter has defined Alzheimer's, delving into the neurological and behavioural impact of the disease. In addition, it has outlined clinical music therapy practices, discussing its historical, cultural, and clinical origins. This discussion will be furthered in Chapter 3, where the current academic and sociopolitical perspectives on how music therapy is perceived as a therapeutic tool for AD symptom management.

CHAPTER 2 — What is Binaural Beat Therapy?

I will now turn my attention to an emerging area within alternative therapies for neurodegenerative diseases, Binaural Beat Therapy (BBT). Although Binaural Beats (BBs) are not classified as a musical genre, the practice of employing sound at specific frequencies has garnered increasing interest among clinical practitioners.

I. THE HISTORY OF BINAURAL BEAT THERAPY

In 2024, Verywell Mind published an article branding Binaural Beats as a "digital drug", inducing mental states akin to those produced by psychoactive drugs (Leoppky, 2024). The year prior, a systematic review of Binaural Beats was published, claiming it is inconclusive at this time as to whether BBs affect brain oscillatory activity (Ingendoh, 2023).

The perception of BBs as a legitimate method for neuroenhancement has varied since their discovery by Heinrich Wilhelm Dove in 1839. It wasn't until the 1970s that binaural beats became more than just a curiosity, with Gerald Oster publishing his seminal paper 'Auditory Beats in the Brain' in 1973. Widely regarded as the first modern scientific treatment of the auditory phenomenon, Oster's findings presented Auditory Beat Stimulation, which Binaural Beats is a strand of, as a diagnostic tool for neurodegenerative disorders. Although Oster's paper was not a clinical trial, it provided the first robust scientific framework for studying auditory beat stimulation, marking a turning point in the field.

Since Oster's publication, a multitude of studies have been conducted aiming to discern the credibility of auditory beat stimulation. Throughout my research, the findings of ABS studies are immensely diverse. Before examining opposing views in the neuroscientific community, I will first explore BBT and the brainwave entrainment hypothesis, which Leopky's article and many media outlets present as settled science, despite ongoing debate.

II. THE NEUROSCIENTIFIC FOUNDATIONS OF BINAURAL BEAT THERAPY

BBs are a form of Auditory Beat Stimulation (ABS), which is a non-invasive cognitive intervention which has been proposed as a tool for neuroenhancement (Chaieb & Fell, 2017). It can be presented monaurally or binaurally. Binaural beats - the most studied form of ABS (Dos Anjos, 2024) and the type I shall be focusing on throughout my research - are perceived when two tones of slightly different frequencies are delivered to each ear. For example, 400Hz played into the left ear and 420Hz played into the right ear would result in a perceptual beat of 20Hz within the brain.

Specifically, these phase-differing signals are integrated within the inferior colliculus and superior olivary nucleus (shown in Figure 1), and the perceptual beat of 20Hz is generated within the brain. Dr. Brian Taylor, senior director of audiology for Signia, states, "this is the essence of binaural beats, an auditory illusion in which each ear is transmitting one frequency to the central auditory pathway" (Leoppky, 2024).

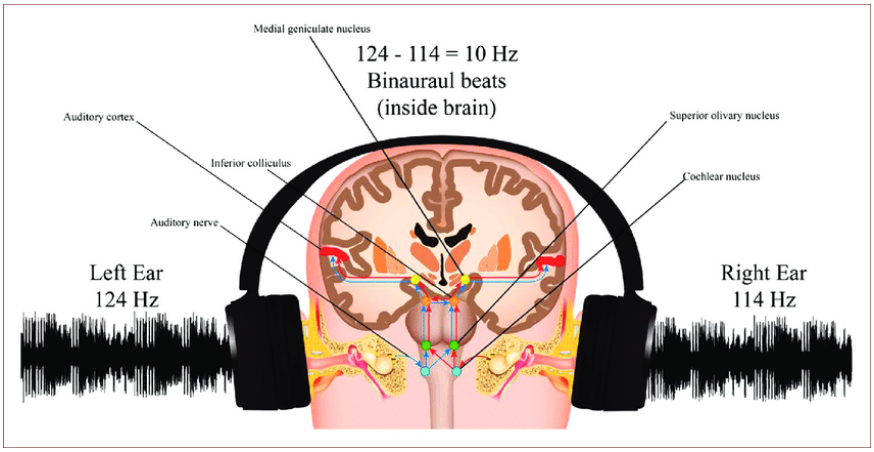

Fig. 1. *Binaural beats generated by the brain* (Aparecido-Kanzler et al., 2021).

III. BRAINWAVE ENTRAINMENT HYPOTHESIS

The next aspect of BBT to understand is the brainwave entrainment hypothesis. It is believed that through brainwave entrainment, the brain's electrocortical activity synchronises with the perceived frequency within the brain. The brain contains tens of billions of nerve cells, which communicate with each other, using electrical charged that travel through the cells. Theoretically, these electrical charge pulses occur at the same rate as the 'entrained' frequency. Therefore, when binaural beats are perceived, neural oscillations may entrain to the frequency of the beat, resulting in brainwave activity that corresponds to the stimulus frequency. In my example, this would be 20Hz.

This becomes impactful when we consider the natural patterns of brainwave activity. Scientists measure brain oscillatory activity using an electroencephalogram (EEG), which refers to the distinct patterns of electrical activity generated by neurons in the brain. Each EEG frequency band (mapped in Fig. 2) is associated with distinct cognitive and physiological states, ranging from deep sleep to high-level concentration. If auditory beat stimulation can successfully entrain brainwave activity, it theoretically enables the modulation of these states in a targeted, non-invasive manner. For example, entraining the brain at 20 Hz, a low-beta frequency, may promote alertness, focused attention, and improved cognitive processing.

Name	Frequency (Hz)	Subjective Feeling States
Gamma	>30	Promotes and maintains arousal during wakeful periods.
Beta	13-30	Increased alertness, improved concentration, improved attention.
Alpha	8-12	Deepened relaxation, increased calmness.
Theta	4-7	REM sleep, creativity, improved meditative states.
Delta	<4	Deep sleep, dreamless, non-REM sleep, trance, unconscious

Fig. 2*. A table of naturally occurring EEG states. Information gained from Medical News Today (Smith, 2019).*

This chapter has introduced the principles and mechanisms of BBT, examining its neuroscientific foundations and introducing crucial neuroscientific concepts to its efficacy. Key concepts such as auditory beat stimulation, brainwave entrainment, and neural oscillatory activity have been explored to provide a foundational understanding of how BBs may influence cognitive states. In the following chapter, this discussion will be expanded through a critical evaluation of current academic and clinical perspectives on the application of BBT in music therapy, particularly in relation to Alzheimer's Disease symptom management.

Chapter 3 — A Review Of The Current Literature

The following discussion will examine the application and perception of MT and BBT in academic research on Alzheimer's behavioural symptoms. Over the past two decades, research in both fields has grown significantly. Though these modalities are often seen as separate disciplines, both approaches share a central aim: to improve cognitive and emotional functioning in people with AD. Whilst BBT is explained through neuroscientific studies, researchers have examined music therapy from many disciplinary perspectives, including neurology, psychology, gerontology, and musicology, leading to a diverse body of literature. For my research paper, I shall focus on the neurological and psychological

foundations of these therapeutic tools, particularly where they converge and diverge in their treatment efficacy for Alzheimer's patients.

I. HOW DOES BEHAVIOURAL MUSIC THERAPY HELP ALZHEIMER'S SYMPTOMS?

Music therapy is widely evidenced to activate multiple regions of the brain, making it a valuable tool for neurological and behavioural rehabilitation. A multitude of studies indicate that both listening to and actively engaging in music stimulates areas, including the amygdala, associated with emotion, the hippocampus, responsible for memory, and the prefrontal cortex, linked to attention (Thaut, 2005; Särkämö et al., 2013). As noted in Chapter 1, all of these areas are affected in the early stages of AD degeneration.

Whilst the parts of the brain responsible for autobiographical memory tend to degenerate first, the limbic system and auditory cortex, which handle emotional and musical stimuli, are known to stay relatively preserved until the later stages (Jacobsen et al., 2015). In a recent systematic review of trials engaging in the effect of MT on cognitive functions of patients with AD, it was noted that "musical memory regions are largely spared and well-preserved in AD, which could help explain why music therapy is so effective in retrieving verbal and musical memories in individuals with the disease" (Bleibal, 2023).

This reinforces the widespread belief that even as memory fades, music could still reach and influence individuals, offering a valuable avenue for support. This preservation helps explain why individuals with Alzheimer's can often recall lyrics and melodies long after other memories have gone. Due to musical memory being "partly independent from other memory systems" (Jacobsen et al., 2015), the musical memory of music for an AD patient can be surprisingly robust.

Baird and Samson note that often an AD patient's ability "to respond to music is potentially preserved even in the late or severe stages of dementia when verbal communication may have ceased" (2015). They note the media attention on this topic, coining a term seen throughout my reading of MT literature, "islands of preservation" (2015). This term refers to the area of the brain in which neuronal death attacks last.

Noted as the ‘islands of memory’ hypothesis in Cuddy et al.’s study from 2012, their study concludes that “musical semantic memory may be spared through the mild and moderate stages of AD and may be preserved even in some individuals at the severe stage” (Cuddy et al., 2012).

However, some academics are sceptical of this presumption, with some arguing there is little experimental support for these findings. Some studies question the overly optimistic view of music’s resilience in dementia care. For example, El Haj et al. (2019) found that while emotional recognition through music might be somewhat preserved, other skills like rhythm perception, pitch discrimination, and understanding musical structure are often significantly impaired in moderate to severe cases. Moussard et al. (2014) also noted that although familiar melodies sometimes triggered autobiographical memories, these moments are not consistent across all patients. These findings suggest that musical memory might be more fragmented than Baird and Samson assert, especially in non-musicians or advanced cases. Cuddy and Duffin warn that the idea of “islands of preservation” (2005) needs more large-scale evidence, and what is presumed as musical memory’s durability could simply be a faint familiarity rather than true cognitive ability. In this way, music therapy may show promise, yet further research is needed to investigate the validity and effectiveness with Alzheimer’s patients.

II. BRAINWAVE ENTRAINMENT HYPOTHESIS AND ALZHEIMER’S EEG PATTERNS

As previously noted, opinions regarding the scientific validity of BBT remain diverse. One school of thought is that through brainwave entrainment, binaural beats routinely have a direct effect on neurological states. However, the theoretical foundation of the brainwave entrainment leaves room for debate, which is largely centred around inconsistent results of studies.

Comprehensive reviews conducted by Chaieb et al. (2015) and Garcia-Argibay et al. (2019) underscore the potential to enhance verbal memory, creativity, attention, sustained attention, and mood states. While they note multiple aspects of well-being that BB can support, the primary areas of contention I shall be addressing in my research are attention, memory, and relaxation. For example, a study from 2020 found that repeated

exposure to beta-frequency (40Hz) significantly accelerated the training outcome of twenty-nine young, healthy volunteers within an attentional blink test (Ross et al., 2020). Therefore, leading to the presumption that brainwave entrainment has taken place routinely throughout the course of the treatment.

This builds on earlier work by Lane et al. (1998), who explored the effects of beta-frequency binaural beats (20 Hz) on vigilance and mood states. In a double-blind, placebo-controlled study, participants were exposed to binaural beats embedded in pink noise while undertaking a 30-minute visual vigilance task. Similar to the study by Ross et al., this research involved repeated exposure across three sessions. The authors found that participants exposed to BB demonstrated improved attentional performance, particularly in reaction time and sustained focus. Moreover, the BB group also reported lower levels of depression and dejection, suggesting that the auditory stimulation had both cognitive and affective benefits. Lane et al. concluded that binaural beat "technology may have applications for the control of attention and arousal and the enhancement of human performance" (1998). This supports the possibility that BBT could be utilised as a supportive intervention for both attention-related disorders and affective conditions such as depression or cognitive fatigue.

However, much like the 'islands of preservation' theory, several researchers remain sceptical of the neurological mechanisms proposed to explain their efficacy. Central to this is a disconnect between the idea of cortical entrainment through binaural stimulation and the current understanding of the neurophysiology of the auditory system. Whilst the auditory brainstem is established to be highly sensitive to subtle frequency differences, the claim that these slight discrepancies can lead to large-scale oscillatory entrainment in larger cortical areas remains poorly supported by empirical evidence.

A systematic review conducted by López-Caballero and Escera (2017) provides one of the most comprehensive examinations of binaural beat entrainment. In their study, López-Caballero and Escera investigated how binaural beats might enhance specific EEG bands. In assessing fourteen studies, they found that in eight, no significant changes to EEG bands were observed. This indicates a routine failure of binaural beats to entrain brainwave activity, putting into doubt its therapeutic benefits and the brainwave

entrainment hypothesis as a whole. The review concluded that “the entrainment effect of binaural beats remains unclear” (2017).

This is partly due to the heterogeneous nature of the studies. Due to the “substantial heterogeneity in the methodologies employed, such as differences in stimulus duration, frequency, and participant state (eyes open/closed, resting, alertness)” (López-Caballero & Escera, 2017), it’s difficult to discern universal findings. These methodological variations are also noted in the aforementioned reviews by Chaieb et al. (2015) and Garcia-Argibay et al. (2019), as they significantly compromise the reproducibility and generalisability of the reported outcomes. In this way, it becomes nearly impossible to isolate which parameters are effective, for whom, and under what conditions in measuring binaural beats' effectiveness in altering EEG.

I will also note that publication bias may have inflated the reported effectiveness of binaural beats, as research with null or negative findings is less likely to be published. This selective reporting could lead to an overestimation of efficacy. Therefore, it is crucial to interpret the existing evidence with caution and encourage the publication of all results to obtain a balanced understanding of ABS’s true impact on EEG states.

III. IS FAMILIAR OR UNFAMILIAR MUSIC MORE EFFECTIVE?

An important conversation within music therapy literature is that familiar music is the most effective tool in music therapy to aid autobiographical recall. It is widely acknowledged across the MT community that familiar music is the most effective type of sound in music therapy for Alzheimer’s.

Referring back to Bleibal et al.’s systematic review, the paper found that there is higher therapeutic efficacy when individualised, familiar playlists are used (2023). Furthermore, music that incorporates singing and familiar tunes particularly supports “verbal fluency, memory, and language” (Bleibel et al., 2023). These findings highlight how familiarity enhances cognitive outcomes, suggesting that personalised music in the patients’ lives can play a pivotal role in triggering memory and preserving cognitive function in Alzheimer’s care.

Ten years prior, a research article published in BioMed Research International concluded its findings by recommending the use of familiar music within legal and clinical settings to asses the cognition performance of AD patients, as well as declaring its' power to enhance self-consciousness of an individual with Alzheimer's. Their findings showed that participants in the familiar-music group demonstrated enhanced mood, evoking memories quicker, with "greater emotional richness", and requiring less executive effort (Arroyo-Anlló et al., 2013). This suggests that familiar songs act as powerful perceptual cues, triggering involuntary recollections embedded in preserved, emotionally resonant neural circuits, also affirming the aforementioned "islands of preservation" theory (Baird & Samson, 2015). These results indicate that familiar music can more effectively rekindle life-span memories, supporting identity continuity and well-being in Alzheimer's care.

Whilst familiar music is widely considered a pivotal tool in MT for Alzheimer's, not all scholars agree that this is the most effective approach. Oliver Sacks, offered a broader view of music's therapeutic potential in his 2007 book *Musicophilia: Tales of Music and the Brain*. Drawing on numerous case studies, Sacks highlighted the benefits of various types of music, not just familiar compositions, for individuals with Alzheimer's.

He proposed that music therapy engages the surviving 'self' of the dementia patient, a self that can be accessed through rhythm, meter, and melody, which help structure neural activity. These elements can support motor function, memory, and learning, even without personal familiarity. As he noted, "music of the right kind can serve to orient and anchor a patient when almost nothing else can" (2007). For Sacks, the therapeutic power lies not in genre or prior exposure, but in music's ability to evoke an emotional, often non-verbal response. Sacks' suggestion that this process is not purely cortical, but subcortical, which echoes Lopéz and Escera's assertion that binaural beats are also recieved in subcortical areas (2017). I propose that this also mirrors the idea that reflects Boethius' ancient concept of *Musica Humana (c.500)*, wherein music restores a person's inner harmony and emotional balance. In both cases, music's ability to realign the self and balance mood is viewed as more critical than its familiarity to the listener.

A pivotal research article by Foster and Valentine embodies this principle, as they found in a group of twenty dementia patients, there was no significant difference between familiar and novel music on autobiographical recall results. They did, however, see significant improvement with the presence of music over noise or no noise. They note that the results point to the importance being on arousal, rather than familiarity, stating that, “these results suggest an explanation of the facilitatory effect of music or other auditory stimulation on autobiographical recall in dementia, predominantly in terms of enhanced arousal or attention deployment” (2001). Instead, they too contend that it is the emotional arousal and elevated attentional state elicited by the music that play a more significant role. This idea of attention over familiarity will be developed in Chapter 4.

This interpretation introduces a meaningful contrast with the familiarity-first approaches to music therapy, widely considered to be the most effective, both academically and socially. In turn, this could open the field of Alzheimer’s music therapy to a broader palette of musical interventions, ones not limited to personal or cultural familiarity, but instead are informed by affective response and cognitive engagement.

This chapter discusses the current literature around how MT and BBT treat Alzheimer’s symptoms, highlighting their neurological and psychological bases. It emphasises MT’s growing clinical value due to preserved musical memory and emotional responses in patients, while also examining BBT’s potential and ongoing efficacy debates. The role of familiarity in music therapy is explored, contrasting traditional views with theories favouring emotional arousal over autobiographical resonance. The next chapter will expand on these debates, whilst proposing a combined approach to fuse the proposed benefits of both modalities.

Chapter 4: A Discussion Of A Combined Approach

In the previous chapters, I have examined the theoretical and neuroscientific foundations of both music therapy and binaural beat practices. I have also delved into the current debates and theoretical discourse surrounding these two fields. Having already

established the efficacy of MT in symptom management for Alzheimer's disease, this chapter seeks to investigate the potential of combining the two modalities.

This chapter proposes a dual-modality approach wherein binaural beats are integrated into the MT framework, facilitating both top-down (social, emotional) and bottom-up (neurological) therapeutic pathways. I shall theorise how BBT might augment the effects of traditional MT by entraining brainwave activity and enhancing cognitive performance during the sessions, particularly in the realms of attention, memory, and mood—all commonly impaired in Alzheimer's. My first point of discussion shall be on the improvement of attention.

I. CONCEPTUAL FRAMEWORK

Abnormal EEG patterns are seen in patients with AD. This is mostly reduced beta and gamma states and increased delta and theta states (Jeong, 2004). As naturally occurring EEG states typically diminish in neurodegenerative conditions such as Alzheimer's disease (Herrmann, 2001; Ross & Lopez, 2020), brainwave entrainment could theoretically allow for a decrease in behavioural symptoms affected by deregulated EEG patterns within AD patients. While music therapy has historically demonstrated consistent benefits for the mood, communication, and emotional regulation of AD patients, there is limited scientific evidence of BBT having a positive effect on AD. It could be argued that embedding BBs within clinical MT sessions could facilitate optimal EEG states for the session, increasing the AD patients' receptivity to therapeutic stimuli. I suggest that BBs could be administered in the following methods:

Method 1: Played at intervals within the MT sessions. e.g. played twice, for ten minutes, in an hour-long session.

Method 2: In the background of a familiar score. e.g. played simultaneously to a piece of classical music, the patient recognises and has shown previous enjoyment.

Method 3: A dedicated binaural beat session is planned within the course of a twelve-session program.

In the following chapter, I will evaluate the appropriateness of each of these approaches in more detail, exploring how they might best be tailored to the needs of individual patients and examining the limitations inherent in each method. I will focus on the main points of contention I have uncovered within Chapter 3: attention, familiarity, and personalisation.

II. AN ANALYSIS OF ATTENTION OVER FAMILIARITY

An important dimension of my research has been on the debate over whether familiarity with the music is the crux to the efficacy of music therapy for AD patients. In describing a sing-along session with Age UK Alzheimer's Support Group, Patient M shares that most of the time, all participants recognise the songs presented. Patient M shares,

> "They are very traditional songs, ones that are easily remembered from people's memories from way back. It makes the group uplifting, and it probably helps rejuvenate what things were like back [when the music was released]."

Patient M's lived experience supports Arroyo-Anlló et al.'s assertions that familiar music supports self-consciousness and autobiographical memory (2023). Whilst this anecdotal evidence is vital, it is put into question by aforementioned academics like Foster and Valentine (1998), who deemed it was the enhanced attentional deployment that helped recall. In this way, perhaps the "uplift" described by Patient M reflects a heightened state of cognitive engagement or attentional activation. This suggests that emotional or mnemonic benefits may stem more from the way music captures attention than from the music's personal relevance alone.

Describing an enquiry after a sound bath administered for AD patients, Simonē Salvåtici shares, "there were instances where [the participants] remembered things from the past, specific things, from specific elements of the music. They'd say, 'that sound reminded me of this time…" As the participants were immersed in Simonē Salvåtici's soundscapes, their attention on the sound led to autobiographical recall immediately after the sound healing session. Simonē's lived experience furthers Garcia et al.'s assertions that it is the

“emotional involvement rather than the music itself which enhances autobiographical memory” (2012).

In this way, combining the binaural tones with MT could leverage music’s inherent emotional and rhythmic qualities, alongside entrained neural oscillatory networks. Or, as Sacks might say, it is the ‘transcendent, subcortical properties’ that add a layer of neural entrainment that supports cognitive engagement (2007). In collecting data from my survey, I saw that 40% of participants reported momentarily improved focus or attention when playing music for their LO. I suggest that by enhancing attentional capacity through binaural beats, patients might better process and encode musical stimuli, whether familiar or novel, facilitating stronger memory retrieval pathways and increasing the benefits of traditional familiar music therapy. A recent review by Jiao supports this**,** discussing integrating music therapy, brainwave entrainment, and AI-driven biofeedback to enhance digital therapeutics. He highlights that binaural beats in multisensory settings can help maintain attention and target neural states, especially gamma oscillations linked to focus. He emphasises that such integration aligns with neural principles, harnessing the brain’s natural ability to process multisensory input for improved outcomes (Jiao, 2025).

This broader, synergistic interpretation of connection within therapeutic musical practice opens the door for incorporating auditory elements like binaural beats, which have been shown to influence attentional states. Since BBs in the beta frequency range (20–40 Hz) are strongly associated with increased alertness and attentional focus (Lane et al., 1998; Beauchene et al., 2016), embedding these frequencies within therapeutic materials could serve to enhance the patient’s attention during MT tasks, regardless of the music’s familiarity. In this instance, Method 1 is appropriate, in which the therapist plays BBs for the client at intervals in the hopes that the brainwaves entrain and lead to a heightened state of attention for the patient. In this state, the patient can then receive heightened benefits from the rest of the MT session, through familiar music or otherwise.

Building on this focus, I will now turn my attention to the behavioural and emotional symptoms associated with AD and how a combined approach could be beneficial.

III. ADDRESSING BEHAVIOURAL SYMPTOMS: MOOD, DEPRESSION, AND ANXIETY

As described in the Introduction, depression and anxiety affect as many as 75% of patients with AD (Mendez, 2021). Music therapy has been a primary clinical intervention in emotional dysregulation since it was introduced into veteran care. As shown by Figure 3, music is also reported to help reduce anxiety and promote relaxation by carers in non-clinical settings.

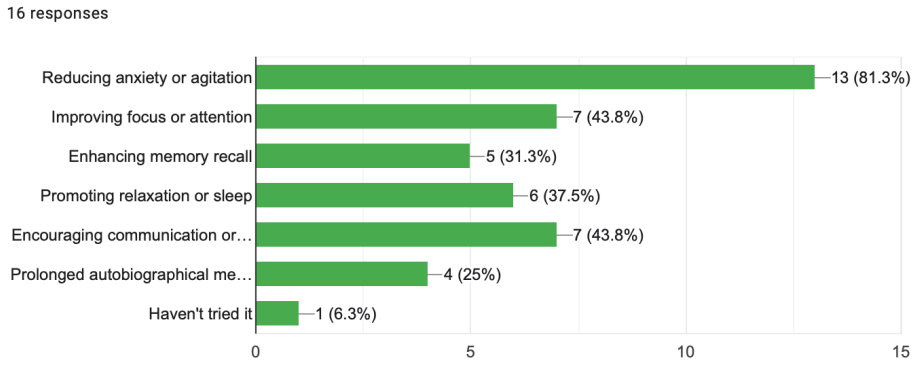

Figure 3. A Graph from my ‘Carer Survey’ [referenced in *Appendix]*

Alternatively, the use of binaural beats as a method for emotional regulation is still not widely adopted. I’ve previously touched on early discoveries showing beta-frequency binaural beats not only improved attentional performance but also lowered levels of depression and dejection during tasks (Lane et al., 1998). However, as noted across a few systematic reviews in my research, there is a concern over heterogeneous samples used within this study, as many included young, healthy participants.

A more targeted investigation published the same year addressed the effect of binaural beats on depressive symptoms for the elderly in a retirement home. Based in Taiwan, the study paired binaural beats with familiar music to the participants. Within the participant group of thirty-five elderly individuals, depression levels were significantly decreased after listening to 30 minutes of familiar music with alpha band binaural beats in the afternoon daily for five days (Sung et al., 2017). This study supports the notion that combining the familiar with the entraining could have the same effect for AD patients suffering from

depression. In my survey, 80% of participants agreed that music reduced anxiety and agitation in their LO with AD, with one participant writing, “I've worked in memory care where we had live music or CDs, it's amazing how people can suddenly become calm”. With this study in mind, perhaps the use of alpha frequencies (8-12Hz) alongside such musical stimulants could, using Oster’s original suggestions (1973), induce a calm, peaceful and relaxing state.

However, I question Sung et al.’s findings, as their study was conducted with a single group and lacked a control group. Therefore, it cannot be definitively stated that the use of alpha binaural frequencies was responsible for the observed decline in depressive symptoms. It could be determined that the positive effect on mood may have resulted from the participants listening to the familiar music for thirty minutes each day over five days. As music is known to influence neurotransmitter systems, leading to increased release of dopamine and endorphins, which enhance mood and motivation (Zatorre & Salimpoor, 2013), it cannot be determined which aspect was the facilitator for the uplifted mood. Given that this is the first study examining binaural beats in elderly individuals, I hesitate to presume that it validates the effectiveness of binaural beats within this demographic. Additionally, I discussed this study with Tim Beanland, and he was wary of the assumption that all participants suited the controls, stating, “there is a lot of undiagnosed cognitive impairment in care homes. I think it’s three-quarters of people in care homes have some degree of cognitive impairment.” On this note, the validity of consistency within the participants is brought into question as Tim Beanland described, the benefits of diagnosing it when someone is getting round-the-clock care are less.

Therefore, I propose a follow-up study comprising three groups: Group A as a control group with no auditory stimuli, Group B with familiar music only during each listening session, and Group C exposed to both binaural beats and familiar music. This design would allow researchers to ascertain whether the uplifting effects on mood are attributable specifically to binaural beats and, by extension, brainwave entrainment. Through this study, it could be determined if Method 2, proposed at the beginning of the chapter, would be a viable therapeutic care plan for AD comorbid mood disorders.

It feels important to note here that not only did Sung et al. find lessened depressive symptoms when applying BB within familiar music, but also a significant reduction in their heart rate, systolic blood pressure, and an activation of the parasympathetic nervous system after each listening session (2017). As it is proven that elevated resting heart rates are associated with all common dementias, including AD and Vascular Dementia (Deng, et al., 2022), I do believe this is an important discovery in the potential of BBT in minimising or prolonging AD degeneration in early- to mid-stage AD, where preserving cognitive function is critical. With all this in mind, I do not believe that Sung et al.'s study can be used in its entirety to support the case for BB integration into Alzheimer's care. It is, however, a hopeful example for the broader population on the positive effects of BBT and a potential case for BBT as a tool for reducing the risk of developing dementia.

IV. THE ROLE OF SOCIAL INTERACTION

An essential aspect of MT is the role of social interaction. As discussed in Chapter 1, the presence of a clinically trained music therapist is crucial to its efficacy, largely because of the therapeutic relationship built between the therapist and the patient. This interpersonal connection is especially important for individuals with Alzheimer's, as McDermott et al. (2014) found in a qualitative study on focus groups within dementia communities. The study found that for people with dementia, "it was not just the music, but the shared musical experience and the relationship with the therapist that made the therapy valuable" (2014). Although it cannot be deemed as clinical, Patient M's sing-along groups emphasise this, as he shares, "everybody is participating, and it includes everyone as well. So, you can see all of the smiles and joy that people get from doing that".

In contrast, BBT is, by nature, a solitary activity. As Simonē Salvåtici points out, BBs must be listened to through headphones in a quiet environment, making interpersonal engagement impossible during an effective session. This isolating mode of delivery eliminates the social and relational component that is central to the effectiveness of clinical music therapy. Even if BBs are embedded within familiar music, as in Sung et al.'s study previously mentioned (2017), patients are required to listen along, limiting opportunities for interpersonal interaction and co-regulation. This creates a challenge when trying to combine BBT with MT, as there is the potential to lose a fundamental aspect of interpersonal engagement within MT. Mary Gayford was wary of this in our

conversation, sharing that what may seem like an “easy win” could lead to patients being isolated. She says, for the success of BB integration, “it would need to take place within a relationship with a therapist. That would need to be thought about carefully.”

I posit that incorporating BBs as an *addition* to an MT plan can preserve opportunities for active engagement with a music therapist, strengthening the interpersonal relationship while still leveraging the EEG modulation benefits of targeted BBT use. Therefore, through the application of Method 3, in which a dedicated session outside of the scope of the program's usual schedule, there could be a way in which the brainwave entrainment could be practised, but it would not interfere with or take time away from the socialness of clinical MT.

V. ONE SOUND DOES NOT FIT ALL: THE LIMITATIONS OF MT AND BB

Personalisation has long been a cornerstone of effective music therapy, particularly in dementia and Alzheimer’s care. As music is inherently subjective, different genres and tones resonate with different people based on their personal history, cultural background, emotional associations, and neurological profile (Garrido et al., 2017). Additionally, the National Institute on Ageing notes the daily unpredictable fluctuations in cognitive and emotional states in patients with progressing AD (n.d.). In the realm of AD, the importance of flexible, personalised MT is heightened, given that individuals with AD often experience fluctuating sensory thresholds, emotional responses, and daily cognitive engagement capacities.

In my research, I found that many of the BB studies are based on regimented exposure. Despite meta-analyses highlighting the lack of standardised protocols in ABS studies (Garcia-Argibay et al., 2019; Chaib et al., 2015), many individual studies maintain internal consistency in key experimental controls through the course of each experiment, such as exposure duration, time of day, and listening environment. Due to the unpredictable nature of AD symptoms, I am concerned that this sets an unattainable precedent for integration within Alzheimer’s Disease care.

Administering BB sounds to the patient in the regimented and structured routine established by these studies may not always be possible. What may be calming for the patient one day could be agitating on another. Even simple actions like wearing headphones or sitting still might become challenging during fluctuations in mood. This raises important questions on the clinical feasibility of current BB practices in the context of AD care, as the unpredictability of symptoms suggests that rigid, standardised protocols may not translate well into real-world AD settings.

In addition to this, the way each individual responds to binaural beats can be considerably different. This is largely due to variations in people's neurophysiology, such as dopamine levels and binaural processing abilities. In speaking to Simonē Salvåtici, it became increasingly apparent that the rhetoric about alternative sound therapies, specifically frequency-based therapies, being a universal cure was a dangerous one. He states,

> "Sound healing really works. But, it's important to remain objective… When people say, 'this is the frequency for the heart', or here's another specific frequency, it's all Speculation…There is a lot of misunderstanding of sound, and I see people also talking about magic frequencies. There is not a magic pill; it is a process."

In this way, I propose that therapeutic approaches using binaural beats may need to adopt the same degree of flexibility and personalised approach as music therapy practices. Therefore, perhaps a combination of Methods 1, 2, and 3 could be a possible route into bringing BBs into an AD patient's care plan. For BB interventions to be meaningfully integrated into AD care, they must allow for responsiveness to the patient's shifting needs, preferences, and capacities on a day-to-day basis.

VI. ONE SONG DOES NOT FIT ALL

During my interview with Mieko Shimizu, an electronic musician who was invited to improvise for a Zest music session for AD patients, she described that whilst 60-70% of the individuals attending participated in the preplanned activity, two AD patients did not.

One participant, male and younger than the group average, declared his taste was distinctly different to the ambient music being played. He began the group in a state of agitation and defiance. However, when guided to the keyboard, which he used to play, this patient became calm. Mieko Shimizu shares,

“At first, it was a very challenging attitude that he had. He said he used to like Black Sabbath, and he wouldn’t join in with the group. He had very different tastes from the rest of [the attendees].”

This anecdotal evidence highlights a key point: familiar music is highly individual and increasingly shaped by evolving access to diverse genres, technologies, and cultural shifts. For some, ambient or classical music may be effective. Others may be more used to electronic, hip-hop, or rock. Mary Gayford also noted that the soundscapes of music therapy are expanding, with newly trained music therapists coming from increasingly diverse musical backgrounds, mirroring the broadening range of patients' preferences.

Chartmetric reported that there were 1,691 different genres worldwide on streaming platforms (2024) last year. The access to a wide spectrum of music genres means that what is ‘familiar’ could look very different for different demographics since streaming culture has been introduced. Additionally, familiarity with digital and frequency-based soundscapes is also growing. As “electronic music has been mitigated with multiple media and embedded into people's lives” (Chen & Feng, 2024), the landscape of ‘familiar’ music is increasingly broadening for future generations. Binaural beats, once niche, are now increasingly mainstream, with apps like Binaural Beats Brainwaves having over 400,000 active users on Android alone (AppBrain, 2025). This growing exposure means such tones could eventually feel familiar to future patients as any other music, particularly for those raised in digital sound environments. Therefore, the convergence of neuroscience-backed audio like BBs with culturally familiar music offers a dual opportunity—to support cognitive function while also honouring personal identity.

Drawing on evidence from neuroscientific studies, psychological theory, and interviews, this chapter has proposed a conceptual and practical framework for embedding BBs within music therapy sessions. I have proposed three methods of integration, offering

potential avenues for Alzheimer's care, that target not only the emotional and social symptoms of the disease, but also harness EEG patterns to increase MT's benefits.

Conclusion

In this project, several topics surrounding MT and BBT as interventions for AD have been discussed. The basics of AD's behavioural symptoms were outlined, with particular focus on the growing need for non-pharmaceutical therapies. Insights into the development of MT, especially Behavioural MT, helped establish a clinical understanding of how music engages preserved brain regions in AD patients. In contrast, BBT was examined as a developing field grounded in the brainwave entrainment hypothesis, with a growing but still inconclusive body of evidence regarding its cognitive effects.

An investigation was also carried out into the overlapping mechanisms of MT and BBT, especially their ability to affect attention and mood. Both rely on neurological stimulation and affective engagement, leading to the proposal that their combined use may provide more effective, personalised interventions for AD. It was suggested that attention and emotional arousal may be more influential than familiarity alone in mediating therapeutic success.

Given the growing prevalence of AD and the evolving relationship between younger generations and digital sound, I suggest that future research should focus on integrated MT-BBT approaches. These may better meet the emotional, cognitive, and sensory needs of Alzheimer's patients and help expand accessible, adaptable care options. I proposed three methods in which BBT could be integrated into MT schedules. It was also proposed that the combination of bottom-up neurological stimulation and top-down social engagement could offer a dual pathway to improve attention, mood, and memory for Alzheimer's patients. However, this research paper is limited due to the heterogeneous nature of current BBT studies, and therefore, any assertions of incorporating it within Alzheimer's care are entirely theoretical and based on studies that do not consider the intricacies of the disease.

Ultimately, this dissertation proposes that BBT should not replace MT but complement it. As the prevalence of Alzheimer's continues to rise, I suggest that further interdisciplinary research involving real-world AD communities is essential to refine these methods and validate their long-term efficacy.

APPENDIX

Preface

This appendix covers the 'Music Therapy + Alzheimer's Support Survey' and related interviews with both clinical and non-clinical professionals, as outlined in the Methodology section.
The survey aimed to understand how caregivers of individuals with Alzheimer's utilise music outside formal clinical environments. Shared through online dementia support groups on Facebook, it gathered 21 responses, reflecting diverse experiences and viewpoints.
Below are the complete survey questions and selected responses, focusing on those most relevant to this research.

The interview prompts for discussions with music therapists, sound practitioners, and a person living with Alzheimer's are also included, along with summaries of each participant's professional background.

All participants gave informed consent, and personal details are only included with their explicit permission.

CARERS SURVEY

Section 1:

Hi there, I'm Sasha, and I'm currently researching how music therapy is used within treatment for Alzheimer's Dementia. This questionnaire is designed to find out how music therapy is currently

being used with Alzheimer's care within communities; therefore does not require background or clinical knowledge of Alzheimer's treatment within a clinical setting.

Your participation in this questionnaire is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point.

Your survey responses will be strictly confidential. If you have any questions about the survey, you may contact me at sashadavies10@gmail.com.

I am excited to hear your stories about how music therapy has helped your loved ones with Alzheimer's! I am passionate about creating a hopeful future for individuals with Alzheimer's through the use of music. For those interested, my research project is focusing on how binaural beats (a version of auditory beat stimulation therapy) could be beneficial for Alzheimer's patients. This survey, however, is to understand how general music therapy is received and used within Alzheimer's care. Please do get in touch if binaural music and/or electronic music is a form of treatment for your loved one.

Thank you for your participation.

Section 2: Demographics

Q1. What is your relationship to the person in your life with Alzheimer's? (e.g., caregiver, family member, patient, healthcare professional)

- Hired Carer (10.5%)
- Child (42.3%)
- Grandchild (21.2%)
- Spouse (26%)

Q2. What is the age range of the person with Alzheimer's?

- 20-30 (0%)
- 31-50 (0)
- 51-60 (4.8%)
- 61-70 (19%)
- 71-80 (42.9%)
- 80+ (33.3%)

Q3. Have you ever tried professional music therapy as part of helping your loved one with Alzheimer's? Note: This must be a session with an accredited music therapist (Yes/No)

- Yes (28.6%)
- No (71.4%)

Q4. If yes, which sort of music was used within the session?

- Classical Music (orchestral instruments) (14.3%)
- Familiar Music (to the patient), e.g. your loved one used to attend Cher concerts, therefore the music therapist included… (42.9%)
- Non-Lyrical Music (e.g. ambient, drone) (0%)
- Instrument Playing (they were involved in making the music) (0%)
- Sing-along Sessions (28.6%)
- Unknown (0%)
- Not applicable (14.3%)

Q5. If applicable, how frequently has the person with Alzheimer's attended these music therapy sessions?

- Daily (14.3%)
- Weekly (71.4%)
- Monthly (0%)
- Sporadically (0%)
- Not applicable (14.3%)

Q6. Did you notice any changes in behaviour, mood, or cognition during or after these sessions? (Yes/No)

- Yes (73%)
- No (9%)
- Unknown (18%)

Q7. Outside of clinical music therapy sessions, do you personally use music to help the person living with Alzheimer's?

- Yes (85%)
- No (15%)

Q8. If yes, and you feel comfortable sharing, can you describe the setting where you use music to help your loved one?

[Answers quoted directly as written.]

- Home, car, concerts when he is up to it (smaller venues or festivals)
- When we're preparing meals together, I put on music. I vary the music and often purposefully select songs from our youth and early adulthood era.

- Her daytime sitter is a musician. He will bring his guitar, keyboard, or steel drums from time to time. He plays "Name That Tune" with her. He also has an extensive album collection, including albums from the 60s and 70s, and they will listen to music and sing together.
- When we as a family would talk about the past and link memories to music that we liked.
- In living room with TV set on music station, smooth jazz or on porch with phone contestants from America's Got Talent.
- We generally listen to music in the morning, a variety of genres. But if she seems to be having a hard time we always listen to 90s country and it really changes her mood.
- During my visits we often choose a songbook and flip through the pages together. She sings bits of the ones she knows, and hums the music as she reads the notes. She used to play the piano.
- Mom loves to listen to hymns...I often put her cd player on repeat so she can listen for quite a while.
- I play music in the house when she becomes agitated! She will hum along and sometimes dance around
- At his home.
- In the living room, in the recliner, wearing headphones.
- While coloring in, waiting to be bathed and during supper .
- We have an Alexa and have compiled a play list of her favourite songs which we regularly play.
- We sing in a church choir. Have always loved music so we frequently have music playing in the house. He uses earphones to listen tousic while he is working or relaxing.
- Kareoke Nights
- In the car driving I put on Jimmy Buffet his all time fav.

Q9. In your experience, has music therapy helped your loved one with any of the following? (Check all that apply)

- Reducing anxiety or agitation — 13, (81.3%)
- Improving focus or attention — 7, (43.8%)
- Enhancing memory recall — 5, (31.3%)
- Promoting relaxation or sleep — 6, (37.5%)
- Encouraging communication or social interaction — 7, (43.8%)
- Prolonged autobiographical memory — 4 (25%)
- Haven’t Tried It — 1 (6.3%)

Q10. Would you recommend music therapy to others helping someone with Alzheimer’s? (Yes/No)

- Yes (76.5%)
- No (0%)
- Undecided (17.7%)
- Haven’t Tried It (5.9%)

Q11. Thank you for answering the survey! If you have any other thoughts, please write in the box below. Thank you for answering the survey! If you have any other thoughts, please write in the box below.

[Answers quoted directly as written.]

- Music is the great catalyst. I've worked in memory care where we had live music or CDs, it's amazing how people can suddenly become calm, body movements to music or even singing some words. It's truly a joy to behold!
- I have never heard of music therapy. Thank you for the idea, I will check locally to see if this available.
- I really think that music is one of the deepest memories and is one of the last to go. I wish Activity Directors at care facilities would use music more.
- Please share your results.

PROFESSIONAL INTERVIEWS

Introduction to Interviewee:

Before we begin, I'd like to explain the focus of my dissertation. My research investigates whether binaural beat therapy has viable potential as a therapeutic tool within music therapy, specifically for addressing behavioural symptoms associated with Alzheimer's Disease. It will be published on my personal website and submitted to my University.

With that in mind:

a) Are you comfortable with your responses being used as part of this academic research?

b) Are you happy for your name and/or professional title to be included in the dissertation?

c) What is your profession?

FOR MUSIC THERAPISTS:

If yes, then move on to the following:

— Ask for an overview of their therapeutic practice (e.g. what does a session look like?)

— Ask which instruments, or types of sounds used within their groups.

— Ask for a description of a specific time helping patients with Alzheimer's.

— Ask for observations on how their music practice has affected people with Alzheimer's.

— Ask if they have experience or knowledge about binaural beats / auditory beat stimulation. If yes, discuss in detail.

— Ask if there is any other points they'd like to share.

FOR TIM BEANLAND:

If yes, then move on to the following:

— In your role as Head Of Knowledge for the Alzheimer's Society, can you describe in which ways music is seen to help people with Alzheimer's?

— How is clinical music therapy seen as separate from community choirs and workshops?

— Have you encountered Auditory Beat Stimulation and Binaural Beats in their work? If yes, discuss in detail.

— In what way do you see the future of music therapy going in terms of Alzheimer's symptom management?

FOR PATIENT M:

If yes, then move on to the following:

— Do you attend any music groups as part of your Alzheimer's treatment? If yes, specify which kind.

— Can you talk me through what happens in that group?

— What do you enjoy most about the group?

— Do you recognise all of the songs? If yes, move on. If no: how do you feel when you don't recognise the song?

— How do you feel after attending the group?

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