

ANGLIA RUSKIN UNIVERSITY

BRIEF GROUP MUSIC THERAPY FOR ACQUIRED BRAIN  
INJURY: COGNITION AND EMOTIONAL NEEDS

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ANGLIA RUSKIN UNIVERSITY  
ABSTRACT

FACULTY OF ARTS, LAW AND SOCIAL SCIENCES

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**Abstract**

Injuries to the brain are the leading cause of permanent disability and death. Survivors of acquired brain injury (ABI) experience cognitive impairments and emotional problems. These often persist into community rehabilitation and are among the most significant needs for those in chronic stages of rehabilitation. There is a dearth of research providing evidence of music therapy addressing cognitive deficits and emotional needs in a holistic approach. This research answers the question how can brief group music therapy address cognitive functional gains and emotional needs of people with acquired brain injury.

A mixed methods design was used to investigate the effect of 16 sessions of weekly group music therapy on attention and memory impairments, and emotional needs of ten ABI survivors in community rehabilitation. Quantitative data were collected to determine the effect of treatment on attention and memory functioning, mood state, and the satisfaction of emotional needs. Qualitative data were collected to reveal survivors' experiences of brain injury and brief group music therapy.

Analysis of the data showed that the intervention improved sustained attention ( $p < .05$ ,  $r = .80$ ) and immediate memory recall ( $p > .05$ ,  $r = .46$ ), and that the effect of treatment increased with dosage. Overall, the intervention was more effective than standard care, and cognitive functional gains continued after treatment for some ABI survivors. The intervention addressed emotional needs of feeling confident ( $p < .05$ ,  $d = .88$ ), feeling part of a group ( $p < .05$ ,  $d = .74$ ), feeling productive/useful ( $p < .05$ ,  $d = .90$ ), feeling supportive ( $p < .05$ ,  $d = .75$ ), feeling valued ( $p < .05$ ,  $d = .74$ ), and enjoyment ( $p < .05$ ,  $d = .34$ ).

Improvements in these domains were observed in the immediate term and over the course of therapy. Music therapy enabled emotional adjustment through the development of self-awareness and insight.

This study offers a music therapy method to deliver a holistic approach in rehabilitation. It demonstrates that music therapy can provide a cost effective, holistic treatment for ABI survivors.

**Key words:** music therapy, brain injury, cognition, emotion

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## **List of abbreviations and definitions of terms**

- ABI: Acquired brain injury is damage to the brain that occurs after birth, rather than due to a congenital disorder.
- Active music therapy: Music therapy that involves clients actively playing music, rather than only listening to music.
- Alternating attention: The ability to shift the focus of attention and move between tasks of differing cognitive requirements.
- Amnesia: The lack of ability to recall information.
- Anterograde amnesia: The lack of ability to encode and store new memories.
- Attention: The focus of cognitive resources to process information from targeted stimuli while filtering out unwanted stimuli.
- AVM: Arteriovenous malformation is a defect of the circulatory system where arteries and veins are directly connected, bypassing the capillary network.
- BI: Brain injury is damage to the brain.
- BL: Baseline is the term used to describe a timepoint at which data is collected before an intervention is introduced.
- BSRM: British society of rehabilitation medicine
- Carry over effects: This term is used to describe the effects of treatment that persist after the treatment has finished.
- Cognitive functional gains: Improvements in functional performance in cognition, such as attention, memory recall, problem solving, and planning.
- CVA: Cerebral vascular accident is the rapid disturbance of blood to the brain, resulting in loss of brain functioning. It is also known as stroke.
- Divided attention: This the ability to respond to multiple tasks or multiple task demands simultaneously.
- Emotional needs: Subjective psychological or mental requirements that originate in the psyche and are dependent on relationships with others.
- F: Female
- Focussed attention: The ability to respond distinctly to specific stimuli.
- FU: Follow-up is the term used to describe a timepoint at which

	data is collected after the termination of treatment.
Immediate memory recall:	The recall of information that has been presented within the last 60 seconds.
Long-term effects:	The lasting effects of an intervention.
M:	Male
Mixed methods:	The mixing of quantitative and qualitative methods in research studies.
Mood state:	The valence and level of arousal of an internal feeling.
MT:	Music therapy
NMT:	Neurologic Music Therapy is a branch of music therapy that focuses on the use of specific techniques to improve functioning in neurologically injured populations.
RBMT:	Rivermead Behavioural Memory Test
RCP:	Royal college of physicians
Receptive music therapy:	Music therapy that focuses on music listening rather than playing musical instruments.
Retrograde amnesia:	The inability to recall information from the past.
SC:	Standard care is the term used to describe normal care and usual treatment, in which nothing has altered for the subjects in an experiment.
Selective attention:	The ability to maintain focus of attention while in the presence of competing stimuli.
Sustained attention:	The ability to maintain a consistent, continuous, repetitive behavioural response.
TBI:	Traumatic brain injury is a brain injury that is caused by a blow to the head.
TEA:	Test of Everyday Attention
VAMS:	Visual Analogue Scale of Mood States
VAS:	Visual analogue scale
VASEN:	Visual Analogue Scale of Emotional Needs
VASES:	Visual Analogue Scale of Emotional States

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# **CHAPTER 1**

## **1 INTRODUCTION**

This dissertation is a report of a mixed methods study of a brief group music therapy intervention for treating adults with acquired brain injury (ABI) in a community setting. The study and treatment focused on addressing cognitive functional gains and emotional needs. It was based on the outcome measurements, interviews, and songs of two groups of five adults (ten subjects in total) engaged in the study.

This chapter of the dissertation sets forth the background of the study, states the problem addressed, explains its significance, and briefly describes the methodology used. The chapter concludes with an outline of the thesis.

### **1.1 Background to the study**

This study originated from my clinical work as a music therapist at a regional day centre for people with brain injuries (BI). I became interested in music therapy in neuro-disability while training as a music therapist. The first placement involved co-facilitating two music therapy groups at a day centre for people with ABI. I found this experience challenging, rewarding, and enlightening. The group members presented with a wide range of abilities and disabilities. They included those who were severely physically and intellectually impaired, and those who seemed less impaired but presented with behavioural difficulties. This music therapy work took place in community rehabilitation. It was terminated due to cessation of funding, causing the group members great distress. It was striking how the decision makers at the day centre did not hear their distress or understand why they valued music therapy. It seemed as though the ABI survivors at the day centre were powerless and had no voice regarding their rehabilitation. Thus, there was a need to communicate more widely the benefits of music therapy and its value to ABI survivors in this setting.

The term 'ABI survivor' used here and throughout the thesis is derived from Bay et al. (2002) and Chamberlain (2006), who presented research about the emotional experience of surviving traumatic brain injury. The term 'survivor' is used in the present study for several reasons. Firstly, it indicates that the study focuses on people who have acquired brain injuries and have passed from earlier phases to later phases of rehabilitation, for example from acute to community rehabilitation. Secondly, it acknowledges the trauma on an individual's life caused by acquired disability and the significant effort required to overcome the challenges presented to them post-injury. Thirdly, the word 'survivor' conveys to the reader the need for those affected by brain injury to be resilient.

After qualifying as a music therapist, I joined a team that provided music therapy in the local and surrounding areas. Music therapy had been scarcely used in BI rehabilitation services in the local area. The opportunity emerged to provide music therapy at another day centre, as a small amount of funding had been raised by the music therapy organisation for ABI work. Several types of group activities, such as gardening and games groups, were already established at the day centre. So, this group approach seemed to be part of the cultural identity there. A music therapy group was selected because it was considered by the day centre to be more cost efficient than individual music therapy: providing music therapy to more service users for the same cost. Clinical reasons for selecting this group approach included enhancing group participation and reducing social isolation.

Funding constraints meant that group music therapy could be provided for one year. The group members seemed to value the music therapy sessions and when the funding ceased they showed distress at the prospect of losing the intervention. I explored funding avenues but it became clear that sponsors required evidence that the music therapy group was effective and useful to the service users. In particular the sponsors requested empirical evidence to support funding applications. The lack of empirical evidence resulted in the

termination of financial support for music therapy at the day centre. This study is a response to the need for evidence to support the funding of music therapy in community rehabilitation settings.

My search for funding also revealed that only small amounts of money were available. This implies that music therapists may need to offer brief courses of treatment, and show effectiveness within this framework. This has influenced the study by focusing it on brief, rather than on-going, intervention.

## **1.2 Aims of the study**

The purpose of this study is to address the gap in knowledge regarding the effect of brief group music therapy on attention and memory functioning, and the satisfaction of emotional needs. It focuses on community rehabilitation for two reasons. Firstly, brain injury survivors experience a decrease in the support available when they leave hospital and return to the community setting compared to the support available in hospital (Hemingway and McAndrew, 1997). However, they continue to require support due to persisting difficulties. Secondly, BI research has focused on patients in the early stages of rehabilitation in hospital settings. Hence, there is a dearth of research with chronic ABI survivors (Jennekens et al., 2010). This study will provide evidence about the effectiveness of brief group music therapy to advance clinical practice, to develop knowledge in this field, and to inform funders and service providers in community rehabilitation.

## **1.3 Significance of the study**

According to the National Health Service, over a million people attend hospital each year due to head injury. Around 135,000 of them will be admitted due to the severity of their injury (National Health Service, 2007). From a worldwide perspective, injuries to the brain are the leading causes of permanent disability and death (International Brain Injury



Association, 2013). In the UK, approximately 500,000 people are living with permanent disability due to traumatic brain injury (TBI). 450,000 people in England suffer severe disability due to stroke.

Brain injury not only causes physical effects, such as weakness or paralysis: it can also cause impairments in cognitive functioning, specifically attention, perception, thinking, learning and memory (Loring, 1999). These cognitive processes are essential to intentional human behaviour and, therefore, impairments in these areas must be treated in order to address an individual's capacity to be rehabilitated. According to Baker and Tamplin (2006), cognitive impairment impacts widely on a patient's rehabilitation potential owing to the fact that physical and communication rehabilitation both require purposeful behaviour. Music therapy is used with people with ABI to facilitate functional gains (Thaut, 2008) and emotional adjustment (Baker and Tamplin, 2006). Music therapy achieves this by using music and its properties to stimulate, motivate and to provide a musical frame for improving physical movement, speech, cognition and psychological health within a therapeutic relationship.

Funding to treat cognitive impairments following the initial intensive period of rehabilitation is difficult to obtain. While people with ABI may reach an apparently optimum recovery or rehabilitation after such an intensive period, they continue to need therapeutic intervention to maintain functioning and achieve maximum quality of life. It may facilitate the funding process if more knowledge was available regarding the 'dosage' of music therapy required for cognitive functional gains and emotional support of ABI survivors. As music therapy in this field becomes more aligned with a goal-oriented, medical model, evidence-based research and practice become increasingly important. Music therapists are being required to think about the 'cost effectiveness' of the treatment they provide (Magee, 1999). Music therapy is able to address the rehabilitation needs of

people with cognitive impairments through the use of neurologic music therapy (NMT) techniques (Thaut, 2008). These techniques have been shown to be therapeutically beneficial in stroke rehabilitation and in the treatment of Parkinson's disease when used in gait training under rhythmic auditory stimulation (RAS) (Thaut, McIntosh and Rice, 1997; Thaut, et al., 1996). Thaut, McIntosh and Rice (1997) showed that with RAS, stroke patients were able to learn to walk with a more improved gait and greater stability. Some of the supporting evidence includes the use of functional magnetic resonance imaging and positron emission tomography to study cerebral reorganisation following stroke (Nudo, Barbay, and Kleim, 2000). More research is needed to focus on the effectiveness of music therapy at different stages of recovery and lengths of treatment, and the NMT research does not directly address the emotional needs of the patient in neuro-rehabilitation. There has been some research about the effect of music listening on cognitive recovery and mood after brain injury (Sarkamo et al., 2008). This was limited to music listening. This study will focus on the use of active music therapy methods to try to fill the gap in knowledge about the effectiveness of these methods over a brief time period.

#### **1.4 Overview of the methodology**

This study involves a mixed methods approach: combining quantitative and qualitative perspectives; and mixing and synthesising quantitative and qualitative data. Quantitative data collection methods were used to investigate the effect of treatment on attention, memory recall, mood state, and the satisfaction of emotional needs. Qualitative data collection methods were used to reveal the participants' experiences of, and opinions about, the treatment and its effectiveness. A full description of the methods is given in chapter 3.

## **1.5 Overview of the thesis**

The following chapters of the thesis are outlined as follows.

Chapter 2 presents the review of the published literature. It describes the review process and discusses the knowledge current at the time of the search, which was prior to the data collection stage of the study. The review presents ABI and its impact on individuals' cognitive functioning and emotional needs. It then discusses the theory and research about rehabilitation and how music therapy has addressed the impact of ABI. The review process identifies the gap in knowledge and describes how this study will enhance knowledge and understanding of ABI and music therapy in community rehabilitation. The research questions are briefly presented at the end of chapter 2.

Chapter 3 describes the study objectives and the methods used. It begins by presenting the research questions and their implications for the overall study design. Then, it discusses the mixed methodology used, providing a rationale and plan for mixing methods in this study. The research design is presented in detail, with recruitment and ethical procedures described. The treatment protocol is also given. This outlines the session plan followed by each element of the treatment protocol set forth individually. The quantitative and qualitative methods of data collection are shown and the outcome measurement tools used in the study are discussed in detail. This chapter concludes with a description of the methods of quantitative and qualitative data analysis.

Chapter 4 presents the results from the quantitative data analysis of the outcome measurements of sustained attention, immediate memory recall, mood states, and satisfaction of emotional needs. Tables and bar charts are used to present the descriptive and statistical analyses of the effect of brief group music therapy on these outcome measurements.

Chapter 5 presents the results from the qualitative data analysis of the semi-structured interviews and the song lyrics. Results from the interpretative phenomenological analysis (IPA) and thematic analysis (TA) are used to reveal insights from the participants' perspectives about the impact of ABI and how music therapy addressed their needs. Their opinions about the treatment, its component parts, and its duration are also given.

Chapter 6 synthesises the quantitative and qualitative data and discusses them with reference to the literature. The process of mixing the data is described before the study findings are discussed. The results are considered with reference to the reviewed literature and current research findings. This includes literature published after the data collection stage of the study. This is followed by a discussion of the validity of the study and its findings. The chapter concludes with a summary of the meta-inferences from the mixed methods discussion, and recommendations for future research and clinical applications.

## **CHAPTER 2**

### **2 LITERATURE REVIEW**

The following chapter presents a review of selected literature regarding brain injury and rehabilitation in relation to music therapy. It examines and synthesises theory and empirical evidence from these fields, to arrive at a position in relation to music therapy treatment and research in brain injury rehabilitation. The chapter begins by presenting the impact of ABI, and identifies attention, memory, and emotional needs as significant areas of interest for music therapy research. Then, models of rehabilitation and recovery are discussed with reference to addressing cognitive and emotional needs of ABI survivors. Finally, music therapy research in neurorehabilitation is presented and discussed drawing on supporting research about the psychological, physiological, and neurological effects of music and music making. Significant areas requiring further research are also identified. The chapter concludes with a summary of its contents and a statement of the key conclusions from the literature review.

#### **2.1 Literature search method**

A systematic search for material published before August 2010 (the beginning of the data collection stage) combined terms ‘music therapy’ or ‘music’, together with ‘neuro-disability’, or ‘brain injury’, or ‘acquired brain injury’, or ‘brain damage’, or ‘neuro-rehabilitation’, or ‘head injury’. Additional searches used the terms ‘attention rehabilitation’, ‘memory rehabilitation’, ‘cognitive rehabilitation’, ‘emotional needs’, or ‘emotional adjustment’. These additional searches were used to provide a conceptual understanding of brain functioning and rehabilitation issues in these areas of interest. Hand searches of journals not indexed were performed, and article references were examined. Below is a list of the databases searched:

Academic OneFile

AMED

ASSIA

CINAHL

Cochrane Central Register of Controlled Trials

Cochrane Database of Systematic Reviews

COPAC

Google Scholar

Index to Theses

JSTOR

MEDLINE

Music Therapy World Journal Index

PsycArticles

PsycINFO

Science Direct

Web of Science

Wiley Online Library

Zetoc

Below is a list of journals searched by hand or through the publishers' website:

British Journal of Music Therapy

Journal of Music Therapy

Voices

Canadian Journal of Music Therapy

Articles were selected based on their relevance to the topic and their significance in their fields. Relevance was judged by the precision of the focus of the article on key areas of

interest in this study, i.e. attention, memory, emotional needs, and music therapy in ABI rehabilitation. Significance was determined by the strength of the evidence presented and citations of the article in other articles and literature.

## **2.2 Acquired brain injury and its impact**

### **2.2.1 ABI and its consequences**

A report by the World Health Organisation (2006) states that neurological disorders<sup>1</sup> affect one billion people worldwide. It identifies these disorders as the greatest threat to public health. In the UK about ten million people are living with a neurological condition that seriously affects their daily lives. It is expected that the numbers of people diagnosed with neurological conditions will rise over the next decade. Although improved diagnostic techniques contribute to this expected rise, other factors include increasing survival rates and longevity, and improving health care and infection control. Neurological disorders and conditions include acquired brain injury, progressive diseases, and genetic disorders.

People with ABI form a considerable proportion of the population of people with neurological disorders. Precise figures for the prevalence of ABI are difficult to obtain due

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<sup>1</sup> The terms neurological disorders, neurological populations, and ABI are used in distinct ways throughout this thesis. ‘People with neurological disorders’ and ‘neurological populations’ are used to describe a broad category of people and include those with ABI, progressive diseases, and genetic disorders. Research from the broader category ‘neurological disorders’ is used in this thesis for several reasons. Firstly, when there was a paucity of research in ABI, it seemed appropriate to refer to research from other neurological disorders, e.g. to demonstrate the effect of a music therapy intervention on memory disorders of people with Alzheimer’s disease. Secondly, when statistical information was available only for neurological disorders and more specific information about ABI was not available, e.g. regarding the prevalence of ABI and its impact globally, it seemed necessary to use the statistics available for neurological disorders. Thirdly, research with neurologically impaired subjects who do not have ABI is used to demonstrate the fundamental biological and neurological effects of music on the brain and its structures. Thus, the term ‘neurological disorders’ has been used when referring to research involving people from the broader category (that might include people with ABI). The term ‘ABI survivors’ is used when there is available research about this narrower category of neurological disorder.

to the wide range of conditions that constitute this population. However, the information available suggests that stroke and TBI comprise the largest proportion of ABI in the UK. The range of severity of brain injury includes mild, moderate, severe, and lethal. Between 10% and 20% of people affected by moderate to severe brain injury are likely to suffer from severe disability or prolonged coma. Although between 65% and 85% of people in this category experience good physical recovery, they may still experience enduring cognitive and psychosocial problems. For many people with ABI, their acquired deficits and disabilities persist for the rest of their lives. The burden of on-going care, rehabilitation, and support for them frequently falls on family members.

ABI is “an inclusive category that embraces acute (rapid onset) brain injury of any cause” (Turner-Stokes, 2003, p. 7). It may have an extrinsic (from outside the nervous system) or an intrinsic (from within the body/nervous system) cause. ABI includes TBI, such as open or closed head injuries, and non-traumatic brain injuries, such as those caused by strokes and other cerebral vascular accidents (CVA), tumours, infectious diseases, hypoxia, metabolic disorders and toxic products taken into the body through inhalation or ingestion. ABI can affect anyone of any age or sex.

ABI survivors might experience difficulties that range from living with weakness or disability for periods of time to requiring support for daily activities and everyday tasks (Neurological Alliance, 2003). These difficulties often result in dependence on a carer. These carers often “provide emotional support, instrumental and financial assistance, housing, and advocacy; facilitate rehabilitation and communications with providers; and identify needed services and service providers” (Rotondi et al., 2007, p. 14).

The impact of ABI on the survivor encompasses a wide range of deficits and difficulties, such as physical, communicative, cognitive, and behavioural/emotional problems. Physical problems include motor deficits, sensory deficits, fatigue, pain, dysphagia, and seizures.



Communicative problems include aphasia, dysarthria, dyslexia, and dysgraphia. Cognitive deficits include impairments in memory, attention, speed of thought, perception, problem-solving, insight, safety awareness, self-monitoring, self-awareness, awareness of others, and social judgement. Behavioural/emotional problems include emotional lability, poor initiation, mood change, adjustment problems, aggressive outbursts, disinhibition, inappropriate sexual behaviour, poor motivation, and psychosis. These deficits limit the survivors' access to social participation and activities. The extent of the limitations is dependent on the severity of the injury, background circumstances, and available support. Owing to these deficits ABI survivors may be limited in their ability to live independently, to drive, to use public transport, to return to work, to learn, to participate in leisure and social activities, and to fulfil family roles and maintain relationships. Cognitive, emotional and behavioural problems are prevalent for people with ABI. These problems often coexist together and may have more impact in the longer term than physical disability (Turner-Stokes, 2003).

Following emergence from coma, ABI survivors may suffer irreversible changes to their psychological makeup (Lezak, 1986). These changes may result in impairments in learning ability, deficits in the ability to control, regulate and modify complex behaviour, and difficulties in regulating emotional reactions (resulting in lability, temper outbursts, or flattened affect). They may also lack self-awareness and the capacity for self-evaluation, making it difficult for them to learn from experience. They may lack the ability to judge a social situation and respond with sensitivity. Families and carers may find themselves in auxiliary roles as the providers of regulation and evaluation of the survivors' mood states and fatigue levels. The caregivers' health, stress levels, mood state, and psychological burden are closely related to the ABI survivors' cognitive abilities and changes in

emotional well being. High psychological demands, poor health, and high stress levels can lead to depression in caregivers (Armstrong, 1991; Rotondi, et al., 2007).

Despite the prevalence of neurological conditions as the major cause of serious disability, the significant impact on health and social services is often unrecognised. The impact on health services is illustrated by the fact that 10% of visits to Accident and Emergency Departments and 19% of hospital admissions are due to neurological problems (Neurological Alliance, 2003). The economic costs to society of brain injury are significant. In the United States the costs associated only with TBI in the year 2000 were estimated to be the region of USD 60 billion. Figures for economic costs in the UK are not available. However, it is clear that ABI has significant impact on individuals, their families, and society in human and economic terms.

As clinical work in the field of neurorehabilitation has developed, clinicians and researchers have given more attention to the experiences and opinions of survivors and their families. Perceived needs following brain injury have become an important area of study. Need is defined as “the difference between a current and an expected or desired state” (Corrigan, Whiteneck and Mellick, 2004, p. 1). Needs assessment processes are value-laden due their subjective bias. However, individuals’ assessments of outcomes are determined by evaluation of subjective well being and are, therefore, useful in determining outcomes and needs (Corrigan, Whiteneck and Mellick, 2004). From a survey conducted with hospitalised TBI survivors, Corrigan, Whiteneck and Mellick (2004) found that improving cognition and managing stress were the most frequently patient-reported subjective needs in acute rehabilitation. These needs persisted one year following hospitalisation and continued to be the most frequently cited. Therefore, treating cognitive and emotional consequences following TBI are fundamental to rehabilitation.

If cognitive deficits are not identified and addressed, serious emotional distress may result due to repeated failures in everyday functioning and a lack of understanding by the ABI survivor and family (Hemingway and McAndrew, 1997). Common emotional changes that occur after ABI include emotional lability, anxiety (due to acquired disability, and changes in identity, self-confidence and esteem), frustration and anger, and depression. Each of these emotional changes presents problems for the individual and their families in engaging the ABI survivor in rehabilitation. Cognitive and emotional changes often influence the development of behavioural problems including disinhibited behaviour, irritability, loss of initiative and egocentricity. They also affect social consequences, such as difficulty maintaining friendships, responding inappropriately in public settings, loss of employment, and changes in the individual's role in the family (Hemingway and McAndrew, 1997).

So, brain injury has serious consequences for society, the family, and the individual survivor. Sections 2.2.2-2.2.3 discuss the impact of brain injury with specific reference to attention and memory functioning, and emotional needs. These three areas of interest were selected because they form the foundations of learning (Baker and Tamplin, 2006) and of gaining a sense of one's identity (Prigatano and Johnson, 2003). They also affect engagement in rehabilitation (Turner-Stokes, 2003).

### **2.2.2 Cognitive impairments following ABI**

Attention and memory form the basis of all cognitive tasks and learning. They function together rather than as separate, unitary constructs. "Attention is a multidimensional construct, incorporating interactive systems for sensory selective attention, arousal and sustained attention, and intentional control" (Ponsford, 2008, p. 508). Attention processes mediate the flow of information in the brain (Cohen, 1993). Deficits in attention functioning present the ABI survivor with difficulties in environmental awareness

(responding to environmental stimuli and events), sustaining attention on a specific task (as in activities of daily living (ADL)), alternating attention during complex tasks (as in cooking at home or carrying out tasks at work), and dividing attention in complex tasks (as in driving) (Ponsford, 2008). Environmental factors and the complexities of tasks have significant effects on task performance for ABI survivors. A study by Ziino and Ponsford (2006) found that participants with TBI performed more slowly on many tasks relative to healthy controls. Tasks that were more complex resulted in more errors being made by the TBI group. Slower performance rates and higher error rates may be due to reductions in the rate or capacity of controlled processing, or dysfunction of higher-level attention processes. Ziino and Ponsford (2006) considered fatigue (reported by many ABI survivors) to be a result of “additional compensatory effort expended by individuals with brain injury in meeting the demands of everyday life in the presence of cognitive deficits” (Ziino and Ponsford, 2006, p.383).

Memory is conceptualised and labelled in a variety of ways. In terms of capacity, memory can be broadly categorised into sensory/immediate memory, which holds accurate copies of information for fractions of a second; working memory, which is linked to attention processes and holds information in mind while processing additional information; and long-term memory, which can hold information for many years. From the perspective of orienting the individual in time, memory may be categorised as retrospective (remembering what had occurred), and prospective (remembering what is expected to occur at a later point in time). Finally, memory may be categorised according to its content: episodic (the recall of events), motor or procedural (the recall of a sequence of physical tasks), and semantic (the recall of knowledge about objects, facts, words, and concepts) (Fuller and Manford, 2006).

Memory disturbances and loss are common for people with ABI. Memory problems are wide ranging and may include loss of long-term memory, and working memory. Often the ability to make new memories is impaired (anterograde amnesia) and this has a direct effect on the individual's capacity for learning, the ability to carry out ADLs safely and effectively, and the capacity for rehabilitation. Memory loss also affects the survivor's sense of self. Wilson, Kopelman and Kapur (2008) report a case study of a man, CW. They considered his prominent and persistent loss of awareness in amnesia and they discuss its effect on his sense of self. They state that there are multiple contributions to the concept of self, including episodic memories, representations of one's own personality traits, knowledge of the facts of one's own life, the sense of continuity of experience through time, a sense of personal agency, and the ability to self-reflect on one's own mental states. The authors concluded that his "sense of self had almost certainly been disrupted by his memory disorder" (Wilson, Kopelman and Kapur, 2008, p.538). Memory is an integral part of consciousness as it enables the development of an experiential sense of self and facilitates self-evaluation. As a component of consciousness and theory of mind, memory is also involved in learning to trust others (Prigatano and Johnson, 2003). Therefore, memory disorders have serious implications for therapeutic interventions, such as music therapy, that rely on building trust.

### **2.2.3 Emotional needs following ABI**

An emotional need is defined as:

"a psychological or mental requirement of intra-psychic origin. It usually centres on such basic feelings as love, fear, anger, sorrow, anxiety, frustration, and depression and involves the understanding, empathy, and support of one person for another. Such needs normally occur in everyone but usually increase during periods of excessive stress or physical and mental illness and during various stages of life, as infancy, early childhood, and old age. If these needs are not routinely met by appropriate, socially accepted means, they can precipitate psychopathologic conditions. Appropriate measures common in nursing for anticipating and satisfying the emotional needs of patients in stress include physical closeness,

especially remaining with the person during periods when the feeling is acute; empathetic listening as the patient discusses the feeling; encouragement to verbalize feelings; and planning activities that provide a constructive outlet for the feeling or the situation.” (Mosby, 2002, p.591)

From this definition it is possible to draw out several themes. The first is that emotional needs are innate to all human beings. Secondly, the urge to satisfy emotional needs increases at times of suffering, stress, and uncertainty. Thirdly, the frustration of emotional needs may lead to mental health problems. Finally, emotional needs are satisfied through caring relationships and constructive activities that facilitate sublimation of feelings. This definition of emotional needs seems to relate to the hierarchy of needs postulated by Maslow (1943). Emotional needs seem to relate strongly to the third, fourth, and fifth levels in Maslow’s hierarchy. These are the love/belonging needs, the esteem needs, and the self-actualisation needs, respectively (Maslow, 1943). Love/belonging needs include the need for relationships with family, friends, and a sexual partner. This level captures the need to feel part of a social group. Esteem needs include the need to feel confident, productive/useful, valued, cared for, and able to support others. Self-actualisation needs include the need to be creative, spontaneous, to enjoy life, and to pursue stimulating activities.

Emotional disturbance in its many forms is prevalent following ABI. Emotional and behavioural consequences of BI cause greater distress for caregivers than purely cognitive deficits. Specific anxiety disorders, such as generalised anxiety disorder, panic disorder, phobic reactions, and Obsessive Compulsive Disorder, have been reported following brain injury (Williams, Evans and Fleminger, 2003). Survivors experience greater emotional problems as time since the injury increases (Williams and Evans, 2003).

Teasdale and Engberg (2001) conducted a study in which a hospitalisations register was analysed to determine the effect of TBI on suicide rates following brain injury. The

researchers found that mortality rates due to suicide were greater for TBI survivors aged between 20 and 60 years of ages than for those aged outside this range. Their results also implied a direct link between the injury itself and the suicide rate. The researchers suggested that the causes of suicide might be due to psychological reactions to identity changes, or losses, and changes or losses experienced socially for this age group (Teasdale and Engberg, 2001).

Brain injured patients often report depressive symptoms (Fleminger, et al., 2003). Insight appears to be related to depressed mood following brain injury. Recognition of disability and the realisation that the individual may not return to their pre-injury work or recreational activities may trigger a psychological response, for example depression. Repeated experiences of failure in familiar activities and situations may force the ABI survivor to confront the reality of their impairments. Severity of depression and emotional distress may increase due to the brain injury survivor's increasing awareness of his or her own disabilities and impairments (Fleminger, et al., 2003). A study by Godfrey, et al. (1993), showed that emotional problems, such as depression, anxiety, and poor self-esteem, appeared to coincide with the development of insight of impairments. This suggests that there is a need for psychological support to manage and counteract emotional problems that emerge as insight develops. ABI survivors with higher self-awareness demonstrate greater emotional distress and also greater motivation to alter their behaviour (Fleminger, et al., 2003).

Emotional changes following ABI are difficult to diagnose and treat due to their complex nature. Armstrong identifies three components: "1) changes due to neurological injury, 2) changes due to reactive maladjustment, and 3) changes due to the adaptive response of the individual" (Armstrong, 1991, p.15). She suggests that these changes are associated with cognitive and perceptual alterations that result in behavioural problems arising out of

interaction. Armstrong asserts that emotional problems, changes in personality, and neurotic reactions may be the most common results of ABI. These factors combined with communication problems and cognitive difficulties can give rise to behavioural reactions, which increase the likelihood of alienation and social isolation for people with ABI and their families (Armstrong, 1991).

ABI survivors may experience depression, denial, and anxiety, and these may appear as anger, apathy, agitation, or impulsivity. Frontal and temporal lobe injuries often result in a disintegration of the link between experience and expression. “Patients are often not able to integrate perceptions with thoughts, thoughts with emotions, and emotions with words or affect” (Armstrong, 1991, p. 21). Armstrong asserts that emotional changes in ABI survivors are due to “neurological damage, ego injury and defensiveness, and adaptive response” (Armstrong, 1991, p. 21). Denial as a reaction to brain injury serves to maintain emotional stability and motivation. However, the breakdown of denial is necessary to permit the adaptive and constructive ego to emerge. This facilitates the redevelopment of the personality, and of a sense of self-persistence of beliefs and values (Armstrong, 1991). So, music therapy interventions should include addressing emotional adjustment to ABI.

### **2.3 Models of rehabilitation and recovery**

The Royal College of Physicians (RCP) and British Society of Rehabilitation Medicine (BSRM) (Turner-Stokes, 2003) present two definitions of rehabilitation: one in terms of concept, and the other in terms of service. The conceptual definition describes rehabilitation as “a process of active change by which a person who has become disabled acquires the knowledge and skills needed for optimal physical, psychological and social function” (Turner-Stokes, 2003, p. 7). The service definition considers it to be the “use of all means to minimise the impact of disabling conditions and to assist disabled people to achieve their desired level of autonomy and participation in society” (Turner-Stokes, 2003,



p. 7). The purpose of rehabilitation is to help alleviate the symptoms of brain injury and to enable the individual to return to their most appropriate environment in society (Wilson, 2009). Rehabilitation services in the UK are becoming more focused on patients' needs rather than on underlying pathology. Therefore, there is less emphasis on distinguishing between different conditions and more emphasis on addressing the broader spectrum of ABI, which presents to the rehabilitation services in real life (Turner-Stokes, 2003).

Rehabilitation following ABI aims to address the broad spectrum of impairments.

Functional goals include improving cognition, communication, and movement.

Psychological interventions aim to address emotional needs, such as emotional expression and emotional adjustment to acquired disability and altered identity, and behavioural and psychosocial problems. Recovery can occur over months or years and each survivor may need input at different stages in their recovery. This suggests that music therapy may be needed in all stages of rehabilitation.

### **2.3.1 Neuroplasticity and recovery of function**

The human brain is capable of significant reorganisation following brain injury through the phenomenon of neuroplasticity (Kolb and Gibb, 2008; Mateer and Kerns, 2000). This is the process whereby experience-dependent changes occur in the brain (Mateer and Kerns, 2000). It is understood as occurring at the synaptic level, involving changes in the number and structure of glial cells. These changes occur through “modification of synaptic activity, changes in synaptic firing, dendritic arborisation, and axonal sprouting” (Mateer and Kerns, 2000, p. 106). Mateer and Kerns assert that when cells are stimulated to fire in synchrony, the connections between them strengthen. These synaptic interconnections are stimulated by behavioural interventions, and shaped by variations in experiences.

Repeating the experience that promotes synchronous firing strengthens connections.

However, it is recommended that the experiences used to stimulate firing should be varied,

with increasing difficulty, to further shape and strengthen synaptic interconnections and develop functional capability. According to Kolb and Gibb (2008) neuroplasticity varies with age, time since injury, and aetiology.

Mateer and Kerns (2000) suggest that there is evidence of the potential for plastic reorganisation in areas of the brain associated with motor functioning, attention, memory, language, and executive functions. They also highlight the role attention plays in modulating change in other cognitive systems in the brain:

“Reorganization of neural circuitry is facilitated by active attention to the relevant task or stimulus. Perhaps this is why unstructured and relatively unattended activation of systems as one goes about daily activities is insufficient to result in maximum recovery of function.” (Mateer and Kerns, 2000, p. 107)

The authors suggest that compensatory processes may inhibit the utilisation of damaged circuits, and thereby reduce the capacity for the recovery of function. Thus, it is recommended that rehabilitation specialists work to help restore as much as possible of the lost functioning before focusing efforts on developing compensatory processes (Matter and Kerns, 2000). Music therapists must be aware of this recommendation when planning interventions.

### **2.3.2 Compensatory strategies**

Compensatory strategies focus on developing methods of performing tasks that compensate for presenting functional deficits. A useful example of the implementation of these strategies can be found in memory rehabilitation (Wilson, JC and Hughes, 1997), where memory compensation systems enable the ABI survivor to function independently in everyday life and at work. Memory impairments are common for people with ABI. Following a period of natural rehabilitation, it is unrealistic to expect that memory functioning will be fully restored. However, Wilson, JC, and Hughes (1997) suggest that it is still possible to help ABI survivors and their families understand and compensate for

memory difficulties. Memory rehabilitation aims to remediate or alleviate cognitive impairments due to brain injury. Methods for achieving this aim include environmental structuring (where labels and signs are used, and the environment is rearranged to enable patients to cope without adequate memory functioning), and external memory aids (including the use of diaries, notebooks, lists, wall charts, audio recorders). Teaching the use of external memory aids is problematic in the sense that people with memory problems may have difficulty in learning to use them efficiently. This is due to people with memory problems forgetting to record information, using the aids in a disorganised way, feeling embarrassed about using such aids, and the devices may be too complicated for them to use. Wilson and Watson (1996) identified some of the factors that may help predict likelihood of successful use of compensatory strategies. These included age, lack of other cognitive impairments, and a minimum screening score of three points out of 12 on the Rivermead Behavioural Memory Test (RBMT) (Wilson, Cockburn, and Baddeley, 1985). These factors help predict survivors' level of independence and the use of memory aids or strategies in ADLs (Wilson, JC and Hughes, 1997, p. 45). The rehabilitation team might concentrate on the use of external aids, mnemonics, rehearsal strategies, and chaining for use as treatment strategies. Compensatory strategies may take a long period of time to develop with a client. Wilson, JC and Hughes (1997) provide an example where their development took ten years and were shown to be very successful, enabling the client to function in daily life and keep a job.

### **2.3.3 Stages of rehabilitation**

Early stages of rehabilitation focus on stabilising the individual's health status, maximising recovery of consciousness and functioning, and developing compensatory strategies to carry out tasks despite loss of functioning. Following these stages of acute and post-acute inpatient care, survivors advance to community-based rehabilitation and longer-term

community support. These later phases of rehabilitation focus on improving activity, enhancing participation and social integration, improving quality of life, and addressing psychological adjustment and carer stress. This study will focus on ABI survivors in community-based rehabilitation.

In cases of severe brain injury, better outcomes have been associated with earlier, more intensive interventions (Turner-Stokes, 2003). However, impairments of awareness and insight may limit a survivor's ability to engage in rehabilitation in the period immediately following ABI. Therefore, intervention may be deferred until a later stage when the survivor is more able to engage. Guidelines from the RCP and BSRM (Turner-Stokes, 2003) state that the intensity of the rehabilitation programme should be matched to the survivor's needs and capacities (Turner-Stokes, 2003). They also state that practice of skills outside formal therapy sessions should be encouraged and facilitated as much as possible (Turner-Stokes, 2003). The treatment protocol used in this study will include the practice of skills outside formal music therapy sessions.

#### **2.3.4 Timing, intensity, and long-term care**

The guidelines from the RCP and BSRM (2003) consider the need for further research in the area of ABI and highlight the areas of timing and intensity of intervention, and the cost effectiveness of rehabilitation. In considering timing and intensity, the guidelines state that current research suggests that early and intensive rehabilitation is linked to more successful outcomes. The guidelines warn, however, that "this interpretation may be overly simplistic and timing of rehabilitation input may be critical to a successful outcome" (Turner-Stokes, 2003, p. 55). Cognitive deficits in the early stages of rehabilitation may restrict survivors' learning and engagement in rehabilitation. They state that the intensity of intervention programmes must be matched to the survivors' abilities, needs, and capacities. Regarding cost effectiveness, the guidelines state that in addition to demonstrating the effectiveness or

quality of life benefits of an intervention, it is also necessary to demonstrate its cost-efficiency (Turner-Stokes, 2003).

People living with TBI six months post-injury continue to need help with emotional, cognitive and behavioural problems (Jennekens, Dierckx de Casterle and Dobbels, 2010). These needs may increase with the length of time since brain injury. Research suggests that professional assistance to address these needs is insufficient in the chronic phase (Jennekens, Dierckx de Casterle and Dobbels, 2010). Therefore, there is a need to provide psychological support for brain injury survivors in community and long-term rehabilitation.

### **2.3.5 Cognitive rehabilitation**

Cognitive deficits, such as lack of insight and awareness of difficulties, may significantly affect a survivor's ability to engage in, and respond to, rehabilitation. This may, in turn, impact on the timing of intervention. The guidelines from the RCP and BSRM (2003) state that, if appropriate, formal cognitive rehabilitation is necessary when impairments in this area cause management difficulties or insufficient response to rehabilitation intervention. They also state that persistent cognitive deficits require survivors to have access to cognitive rehabilitation. The guidelines recommend that this form of rehabilitation should involve programmes targeted at addressing "executive difficulties (i.e. problems with planning, organisation, problem-solving and divided attention)" in a "structured and distraction-free environment" (Turner-Stokes, 2003, p. 44). Intervention should also include addressing improvements in attention processing, learning compensatory techniques, and the use of memory aids to increase independence (for those with memory impairments) (Turner-Stokes, 2003). Ownsworth, McFarland and Young (2000) showed how a group support program addressed self-awareness deficits and psychosocial functioning of chronic ABI survivors. They found that the benefits of a group support

intervention included “greater levels of social interaction, alertness behaviour, emotional behaviour, and communication skills” (Ownsworth, McFarland and Young, 2000, p. 482).

### **2.3.6 Emotional needs in rehabilitation**

Following ABI, emotional problems, such as anxiety and depression, are likely to increase over time if left untreated. According to Von Steinbuechel, et al. (2005) “in addition to intensive cognitive therapy, rehabilitation should concentrate on emotional changes after injury” (Von Steinbuechel, et al., 2005, p 683). The guidelines from the RCP and BSRM (2003) suggest that emotional state, including mood, should be assessed and that survivors should be given the opportunity to discuss with a suitable agency the impact of ABI on their lives (Turner-Stokes, 2003). Armstrong (1991) highlights the importance of the ABI survivor feeling wanted and cared about. Interventions that address emotional needs may reduce dysfunctional behaviours by satisfying an unmet need at a deep level. By meeting unmet emotional needs behaviour can be managed better and the survivor is supported to engage in rehabilitation (Armstrong, 1991). Agencies providing intervention should be experienced in the management of emotional issues regarding the impact of ABI. ABI survivors must have access to “individual and/or group psychological interventions for their emotional difficulties” (Turner-Stokes, 2003, p. 45). Music therapy is able to provide both individual and group interventions.

### **2.3.7 Quality of life in rehabilitation**

Quality of life is recognised as a health domain (World Health Organisation, 2002) and it is affected by involvement in leisure activities. Unemployed ABI survivors have more time to engage in these activities. However, their access to these activities may be restricted due to cognitive deficits, social and behavioural problems, and environmental factors, such as limited access around public buildings and inability to use public transport. The guidelines

from the RCP and BSRM (2003) suggest that ABI survivors should be offered “a goal-directed community-based programme aimed at increasing participation in leisure and social activities” (Turner-Stokes, 2003, p. 48).

Although most stroke patients (and their caregivers) have to live with cognitive disturbances, most health-related quality of life studies tend to neglect neurocognitive impairments (Von Steinbuechel, et al., 2005). The effect on quality of life is a significant indicator for the value of health-related interventions. Von Steinbuechel, et al. (2005) recommend that brief, post-injury outcome measures of changes in emotions and community participation should be used as predictors for health-related quality of life studies.

### **2.3.8 A holistic approach to rehabilitation**

Holistic approaches to rehabilitation address ABI survivors’ emotional needs (Armstrong, 1991) while providing meaningful goals (Williams, Evans and Fleminger, 2003) and facilitating adjustment to illness and disability (Yates, 2003). Synthesis of neurological, reactive, adaptive explanations, rather than a reductionistic approach, may help to understand the emotional response to brain injury (Armstrong, 1991). This reflects the assertion that emotional responses to brain injury are dynamic, complex, and varied. Thus, the survivors’ responses are viewed as complex and as the result of internal and environmental factors. This suggests the necessity of a more holistic perspective in rehabilitation work, such as that provided by music therapy (Robb, 1996).

Holistic approaches to rehabilitation are appropriate ways for engaging ABI survivors in meaningful rehabilitation that is self-rewarding. The use of a structured, holistic approach with cognitive rehabilitation that focuses on meaningful goals in daily life may be an effective way of reducing anxiety for ABI survivors and improving rehabilitation and reintegration into the community (Williams, Evans and Fleminger, 2003).

Yates (2003) states that there is a need to address both cognitive impairments and emotional dysfunctions to improve levels of activity, participation, and social functioning in the community. Empowerment is a critical concept in facilitating improvement in these areas. As a construct, empowerment includes the concepts of “self-efficacy, participation and collaboration, sense of control, meeting personal needs, understanding the environment, personal action, and access to resources” (Yates, 2003, p. 292).

Ability and disability are important concepts for ABI survivors. Disability may be considered as a social construct that is relative rather than absolute (Yates, 2003). This model suggests that individual and social meanings of disability are shaped by experiences of impairment and the creation of social and psychological dependency. Self-constructed and socially constructed value systems dominate to result in feelings of inferiority, with direct consequences for the well being of the person with acquired disability. Disability is neither absolute nor the direct result of impairment (Yates, 2003). Rather it can be considered to be a function of the person’s intrinsic impairments, and environmental and social factors. It can, therefore, be worked through to improve an individual’s quality of life. Yates proposes community integration and enablement as important goals in rehabilitation. He suggests that the social model of disability offers a useful way to inform work in this area, as social inclusion and feeling valued are promoted within this model. A holistic approach offers a useful way to facilitate adjustment and community integration through addressing cognitive impairments, emotional needs for support and adjustment, and social needs for inclusion (Yates, 2003).

## **2.4 Addressing cognitive impairments and emotional needs through music therapy**

This section presents the music therapy literature regarding cognitive functioning and emotional needs. It demonstrates the breadth of research conducted, the current knowledge



about music therapy in brain injury rehabilitation, and the issues presented to researchers conducting studies in this challenging field. The section begins with a discussion about the special relationship between music and the brain, and presents an overview of music therapy in brain injury. Then, it presents some findings from a systematic review of music therapy research in ABI to identify important criteria and areas for further research. The section then focuses on music therapy research that addresses cognitive rehabilitation and emotional needs. The section concludes with a discussion of the need to conduct research in music therapy as a holistic approach to rehabilitation.

#### **2.4.1 Music as a tool for music therapy in rehabilitation**

Music acts as an organising stimulus that is able to prepare the nervous system and to initiate, organise, sequence, and regulate functional processes, e.g. movement and speech (Sacks, 1998; Thaut, 2008). “It is not just a matter of motion and time, but of inner force and energy, of intention and impulse” (Sacks, 1998, p. 8). Sacks (1998) described amnesic patients whose musical memory remained intact: patients who continued to play the piano while being forgetful in other daily situations. The use of music in music therapy may be distinguished from drug treatment in several ways. There are patients for whom music does not work, and music is not guaranteed to act when administered. Drug treatment involves the patient in a passive role, whereas music therapy involves the patient in an active one. Patients may develop a tolerance to drugs, whereas there is no evidence of patients requiring higher doses of music therapy to achieve the same outcomes. Sacks (1998) asserts that music is not generic, but specific. It does not have a general effect, but the same music may affect some individuals more strongly than others. Musical pieces may also have specific meanings and memories for each individual. The emotional impact of music is its primary effect. Brain injury survivors with severe frontal lobe damage are able to sing with emotion appropriate to songs while remaining indifferent emotionally in

other situations where others expressed a range of emotions. Music has the ability to enable people to express and develop their identity through non-verbal means (Sacks, 1998).

The brain seems to possess innate functioning that allows for the perception (Grahn, 2009; Iverson, Repp and Patel, 2009; Large and Snyder, 2009), performance (Chen, Penhune and Zatorre, 2009), and anticipation of rhythmic patterns (Fujioka, et al., 2009). The oscillatory mechanisms in neural activity seem to support the collaboration of different parts of the brain (Chen, Penhune and Zatorre, 2009), and these are mediated by other brain structures (Chen, Penhune and Zatorre, 2009; Grahn and Brett, 2007). Musical experience recruits multiple parts of the brain bilaterally (Large and Snyder, 2009), and all human beings, regardless of musical training, possess innate neurological processes that are influenced by the periodicity and meter of rhythm, and the structure of music (Chen, Penhune and Zatorre, 2009; Grahn, 2009; Large and Snyder, 2009).

Musical experiences and training shape and develop neural connections and processes through the phenomenon of neuroplasticity (Pascual-Leone, 2001). Restoration of function is also based on the concept of neuroplasticity and functional reorganisation (Kolb and Gibb, 2010; Mateer and Kerns, 2000). Key factors in functional reorganisation are repetition of functional processes and varied experiences involving these processes to develop and strengthen synaptic interconnections. Music therapy has been used to stimulate cortical reorganisation and develop new connections in other parts of the brain to recover lost functions. Examples of this approach in music therapy include motor retraining of affected limbs, where music is used to stimulate, shape and regulate movement (Thaut, 2000; Livingston, 1996); cognitive retraining, where music is used to motivate practice and support the process via musical cues (Gervin, 1991); communication rehabilitation, where music is used to enhance the client's communication potential

(Magee, 1999). Baker and Roth (2004) argue that music therapy provides a different medium compared to other therapies. It can provide great variation in experiences to encourage neural and synaptic interconnections, making it a useful tool for rehabilitation. Music therapy involves a wide range of creative techniques to address needs and functional gains in movement, verbal and non-verbal communication, cognition, and sensory perceptions (Thaut and Abiru, 2010; Baker and Tamplin, 2006). It has also been used to aid the prevention and treatment of mood disorders, provide support for social interaction, address psychological problems, and enable emotional adjustment to acquired disability (Magee and Davidson, 2002; Barker and Brunk, 1991; Baker and Tamplin, 2006). Music therapy interventions in neurological rehabilitation include rhythmic auditory stimulation, instrumental playing, music listening, musical improvisations, improvisational song creation, composition, song writing, song listening and discussion, song reminiscing, song story, song text writing, instructional song, song quizzes, music-based attention training, musical sensory orientation training, singing, vocal exercises, and vocal improvisation (Bradt, et al., 2010; Gilbertson, 2009).

Music therapy is used in a range of settings at different stages of rehabilitation: from working with people with disorders of consciousness to developing functional abilities to adapting to life in the community. The client's psychopathology and individual needs (emotional, cognitive, communication, physical, and social) are fundamental to considerations made by the therapist in assessing the client and designing treatment. The treatment plan reflects the individual's needs, abilities, preferences, and psychopathology. Other important considerations are whether individual or group treatment is most appropriate, which techniques might be used, and the duration and frequency of intervention. The treatment plan may involve setting long-term goals divided into short-term aims. Factors affecting the treatment plan and delivery of a music therapy service

might include the staffing resources, goals of the whole facility, availability of the music therapist, and expectations of music therapy in the rehabilitation service. Other factors that may have great impact on the delivery of music therapy are the cost and available funds to cover them, timetabling of therapy sessions and fatigue considerations, and also travelling to the service in community rehabilitation settings. The duration of treatment is dependent on the orientation of therapy: towards functional goals or process (as in psychotherapy). Functional work may be shorter as functional objectives are reached and therapy ceases. However, process oriented therapy may last longer. Another difference is that functional work commonly involves shorter sessions between two and five times a week, whereas process oriented work may involve weekly sessions lasting 45 to 60 minutes. The key point in this difference is that during functional training the emphasis is on the learning and rehearsal of functional skills. This requires a high frequency of practice and repetition to succeed. Therefore, it places high demands on the availability of the music therapist unless an alternative solution can be found. This type of work is more likely to be found in hospital rehabilitation settings rather than in the community. Baker and Roth (2004) discuss the need to address restoration of function with reference to the timing and type of intervention. They recommend that music therapists should focus on restoration of impaired function in the earlier stages of rehabilitation. Then, when functional gains appear to cease, longer-term work should include the use of compensatory strategies. The authors do not provide figures for the lengths of these stages of rehabilitation. This may imply that each individual's recovery and rehabilitation is unique and decisions about the choice of intervention and focus of the effort of work must be guided by evaluation of the individual's progress and needs.

Although music listening has been used by non-music therapists, an intervention is defined as music therapy if it consists of the following components: "(1) implementation of goal-

directed music interventions by a trained music therapist, and (2) the use of music experiences individualised to patient need” (Bradt, et al., 2010, p. 3). This highlights the necessity for the use of music and the music therapist-client relationship for the intervention to be considered music therapy. Bruscia defined music therapy as “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, p.20). This matches the components of music therapy given by Bradt, et al. (2010).

Music therapists have used music to stimulate and develop spared capacity in various functional skills. Music therapy programs can be designed to provide opportunities for clients to learn new ways of undertaking daily tasks, thus compensating for the neurological impairments that limit their abilities. These methods utilise the clients’ strengths and capacity of functioning. Examples of music therapy used in this way include introducing and practising the use of augmentative tools, such as communication aids and memory aids (Baker, 2003; Livingston, 1996; Lee and Baker, 1997); developing the physical functioning of unaffected, pre-morbidly dominant limbs to improve daily functioning and quality of life (Lucia, 1987); and learning new information to perform acts of daily living safely and effectively (Livingston, 1996; Lee and Baker, 1997). In these examples music is used as a powerful motivating, organising, and cueing tool to achieve functional outcomes relevant to the daily needs of clients with ABI.

Music therapy may not only be useful as an agent of recovery of function, but it may also be a valuable tool in revealing, understanding, and working with ABI survivors’ cognitive difficulties, for example in sensory and attention processing (Magee and Bowen, 2008). Music therapists can offer useful insight into the use of music and its management in the environment. Thus families and carers can limit the load on survivors’ attention processing

systems, and reduce agitation levels. Music therapy can enable survivors and their families to find non-verbal, meaningful, satisfying, creative ways of being together. Without meaningful and social activities the survivor is at risk of social isolation (Magee and Bowen, 2008). “Music enables connection and companionship between people without the need for verbal language and carers who view their situation as meaningful and manageable appear to cope better” (Magee and Bowen, 2008, p. 306).

Bradt, et al. (2010) stipulate that only qualified music therapists may provide a music therapy service, but collaborative work involving multidisciplinary approaches can be extremely beneficial. Collaborative work may take place with other interventions, such as occupational therapy, speech and language therapy, physical therapy, physiotherapy, and psychology. In multidisciplinary work, music therapy can provide significant benefits that would otherwise be much more difficult to obtain. For example, a music therapist may be able to elicit a fuller understanding of the client’s cognitive functioning and mood state. This may aid the psychologist’s assessment. The use of music may help gain further insight and develop the client’s ability for emotional expression, and ability to relate to others. The use of music can sometimes transcend barriers that exist around the use of words. The client’s musical responses may reveal information about cognitive processes and skills, such as attention, memory, executive functions, the ability to be spontaneous and initiating, and inhibitive control of behavioural responses, such as aggression (Magee and Wheeler, 2006). Music therapy can support other interventions, such as occupational therapy, to develop and support compensatory techniques to address functional problems in the areas of initiation, sequencing, motor planning, and problem solving (Gervin, 1991). Approaches to treatment of patients with severe problems due to ABI have evolved from a purely medical, mainly pharmacological approach to one that addresses their capabilities and needs. The cost of healthcare and treatment has shaped the evolution of service

provision in rehabilitation. Quality and dignity of life have become increasingly important in treatment, and when we consider the cost effectiveness of music therapy, “the benefit immeasurably exceeds the cost” (Sacks, 1998, p. 11). Magee (1999) provided further comment on the cost effectiveness of music therapy in rehabilitation. She stated that costs are high in brain injury rehabilitation due to the level of specialist care required. As a result, there has been an increase in requests for rehabilitation practitioners to demonstrate the effects of treatment in measurable terms, to justify the cost effectiveness of the intervention in rehabilitation. In medical model settings, treatment is expensive and the medical stability of the client is paramount. Therefore, music therapists must evaluate the effectiveness and value of the service they provide (Magee, 1999).

Gilbertson (2006) draws attention to important considerations regarding rehabilitation and an understanding that it is an “element of our society that is based on participation and equality, regardless of health situation” (Gilbertson, 2006, p. 665). He suggests that rehabilitation is successful when it eliminates loneliness and isolation, and facilitates re-integration of the individual into society. This suggests that a holistic approach is necessary in rehabilitation. In the UK, many music therapists may focus on functional gains, or they may work psychotherapeutically to focus on emotional experiences (Magee and Wheeler, 2006). However, music therapy is an intervention that works with the client’s responses in a holistic way. Music therapy provides a safe, relaxed environment for rehabilitative work due to the inherent emotional, psychological and physiological effects of music (Magee and Wheeler, 2006).

While it is recognised that the breadth of music therapy intervention addresses a wide range of needs and areas of functioning, this doctoral study focuses on music therapy to address cognitive functional gains and emotional needs following ABI.

### **2.4.2 Music therapy research in ABI**

Bradt, et al. (2010) carried out a systematic review to assess the effects of music therapy with standard care compared with standard care alone or standard care combined with other interventions on “gait, upper extremity function, communication, mood and emotions, social skills, pain, behavioural outcomes, activities of daily living and adverse events” (Bradt, et al., 2010, p. 1). The review’s objectives were threefold. First, it sought to identify randomised controlled trials (RCT) that examined the effectiveness of music therapy in aiding recovery for ABI survivors. Second, it sought to compare the effect of music therapy and standard care with other conditions, such as standard care alone, standard care plus placebo, or standard care plus other therapies. Third, it aimed to compare the effectiveness of the various types of music therapy interventions. The conclusions drawn provide useful information regarding recommendations for clinical treatment and further research.

The review considered rehabilitation of mobility as imperative to enhancing the independence of people with ABI. Therefore, improvements in gait and upper extremity function were considered primary outcomes. Secondary outcomes listed were communication, mood and emotions, social skills and interactions, pain, behavioural outcomes, activities of daily living, and adverse events (e.g. falls, fatigue, and death). It is notable that cognitive gains were not included in the list. This suggests a paucity of music therapy research in this area, and highlights the need for research in music therapy to address cognitive gains in ABI.

Cochrane systematic reviews adhere to rigorous research designs only. Thus, 21 studies were excluded. The main reason for exclusion was the lack of a control group/condition. The review included seven studies that met the inclusion criteria. The risk of bias in the included studies was assessed in terms of the use of randomisation of allocation, allocation



concealment, blinding of outcome assessors, and dropout rates of 20% or less. As a result only two studies achieved a low risk of bias rating. Only one study detailed the “method of randomisation, allocation concealment and level of blinding” (Bradt, et al., 2010, p. 10). So, research design and the high risk of bias significantly reduced the number of studies that met the inclusion criteria, and contributed to the poor quality of the evidence.

The authors conclude that the strongest evidence existed in studies proposing the use of rhythmic auditory stimulation (RAS) for gait training. However, they state that more evidence is required before clinical recommendations can be made. The reviewers also conclude that there is not sufficient evidence from RCTs to support the use of music therapy for improvement of agitation, cognitive orientation, mood and emotions, social skills and interactions, and activities of daily living (Bradt, et al., 2010). Without sufficient evidence, it is not possible to make recommendations for clinical practice for these outcomes. Therefore, there is a need for future music therapy research to include outcomes in cognitive functional gains, mood states and emotional needs.

The reviewers argue that in order to inform clinical practice we must have strong evidence from RCTs to support recommendations. However, Gilbertson (2009) argues the value of case studies in developing music therapy as a health profession. He suggests that case studies offer useful knowledge about the efficacy and clinical benefit of music therapy, and these reports should not be disregarded but used to inform clinical practice. In other disciplines, such as psychotherapy, single cases have provided the foundations for many widely used techniques. Gilbertson advocates an inclusive approach when identifying published material, regardless of study design. An inclusive approach precludes an unbiased literature base, which itself preserves the diversity of clinical techniques, populations, and geographical locations. Gilbertson argues that systematic reviews and meta-analyses are not able to capture the clinical diversity of a profession that approaches

clinical work creatively. However, case studies are not able to eliminate bias and, hence, cannot show efficacy. Perhaps these opposing arguments suggest the necessity for more mixed methods research in music therapy to develop treatment methods and evaluate their effectiveness.

Both quantitative and qualitative evidence have their strengths and weaknesses.

Quantitative evidence provides information about causal relationships and the magnitude of effects in an objective way. Qualitative evidence reveals how something is experienced and thought about in a subjective way. Both are useful forms of evidence when recommending treatment. It is important to note that mixed methods approaches are currently outside the inclusion criteria of acceptable research designs as stipulated by the Cochrane library. However, a mixed methods approach would be able to provide both types of evidence.

Bradt, et al. (2010) note the difficulty in determining efficacy due to small sample sizes used in the vast majority of studies. Other research in brain injury has highlighted the difficulty in recruiting large numbers of participants for conducting research with this population (Kim, 2010; Limond and Leeke, 2005). Limond and Leeke (2005) identified ethical and design problems with using control groups in research with ABI populations. They reviewed studies with an emphasis on eliminating bias. RCTs were held as the highest level of study as they were more likely to eliminate bias effectively. However, the authors state that “heterogeneity within this population means that one case is rarely similar to the next and this may restrict the use of RCTs” (Limond and Leeke, 2005, p. 347). Serious consideration must be given to the ethical problem of using control groups that may not receive rehabilitation at the most appropriate stage of recovery. The authors suggest the use of natural experiments to study the effectiveness of cognitive rehabilitation but state that these must be used in a systematic and controlled manner. Hurt, et al. (1998)

comment on the use of repeated measures designs and highlight the need to use an experimental design in which subjects act as their own controls. They state that this is necessary where the population is very heterogeneous (as in ABI), making it extremely difficult to match control samples (as in RCTs).

This doctoral study is unique in providing quantitative and qualitative data within a mixed methods paradigm in this field of research. The use of repeated measures in the experimental design may also enable the use of smaller samples and eliminate between-subject differences that might be present in an RCT. In this way, the study will contribute to the body of evidence required to inform clinical recommendations.

#### **2.4.2.1 Music therapy research in attention rehabilitation**

Attention problems are arguably the most significant impairment acquired through brain injury because deficits in this area of functioning may prevent ABI survivors from obtaining benefits offered by therapy interventions. This makes attention rehabilitation a priority following brain injury (Knox, et al., 2003). Music therapy has sought to improve attention with different client groups since the beginning of the profession (Bruscia, 1987). Examples may be found in models of improvisational music therapy, such as Juliette Alvin, Riordan-Bruscia model of Experimental Improvisation Therapy, and Orff-Schulwerk music therapy (Bruscia, 1987).

According to Thaut (2010) over the past 50 years there have been few research studies in music therapy in cognitive rehabilitation compared to music therapy in other areas of rehabilitation, for example motor rehabilitation and speech and language rehabilitation. Thaut suggests that the focus on broad, psychotherapeutically oriented concepts and approaches to treatment has limited the development of research in this important area. He also states that limitations in brain imaging techniques have also contributed to this paucity in research in this field. However, the development of electroencephalography (EEG) and magnetoencephalography (MEG) techniques for measuring brain-wave activity has greatly

improved research in the field. Thaut highlights research that has examined the link between music and attention (Drake, Jones and Baruch, 2000; Large and Jones, 1999). Research has also extended into using music for functional recovery of cognition, and examples include research into the effect of rhythm on attention processes (Drake, Jones and Baruch, 2000; Jones, 1992; Jones, Boltz and Kidd, 1982; Jones and Ralston, 1991; Klein and Jones, 1996).

Thaut focuses on the use of rhythm in rehabilitation. He considers rhythmic patterns to be able to “entrain attention focus by interacting with attention oscillators via coupling mechanisms” (Thaut, 2010, p. 281). He postulates that "the mechanisms that drive cognitive processes in music, such as in attention and memory, are shared by equivalent processes in non-musical cognition" (Thaut 2010, p. 282).

Wit, et al. (1994) present a multiple baseline, longitudinal study to explore the effectiveness and feasibility of music therapy for attention rehabilitation in brain injury. The study involved five adolescent subjects enrolled in a head injury rehabilitation program. The study compared varying amounts (dosages) of musical attention training. The attention training focused on four levels of attention processing: sustained, selective, alternating, and divided attention. All subjects, including the control, also received standard music therapy. The researchers conclude that attention training through music is feasible in rehabilitation. They emphasise the need for further studies involving larger samples. They also state that cognitive needs must be addressed in order for music therapy with brain injury survivors to be holistic.

Knox, et al. (2003) conducted a single subject study with repeated measurement to investigate the effects of a musical attention training programme (MATP) on the alternating attention function of a young male TBI survivor. Using standardised assessment tools they determined that although his alternating attention functioning was within the normal range, the client's functioning improved with the use of the MATP exercises. Knox, et al. (2003) highlight the need for future research in this area to include

larger samples and baseline data.

So, musical attention training seems to be feasible for rehabilitation of attention for brain injury survivors. However, there has been a paucity of empirical research that uses large samples to examine the effects of music therapy on functional gains in attention for ABI survivors (Knox, et al., 2003).

The number of sessions, i.e. dosage of music therapy, may also be an important issue to examine through music therapy research in attention rehabilitation. Thaut, et al. (2009) studied the immediate effects of music therapy on cognitive functioning with people with BI. Treatment participants were given four 30-minute sessions of music therapy focusing on one aspect of cognitive rehabilitation in each session. The researchers found that neither the treatment group nor control group improved in attention functioning, and effect sizes were small for both groups. Thaut, et al. (2009) suggest that this might indicate the need for more than one session to produce improvements in attention functioning. This is concurrent with findings from a study by Sarkamo, et al. (2008) that used a single-blind, randomised, longitudinal experimental design to determine whether music listening can facilitate cognitive functional gains following stroke. The researchers found that, after a two-month intervention period, stroke survivors who listened to their favourite music daily showed greater improvement in focused attention than those in the control groups (Sarkamo, et al., 2008). Focused attention and verbal memory scores in their study were highly correlated and this suggests that “the effect is mostly related to enhanced attention” (Sarkamo, et al., 2008, p. 873). This is in agreement with the *arousal and mood hypothesis* (Thompson, Schellenberg and Husain, 2001), which states that enjoyable stimuli, such as music, may induce positive affect and increased arousal, leading to improved cognitive performance. The treatment group in the study chose to listen to their favourite music. This music may not have been in modes of positive affect. However, it would have been meaningful to each participant. So, perhaps it can be deduced that meaningful musical

experiences enhance attention functioning for brain injury survivors. However, functional gains may be more likely with larger doses, i.e. more sessions, of music therapy.

#### **2.4.2.2 Music therapy research in memory rehabilitation**

Samson, et al. (2009) state that there is a paucity of research investigating the effect of emotion on memory recall. However, there are useful findings in the research that has been conducted. There is a positive correlation between emotional arousal induced by music and retrieval of semantic information about the music (i.e. title or performer name) (Schulkind, Hennis and Rubin, 1999). Emotion appears to enable encoding and retrieval of long-term musical memory. Musical pieces that rate highly positively in emotional valence are recognised more accurately than others. This suggests that emotional valence may be an important factor in influencing long-term memory (Eschrich, Munte and Altenmuller, 2008). Excerpts that elicit high arousal emotions, e.g. fear and happiness, enhance musical memory compared to excerpts that elicit low arousal emotions, e.g. sadness and peacefulness (Samson, Dellacherie and Platel, 2009). Phelps (2004) suggested that the amygdala influences the encoding and storage of hippocampus-dependent memories, and these two medial temporal lobe structures function as a group when emotion and memory functions are activated. Samson, Dellacherie and Platel (2009) suggest that “musical memory may be less affected than verbal memory in patients with temporal lobe epilepsy. The emotional power of music is likely to be responsible for this relatively spared memory function” (Samson, Dellacherie and Platel, 2009, p. 249).

People with Alzheimer’s disease (AD) were reported as being able to learn and remember a ten-line song in 8 weeks (Baird and Samson, 2009). Samson, Dellacherie and Platel (2009) tested this observation and studied the ability of patients with AD to recognise music and short stories, and also the long-term retention of this familiarity. They found that patients with AD reported greater feelings of familiarity for old than for new songs,

and this difference was not significant for short stories. Musical material (or material that is musically framed) is retained more securely for longer than verbal information.

The amygdala and the hippocampus are known for being essential for emotion and memory functioning. Perhaps this is why memory for music seems to be less impaired than memory for language (Samson, Dellacherie and Platel, 2009). Samson, Dellacherie and Platel (2009) state that "the powerful and long-lasting memory-enhancing effect for musical stimuli raises the potential benefits of using music stimuli in rehabilitation of brain-damaged patients" (Samson, Dellacherie and Platel, 2009, p. 253).

Research exists that has examined the link between music and auditory verbal memory (Deutsch, 1982; Glassman, 1999; Kilgour, Jakobson and Cuddy, 2000; Thaut, Peterson and McIntosh, 2005; Chan et al., 1998; Ho et al., 2003). Rhythm seems to be an important component in the development of music therapy techniques for rehabilitation of memory disorders. Drawing on the research of Deutsch (1982), Thaut suggests that "fundamental organisational processes for memory formation in music - based on the structural principles of phrasing, grouping, and hierarchical abstractions in musical patterns - have their parallels in temporal chunking principles of non-musical memory processes" (Thaut 2010, p. 281).

Music has been used as a mnemonic device to enable learning and recall with a range of populations (Clausson and Thaut, 1997; Gfeller, 1983; Wallace, 1994; Wolfe and Hom, 1993; Moore, et al., 2008). Thaut (2010) suggests that the "highly developed temporal structure in musical stimuli - songs, chants, rhymes - functions as a metrical template that helps to organise and chunk information into more manageable units" (Thaut, 2010, p. 282). A study by Thaut, Peterson, and McIntosh (2005) has shown that words were learned and recalled more effectively with musical support through song (as a rhythmic-melodic template) when compared with spoken presentation and rehearsal. EEG recordings of the study subjects showed higher levels of synchronised oscillatory activity in bilateral prefrontal neural networks underlying memory for the musical mnemonic condition than for the spoken condition.

Two studies by Silverman (2007, 2010) studied the effect of music on immediate memory recall. The participants in both studies were recruited from higher education settings and were not known to have brain injuries. Silverman found that participants recalled digits paired with rhythm more accurately than digits paired with speech, pitch, or a pitch-rhythm combination.

Silverman (2010) suggests that recall of information was most accurate when it was learned with rhythm only. This concurred with previous research that supported the use of rhythm as a means to chunk information into more manageable units during immediate memory recall tasks (Miller, 1956; Schellenberg and Moore, 1985; Silverman, 2007; Stoffer, 1985).

So, rhythm aids memory recall and the accuracy of semantic information recalled is higher when the semantic information is paired with rhythm. Pitch may also have an effect on immediate memory recall, as it may serve to overload working memory (Silverman, 2010). Working memory has been considered to have storage limitations (Berz, 1995; Schunk, 2004; Snyder, 2000). These limitations may be linked to loads on attention or sensory processing. This suggests that music therapy in the rehabilitation of memory should focus on the use of rhythm rather than pitch.

The role of emotion in memory recall is implicated in several studies. Tomaino (1998) discussed music therapy and its effect on long-term memory recall. She highlights the auditory nerve and its connection to the midbrain, specifically the limbic system. When considering how music emotionally arouses brain-damaged patients she states that “first the rhythm helps focus the person’s attention, then the melodic line/harmonies stimulate an emotional response” (Tomaino, 1998, p. 21). Functional processes that are stored as procedural memory can be recovered through the use of rhythm in retraining (Tomaino, 1998). Emotional context and mood state enhance learning and memory recall (Bower,



1981; Adolphs, Denburg and Tranel, 2001). From these findings, Thaut deduced that musical memories provide access to non-musical material by "strong associative learning mechanisms that utilise music as a highly salient conditioning stimulus" (Thaut, 2010, p. 282). The amygdala and hippocampus are integral to this process (Grady, et al., 2001). Therefore, emotional context may contribute to longer residual memory functions (Thaut, 2010). Music-based memory training may help individuals with ABI access the amygdala-based neuroanatomical network through the use of music as a "highly salient emotional stimulus" (Thaut, 2010, p. 283).

Music improves mood and orientation, which, in turn, affects cognitive processes of brain injury survivors (Baker, 2001; Sarkamo, et al., 2008). Baker (2001) conducted a study comparing the effects of live, taped, and no music, on agitation and orientation levels of people experiencing post-traumatic amnesia (PTA). Baker found that "both live and taped music are effective in enhancing orientation and reducing agitation among people experiencing PTA and therefore viable methods of managing the person in PTA" (Baker, 2001, p. 189). Baker suggests that her findings supported claims that music therapy interventions are a useful alternative to pharmacological ones, which may produce detrimental side effects. These findings concur with those of Sarkamo, et al. (2008) that suggest that recovery in the domains of verbal memory and focused attention improved with mood state when participants listened to their favourite music. Sarkamo, et al. (2008) conclude that music listening during early post-stroke rehabilitation could enhance recovery of memory and attention and prevent negative mood states.

Experiences of music that are meaningful to the individual activate an interconnected neurological network consisting of cortical and subcortical brain regions (Blood and Zatorre, 2001; Brown, et al., 2004; Menon and Levitin, 2005; Koelsch, et al., 2006). Dopamine is released in this process, (Ashby, et al., 1999), which is linked to the regulation of aversive stimuli, pain, and stress (Menon and Levitin, 2005). This

dopaminergic mesocorticolimbic system is fundamental to the mediation of arousal, emotion, reward, motivation, memory, and attention functioning (Ashby, Isen, and Turken, 1999). The increased dopamine level directly improves attention and memory in healthy subjects (Schück, et al., 2002). It also improves cognitive functioning in patients with cognitive impairments (Nagaraja and Jayashree, 2001). Therefore, it may be deduced that the positive mood induced by music mediates attention and memory recovery for brain injury survivors (Sarkamo, et al., 2008)

Dosage also seems to be an important factor in music therapy interventions for rehabilitation of memory. Results from a study by Thaut, et al. (2009) suggest that more than one session of music therapy may be necessary to produce improvements in memory recall. This suggestion is supported by the findings of Sarkamo, et al. (2008) that show improvements in verbal memory recall following two-months of daily music listening.

#### **2.4.2.3 Music therapy research in addressing emotional needs**

There is a growing body of evidence that shows that music making activates neurological networks involved in cognitive, sensorimotor, and emotional processing. However, there is a lack of empirical evidence investigating the benefits of music making for psychological and physiological health (Koelsch, Offermanns and Franzke, 2010). Research supports the assertion that engagement in music activates core structures of emotional processing in the brain (Dantzer, et al, 2008; Koelsch and Siebel, 2005; Koelsch, Offermanns and Franzke, 2010). “Such emotional effects form an important basis for a possible intervention using music in the treatment of disorders related to autonomic, endocrine, and immune system dysfunction, because the activity of these systems is under the modulatory control of emotional processes” (Koelsch, Offermanns and Franzke, 2010, p. 307). Therefore, there is a clear requirement for music therapy to address the paucity in this area of research.

Music therapy may improve the mood states of brain injury survivors (Baker and Wigram, 2004; Goldberg, Hoss and Chesna, 1988; and Magee and Davidson, 2002). Goldberg, Hoss and Chesna (1988) found that through the use of music and imagery a brain-damaged patient was engaged in addressing her psychological problems. They suggest that through music therapy the patient was able to improve her mood state, develop a more positive attitude towards others and become more part of her immediate social group (Goldberg, Hoss and Chesna, 1988).

Research into the immediate and short-term effects of music therapy on mood state have yielded contradictory findings. A study conducted by Magee and Davidson (2002) compared pre- and post-session measures of mood state before and after two individual music therapy sessions. The sessions occurred over a period of two weeks. The music therapy intervention involved the use of welcome and ending musical activities, pre-composed songs, and clinical improvisation. The researchers found significant positive changes in the mood states composed-anxious, energetic-tired, and agreeable-hostile after the music therapy intervention. However, no statistically significant changes were found for the mood subscale elated-depressed. Their study suggests that music therapy may produce significant changes in mood after a brief intervention. This may have useful implications for music therapy practice in neurological rehabilitation settings where there is an emphasis on cost effective, non-pharmacological interventions that have immediate effects.

Baker and Wigram (2004) contradicted the above assertion that music therapy produces immediate positive changes in mood state. They examined pre-post mood changes over 15 individual singing sessions. Immediate effects showed that scores for feelings of fear, anger, sadness, and fatigue increased post-session. In attempting to interpret their results, Baker and Wigram (2004) suggested that intense pain, fear, and anger might be voiced

through singing. This process increases the individual's capacity to feel and express intense emotions. The researchers postulated that through intensification of feelings and emotions the participants may have become more aware of them, resulting in increases in these feeling states (Baker and Wigram, 2004). These findings contradict those of Magee and Davidson (2002). The music therapy intervention in Magee and Davidson's study involved the use of songs, but they reported positive changes in mood states. This discrepancy may be due to factors including differences in the types of songs used, variations in the relevance of the songs to the participants, and differences in the outcome measures.

In contrast to the findings of Baker and Wigram (2004), Thaut, et al. (2009) compared the pre- and post-test scores for mood states of TBI patients during four sessions of music therapy. In the area of anxiety, the treatment group showed significant improvement and a small effect size, whereas the control group showed no significant change and a small effect size. The treatment group's depression scores improved significantly with a medium effect size, whereas the control group's scores did not change, and showed a small effect size. The above research into the immediate effects of music therapy on mood state is inconclusive. However, it suggests that music therapy may have an immediate positive effect on mood. The contradictory nature of these findings suggests the need for further research into the immediate effects of music on mood and emotional needs.

There is some evidence to support the positive effects of singing on mood over the course of treatment. It showed that feelings of happiness increased, and feelings of fear, sadness, and confusion decreased after 15 sessions of music therapy (Baker and Wigram, 2004). The researchers interpreted this finding by suggesting that the songs used were reflective of the subjects' emotional states, and "by engaging in the singing of these songs the participants are, in effect, singing about their own feelings, and the very act of doing so

allows them to release and let go of pent up emotions – a cathartic effect” (Baker and Wigram, 2004, p. 58). The authors postulate that by facilitating emotional expression positive mood states were increased and negative ones decreased over the course of therapy. They also suggest that repeated singing of the same songs might have increased the subjects’ emotional responsiveness to the songs, thereby increasing the songs’ cathartic effects (Baker and Wigram, 2004).

#### **2.4.2.3.1 Music and the limbic system**

Understanding of the effect of music on the limbic system is fundamental to the development and implementation of music therapy techniques in treating affective disorders and addressing emotional needs. Research using functional magnetic resonance imaging (fMRI) has shown that activity changes in the amygdala, ventral striatum, and hippocampus were activated by music with moderate intensity emotional arousal (Koelsch, et al., 2006). The use of positron emission tomography (PET) has shown that regional cerebral blood flow correlates positively with peak emotional arousal due to music listening (Blood and Zatorre, 2001). The hippocampus may be an important structure for the emotion arousal effect of music on regions of the brain in relation to affective disorders. A number of functional neuroimaging studies report the effect of music on activity in the hippocampal formation (Blood and Zatorre, 2001; Baumgartner, et al., 2006; Eldar, et al., 2007; Koelsch, et al., 2006; Mitterschiffthaler, et al., 2007). Therefore, it may have an important role in activity in this area and in the generation of positive emotions. Peretti and Swenson (1974) investigated the effects of music on anxiety and found that music affected anxiety level. They state that the use of music causes significant reductions in the anxiety and tension induced by anxiety-provoking tasks and situations (Peretti and Swenson, 1974). This may suggest that music may arouse positive emotional responses and release inner tension. Blood and Zatorre (2001) studied neural mechanisms

fundamental to intensely pleasurable emotional responses to music known as “chills” (Blood and Zatorre, 2001). They found that listening to music that is meaningful to the individual induces chills that are related to increases in heart rate, electromyogram (EMG), and respiration depth. This indicates that changes occur in autonomic and other psychophysiological activity while individuals listen to selected music. The researchers identified changes in brain structures involved in reward. These included increases in regional cerebral blood flow (rCBF) in left ventral striatum and dorsomedial midbrain, and decreases in rCBF in right amygdala, left hippocampus/amygdala, and ventral medial prefrontal cortex. Increases in rCBF in relation to chills intensity were also noted in paralimbic regions (bilateral insula, right orbitofrontal cortex (OfC)) and in areas involved in arousal (thalamus and anterior cingulate cortex (AC)) and motor processes (supplementary motor area (SMA) and cerebellum).

The observed rCBF decreases in the amygdala and hippocampus during music-induced chills supports the notion that these structures play a key role in reward and emotion. The amygdala is involved in fear and other negative emotions. It is also involved in judgement processes involving socially and biologically important emotions. The ventral striatum moderates judgement processes involved in reward and motivation behaviour. This suggests that music may maximise pleasure by simultaneously activating the reward system and reducing activity in brain structures linked to negative emotions (Blood and Zatorre, 2001).

Further research investigated whether emotional arousal underlies the pleasurable aspects of music listening. Salimpoor, et al. (2009) found evidence for a direct relationship between emotions and the rewarding aspects of music listening. When individuals experience pleasure listening to music they show a distinct profile of increasing sympathetic nervous system activity as pleasure increases (Salimpoor, et al., 2009). The

researchers conclude that their findings support the theory that “musical emotions underlie the pleasurable aspects of music listening” (Salimpoor, et al., 2009, p. 10).

From the research of Peretti and Swenson (1974), Blood and Zatorre (2001), and Salimpoor, et al. (2009) it seems that music induces pleasurable emotional responses by causing changes in cerebral blood flow in brain structures associated with reward and arousal. These pleasurable emotional responses may act to reduce anxiety and suggests that music may be effective in addressing emotional needs and affective disorders. It also suggests that music therapy may be highly effective in facilitating emotional adjustment for brain injury survivors.

#### **2.4.2.3.2 Music therapy and motivation**

Motivation is an important issue in rehabilitation. Motivating people with ABI to engage in and maintain a rehabilitation regime can be very difficult. This may be due to several factors including mood disorders, fatigue, environmental issues, psychological problems, cognitive deficits, and emotional problems relating to acquired disability. The effect of music on emotion, mood, and functioning may influence an individual’s level of motivation in rehabilitation. Music therapy is able to address many of the factors affecting motivation (Nayak, et al., 2000).

Researchers have investigated the effect of music on adherence to a physical rehabilitation exercise program (Johnson, Otto and Clair, 2001) and the effect of music on functional motor training when compared to standard training without music (Schneider, et al., 2010). The use of strong metronomic beats seems to be an important factor in motivating people to adhere to rehabilitation exercises. Therefore, the use of rhythm might improve motivation and adherence to physical rehabilitation exercise programmes (Johnson, Otto and Clair, 2001). Music-supported training was found to be more efficient than functional motor training without music (Schneider, et al., 2010). The motivational and emotional

effects of music may influence the subjects' experience of the rehabilitation programmes that include the use of music. Participants have reported that the use of music enabled enjoyment of the exercises, making it a highpoint in their rehabilitation process (Johnson, Otto and Clair, 2001; Schneider, et al., 2010). This research focused on intervention in early rehabilitation phases. So, there is a need for future research to examine treatment in chronic stroke survivors.

Kim and Koh (2005) conducted a study to determine the effects of music therapy on the perception of pain for chronic stroke survivors during upper extremity joint exercises. There were no statistically significant differences in pain rating between the conditions of song, karaoke accompaniment, and no music. However, the researchers found that subjects experienced increased motivation for rehabilitation. The survivors' positive mental association between music and exercise are a clinically relevant and valuable outcome (Kim and Koh, 2005). Music induces positive affect and increases arousal levels, leading to improvements in task performance (Thompson, Schellenberg and Husain, 2001). This supports the assertion that music may be crucial for enhancing participation in rehabilitation programmes.

Mood affects survivors' motivation to engage in rehabilitation therapy. Mood disturbances impact negatively on the individual's capacity for rehabilitation, and, therefore, mood is an important issue worthy of investigation and treatment during rehabilitation (Baker and Wigram, 2004). Music therapy can produce improvements in functional outcomes and also in measures of well being, leading to improved participation (Magee, et al., 2006). Baker and Wigram (2004) state that optimum progress in rehabilitation is attained when brain injury survivors are engaged physically, cognitively, and emotionally in therapy processes. As music is able to evoke mood responses, music therapy may be an essential tool to maximise the individual's capacity during rehabilitation (Baker and Wigram, 2004). This



claim is supported in a study by Pacchetti, et al. (2000) investigating the efficacy of active music therapy on motor and emotional functions in neurologically impaired patients – people with Parkinson’s disease. This study compared active music therapy with physical therapy. The researchers found that improvements in motor functioning and emotional state were associated with music therapy. Improvements in emotional state were found throughout the music therapy intervention. However, after the intervention finished, measures of emotional state returned to baseline levels. This indicates an immediate, but temporary effect of music therapy to improve emotional state. The researchers also found significant improvements in activities of daily living (ADL) and quality of life (QOL) for subjects undergoing music therapy. Emotional state and psychosocial problems may affect motor performance. Affective arousal through musical activity can influence emotional and motivational processes in the brain, and this might be linked to functional performance (Pacchetti, et al., 2000). Music therapy can address emotional needs while also addressing functional gains in a creative way that motivates and engages people with ABI. The research by Pacchetti, et al. (2000) showed immediate and temporary improvements in emotional state rather than long-term improvements. Although this contradicts the findings of Baker and Wigram (2004), it suggests that music therapy may be more effective when used to facilitate engagement and participation in comprehensive programmes that address functional gains and emotional adjustment.

#### **2.4.2.3.3 Music therapy and social participation**

Participation in rehabilitation may also be linked to social and behavioural outcomes. Group music making can be rewarding and pleasurable. The emotional effects of engaging in group music making include joy and happiness (Koelsch, Offermanns and Franzke, 2010). This has important implications for the practice of music therapy, especially for recommendations of group interventions. Social isolation and exclusion from social

interaction have harmful effects for human beings, significantly influencing morbidity and mortality (Cacioppo and Hawkley, 2003). Music therapy counteracts this by facilitating contact through music making. The positive effects of group music making may be due to several factors. Music automatically engages areas of the brain associated with social cognition and mentalisation (Steinbeis and Koelsch, 2009). Music enables individuals to perceive the emotional states of others and resonate with them (Koelsch, Offermanns and Franzke, 2010). Communication is a core function of music making in non-verbal and verbal forms. Music making enables accurate coordination of movements in human social groups, which is associated with pleasure (Huron, 2001). Kirschner and Tomasello (2009) showed that very young children synchronise more accurately to a beat presented by a human play partner than in situations of non-social contact. It also encourages cooperation, which is associated with the activation of a reward network in the brain (Rilling, et al., 2002). Human beings demonstrate a need to feel part of a group and form enduring attachments (Koelsch, Offermanns and Franzke, 2010). Music making addresses this need. A study by Koelsch, Offermanns and Franzke (2010) found that participants involved in group music making “felt more pleasant, more aroused, happier, less angry, less sad, and less anxious compared to the control group” (Koelsch, Offermanns and Franzke, 2010, p. 312). Music therapy has been shown to improve social and behavioural outcomes, leading to greater participation in the standard rehabilitation process (Nayak, et al., 2000). Nayak, et al. (2000) argued for music therapy to be included in the collection of interdisciplinary rehabilitation interventions as an adjunctive treatment to complement other interventions and to enable better attainment of rehabilitation goals.

#### **2.4.2.3.4 Song writing in ABI**

ABI survivors often require support for emotional adjustment to changes due to brain injury. Song writing has been shown to be an effective intervention for enabling emotional

adjustment. Song writing methods include fill-in-the-blank format, group song writing, and improvisational song writing. These vary in their emphasis on lyric composition, vocal improvisation, instrumental improvisation, and song parody. Robb (1996) described the use of song writing to address the emotional needs and physical well being of ABI survivors. She showed that music therapy can address clients' needs in a holistic way by simultaneously addressing emotional needs while attending to functional goals. Robb argued that the psychological and physiological aspects of brain injury rehabilitation cannot be separated due to the concurrent and concomitant sources of physical, psychological and emotional pain. Psychosocial interventions, such as song writing, affect physical well being as a result of improving emotional well being (Robb, 1996). Song writing simultaneously targets self-expression, self-esteem, emotional adjustment, interpersonal communication, and recovery of repressed emotions and thoughts. In this way it can be an integral part of an ABI survivor's rehabilitation.

Song writing often involves descriptions of feelings, situations, and personal narratives. Traumatic changes, such as loss or acquired disability, can affect individuals on many levels of psychological functioning and well being, including their thoughts about their own identity, their relationships, and the meaning of their own existence. The inability to look back at a traumatic event and talk about it shows a difficulty with accepting the experience. However, telling the story helps the individual make sense of it, and labelling the emotions involved may reduce their effect on the individual (Pennebaker, Mayne and Francis, 1997). Self-narratives can be a useful psychological intervention for enhancing recovery (Chamberlain, 2006). Self-narratives involve substituting positive narratives for negative ones, with the intention of instilling hope and a positive outlook to improve mental health and enhance self-reflection. This psychological approach enables the individual to test reality, to do psychological work, and to acknowledge and grieve for loss.

Chamberlain (2006) notes that the literature on the subject of emotional adjustment presents opposing views regarding this type of psychological work. For some, working with grief is possible and essential due to the capacity of the individuals to be aware of their losses and their capacity for sense of self. Others may not acknowledge the loss and see no reason to grieve or adjust to reality. Cognitive and communication deficits may also determine the value of personal narratives in interventions (Chamberlain, 2006).

As a tool in music therapy, song writing aids self-reflection and emotional adjustment (Baker, Kennelly and Tamplin, 2005b). ABI survivors have identified loneliness and isolation, happiness, lack of freedom, frustration, and anger as salient and frequently occurring themes in songs (Baker, Kennelly and Tamplin, 2005a). Other important themes were changes in appearance, current difficulties, concerns about the future, and fears and anxieties about living with disability. Therapeutic song writing is an emotion-focused coping strategy that facilitates acknowledgement of emotional responses to situations over which the individual has little or no control. The acknowledgement of these emotional responses is an important part of the process of emotional adjustment (Baker, Kennelly and Tamplin, 2005b).

Song writing involves cognitive mental processes that govern attention functioning, memory recall, psychosocial skills, and executive functioning (e.g. organising and sequencing). It is a complex task that recruits parts of the brain involved in cognition and emotion. Therefore, the use of song writing might imply a holistic approach to treatment, and a mixed methods approach to research.

#### **2.4.2.4 Music therapy research and the holistic approach to ABI rehabilitation**

Rehabilitation teams within the medical model setting determine treatment goals according to the overwhelming need to achieve functional gains (Magee, 1999). This has the effect of reducing the ABI survivor to a list of functional impairments and medical problems, and may be experienced as dehumanising for the individual. Rehabilitation teams might also view emotional and social needs as less important as a result (Magee, 1999). ABI survivors are more responsive to relationships rather than mere techniques or processes (Claeys, et al., 1989). This suggests the need for a therapist, or at least another human being, to be involved in the survivor's rehabilitation. Perhaps it predicts the value of group interventions for brain injury survivors.

The biopsychosocial approach to neurorehabilitation considers illness as the “result of an imbalance within a functioning system, and is not simply a malfunction of one element of an individual.” (Claeys, et al., 1989, p. 71). This approach has implications for rehabilitation treatment and research. It implies a need for a holistic approach to rehabilitation rather than a focus on discrete elements at the exclusion of other needs within the individual.

Different ways of viewing individuals with ABI are reflected in rehabilitation models. Lee and Baker (1997) presented a paper that explored how music therapy practice within neurorehabilitation can adapt to a changing treatment ideology. The authors discussed the impact of moving from a multidisciplinary ideology to that of an interdisciplinary model. The multidisciplinary model views the client as a collection of discrete functional impairments addressed independently. The interdisciplinary model views the client as a whole and his/her needs as complex and related, with treatment aiming at reintegration back into life roles. A holistic approach, addressing functional and psychosocial needs, is

enabling and empowering for the client, and improves engagement in rehabilitation programmes (Lee and Baker, 1997). An example of interdisciplinary work shows how music therapy was used to develop a learning and memory tool to improve the safety of an ABI survivor when using her wheelchair. The music therapist composed a safety song that was used by all team members to facilitate carry over in a variety of settings (Lee and Baker, 1997).

While it is important to discuss the clinicians' ways of viewing ABI, it is also important to consider survivors' perspectives, as it relates to their concepts of identity. ABI results in changes to an individual's identity. Through music therapy it is possible to address key self-concepts and feelings of identity that are damaged due to acquiring disability (Magee and Davidson, 2004). "From the participant's perspective music therapy intervention increases awareness of one's physical performance" (Magee and Davidson, 2004, p.48). This physical awareness is deeply rooted in the individual's concept of identity. Control, physical ability, life review, and independence are important in constructing identity. Music therapy enables individuals to explore these phenomena in relation to themselves. It provides specific benefits relating to the use of music as a medium for intervention. The music therapy process enables survivors to explore the personal experience of illness, and to develop strategies for "coping with the emotional consequences of illness" (Magee and Davidson, 2004, p. 48). In this way, music therapy "affects self-concepts and promotes positive feelings of identity" (Magee and Davidson, 2004, p. 50). The findings of this research also highlight the value of survivors' perspectives for assessing the effectiveness of interventions and for developing treatment.

Many interventions in rehabilitation focus on functional goals. The focus on functional outcomes predetermines the selection of other professions, such as physiotherapy, speech and language therapy, and psychology, to address treatment goals. These other professions

are considered essential to rehabilitation and have specific training, knowledge and collections of measures well suited to addressing functional goals. Unessential treatments, or those that are adjuncts to other treatments, may be unlikely to be included in rehabilitation teams due to cost considerations (Magee, 1999). Music therapy sometimes adopts an adjunctive role to support other therapies in rehabilitation. However, although music therapy can address functional goals, it can also facilitate improvements in psychological, social, and emotional areas of need (Gilbertson, 2006), showing its flexibility. Gilbertson highlighted the importance of assisting brain injury survivors to enjoy and develop relationships. He suggested that this is an essential part of human life and, therefore, is an essential goal for rehabilitation.

While rehabilitation teams pay immediate attention to self-care, and communication and physical problems, the ABI survivor's affective and behavioural changes have a profound effect on post-injury life. Music therapy research studies have examined emotional and social changes due to music therapy (Purdie, Hamilton and Baldwin, 1997; Nayak, et al., 2000; Magee and Davidson, 2002), and their effects on participation in rehabilitation (Barker and Brunk, 1991). The research showed that music therapy addressed functional goals, encouraged socialisation, and provided an emotional outlet during rehabilitation (Barker and Brunk, 1991). Patients receiving music therapy participated more in their rehabilitation program and were more socially interactive (Purdie, Hamilton and Baldwin, 1997). Researchers also found significant differences between pre- and post-session measures of mood state (Magee and Davidson, 2002). A holistic approach to rehabilitation is able to meet functional, psychological, and social needs simultaneously with great benefit to patients and at little cost to the rehabilitation unit (Barker and Brunk, 1991; Gilbertson, 2006).

Engagement in music appears to be a holistic experience in which music may form an important link between cognition and emotion. Krumhansl (2002) stated that “people report that their primary motivation for listening to music is its emotional effect” (Krumhansl, 2002, p. 45). She presented an article using the concept of musical tension to connect “the cognition of musical structures with musical emotions” (Krumhansl, 2002, p. 45). Through a series of experimental examples (using self-rating measures of emotional response, physiological measures of emotional responses, and cognitive psychological measures of musical interpretation of structure) Krumhansl (2002) showed that changes in listeners’ emotional responses and feelings of tension were linked to temporal organisation in music, as they experienced “contours of tension and emotion” (Krumhansl, 2002, p. 48). She found that the musical excerpts used “produced the same direction of change compared with baseline levels, suggesting that music has an overall effect on emotional physiology” (Krumhansl, 2002, p. 46). By comparing musical analysis of classical instrumental music with listeners’ real-time judgements of memorability, degree of openness, and amount of emotion, Krumhansl (2002) found that “all three judgements could be accounted for by the musical analysis” (Krumhansl, 2002, p. 48).

Levitin (2009) presented an article in which he discussed neural processing in relation to structure in music. He postulated that strong emotional reactions to music are related to the structure of music. His reasoning involved the notion that a randomised sequence of notes does not elicit the same emotional response as the same group of notes in an arranged structure. Levitin (2009) states that brain regions involved in attending to music are bilateral, and that the processing of music appears to recruit several networks in the cerebellum, superior temporal poles, inferior frontal cortex, and the prefrontal cortex. Music that is emotionally meaningful for the individual extends this activity to the ventral tagmental area, the nucleus accumbens, and the hypothalamus (Menon and Levitin, 2005).



The prefrontal cortex also seems to perform a role in mediating access to the hippocampus and to long-term and working memory for music (Levitin, 2009). A neural network that connects the cerebellum, parietal, frontal, and temporal lobes appears to be involved in the processing of time, tempo, and structure in music (Levitin, 2008).

The cognition-emotion link activated and mediated by musical experience may have important implications for music therapy research. The goal-oriented medical model of rehabilitation focuses on functional goal attainment as a measure of therapeutic efficacy. For music therapy some difficulty exists in communicating meaningful achievements as clearly identified outcomes. Firstly, outcomes in emotional and social needs are difficult to measure in a quantifiable way. Secondly, treatment approaches and therapeutic orientations vary widely in the music therapy profession. This can make it difficult to determine the effectiveness of music therapy in rehabilitation (Magee, 1999). There is a significant gap between the reported outcomes in research studies and the benefits reported by clinicians in the descriptive literature. The descriptive literature in this field suggests a holistic effect of treatment on areas including communication, emotions, and social and physical responses. Magee and Davidson (2004) posit that “descriptive studies remain the most beneficial format for understanding the individual experience psychodynamically, behaviourally and physically in music therapy” (Magee and Davidson, 2004, p. 39). However, empirical research identifies and isolates specific dependent variables to measure the effect of music therapy on individual functional outcomes (Magee and Davidson, 2004). This difference may be due to functional outcomes being more easily assigned to dependent variables in an empirical study than are changes in identity and self-concept, and emotional well being or mood (Magee and Davidson, 2004). Therefore, qualitative approaches have been used when limitations in outcome measurement have precluded the exclusion of experimental designs.

The difference between clinician reports and outcomes reported in empirical studies may also be the result of different, and sometimes incompatible, aims and processes. In empirical research, the focus is on controlling for variables and effects, and eliminating bias so that the quantitative outcome measurements can be analysed to produce trustworthy conclusions. Simplicity is an important goal in conducting this kind of research, as it reduces the effect of confounding variables in an experiment. It is an experimental ideology and is suited to the laboratory where conditions can be controlled more successfully. Participants are included or excluded depending on strict criteria. This research often recruits neuro-typical participants rather than neurologically impaired ones. However, it is fundamental to our understanding of what happens at molecular and synaptic levels, and provides experimenters with sufficient sample sizes. This is essential to increasing the power of the experiment to examine the causal relationship under study. Empirical research provides us with clues to developing interventions and evidence that suggests that music is useful in treatment.

Clinical reports do not attempt to control variables or eliminate bias (although, it is important to establish trustworthiness in qualitative studies). These naturalistic reports reflect events in the real-world, clinical setting where variables are difficult to control and the research focus broadens to include the complex system within which the participant is situated. They inform us about what happened at behavioural, emotional, psychological, and systemic levels. Qualitative research methods are more able to deal with complexity; but in doing so their conclusions lack the certainty of simple, experimental methods when investigating effectiveness. They describe the effect of intervention with neurologically impaired subjects, rather than with neuro-typical subjects. Thus, they focus on clinical applications.

There are several issues to consider when conducting quantitative research with neurologically impaired subjects. Methodological problems have been found to cause issues in obtaining results that reach statistical significance (Purdie, Hamilton and Baldwin, 1997; Nayak, et al., 2000; Baker and Wigram, 2004). For example, the use of small samples has been cited as a major limitation (Magee, et al., 2006; Goldberg, Hoss and Chesna, 1988; Magee and Davidson, 2002; Kim and Koh, 2005), and makes generalising the findings problematic (Baker and Wigram, 2004). However, the small sample sizes used in empirical research have been influenced by other problems regarding recruitment of subjects and attrition. The neurologically impaired population is a diverse, heterogeneous one. This is reflected in the very wide variety of music therapy treatment methods shown in the literature. The heterogeneous nature of the population and their injuries makes participant selection very difficult and contributes to the use of small sample sizes in experiments. Ethical problems exist for experiments using random assignment and control groups. Participants have expressed strong preferences to be assigned to the treatment group rather than a control group, and random assignment to groups have been problematic due to ethical considerations about interference with patients' treatment schedules.

Recruitment difficulties, irregular attendance, and early discharge from hospital have all contributed to limitations in research design. Fatigue and illness have been cited as the main causes of irregular attendance (Nayak, et al., 2000). Fatigue has also been reported as a significant problem that impacts on a participant's ability to engage in the activities (Magee, et al., 2006). Baker and Wigram (2004) suggest that there is a link between fatigue and mood state. In their study, reports of tiredness seemed to increase as the reports of anger, sadness and fear increased. They explained that this might be due to the experience of expressing intense emotions: "people feel more tired after intense emotional

experiences” (Baker and Wigram, 2004, p. 62). So, researchers and clinicians must be aware of fatigue issues that affect, and are affected by, participation in therapeutic rehabilitation.

Another major problem for quantitative researchers in rehabilitation is the difficulty in finding specific and appropriate measurement tools. As stated earlier, the population is heterogeneous and presents researchers and clinicians with extremely wide variations in age, cognitive abilities, level of consciousness, physical abilities, emotional responses and needs, and sensitivity to treatments, such as music therapy. Older chronic survivors might show a more limited capacity to self-evaluate than younger survivors (Kim and Koh, 2005). This may limit the feasibility of using self-report outcome measures. Participants have reported polarised responses in self-report measures of mood state (e.g. VAMS). This has led to “unusual distributions of values, and therefore an increased estimate of the standard deviation” (Baker and Wigram, 2004, p. 58). This may result in an underestimation of the true effects of treatment.

Clinical relevance poses a problem when conducting empirical research. Dependent variables are often defined to reflect meaningful change during rehabilitation. However, these variables do not match therapeutic aims, such as self-esteem, identity, and emotional expression, given in published clinical case material in this field (Magee and Davidson, 2004). Qualitative research enables examinations of the experience of illness, of the clinical process (rather than focusing on outcome measurement), and exploring emotional responses to music therapy.

Experimental research methods may neglect important benefits of treatment due to their focus on specific functional outcomes. A more holistic approach may be more able to investigate unexpected benefits that occur as a result of treatment. In a case example, Magee showed that functional goals were not reached at all. However, through improvised

singing “music therapy provided a quality of interaction” (Magee, 1999, p. 25) that was missing in the client’s life. Magee described the use of improvisational techniques as providing opportunities for measurable outcomes where functional gains are difficult to assess through standardised measures. She acknowledged the need for music therapists to show outcomes. However, she warned that this pursuit may potentially lead the music therapist to ignore that “which motivates, facilitates and structures interaction, and addresses qualitative issues” (Magee, 1999, p.26) – the emotional experience of music. While empirical research methods can determine the statistical differences between pre- and post-session outcome measures, qualitative research methods can capture complex factors that contribute to these results. Therefore, a mixed methods approach using qualitative and quantitative data would provide a more comprehensive understanding of the results (Magee and Davidson, 2002).

ABI survivors’ disabilities are becoming more profound due to increasing survival rates of severe brain injuries (Magee, 1999). This results in greater difficulty in identifying successful outcomes. With clients in these predicaments, music therapy can improve aspects of quality of life that are unattainable through a purely functional approach to rehabilitation (Magee, 1999). It is music’s ability to “reach individuals, regardless of physical, sensory, cognitive or communication abilities” (Magee, 1999, p. 26) that makes music therapy so potent. Perhaps it is also music’s ability to reach individuals in each of these areas as well as emotionally that makes it suitable as a truly holistic intervention. This suggests that music therapy researchers should consider mixed methods as a viable approach to investigating the effect of music therapy in addressing the needs of ABI survivors.

## **2.5 Summary**

ABI affects survivors, families, carers, service providers and society. It impacts on survivors' functional abilities and emotional needs. Impairments in cognitive ability and emotional problems coexist and are persistent many years after acquiring the brain injury. The combination of acquired disability, emotional problems, and lost relationships often result in an altered sense of identity and social isolation. The growing number of brain injury survivors indicates an increasing need to address issues following ABI. Therefore, this study will focus on addressing cognitive functional gains and emotional needs in community rehabilitation.

Functional approaches to rehabilitation can be effective in improving functional gains in a specific area. However, these approaches fail to address the emotional response to acquired disability and the multitude of losses experienced. Music affects human beings at cognitive and emotional levels simultaneously and holistically. It is very difficult to isolate and separate the cognitive and emotional effects of music on brain injury survivors, especially in the clinical setting. Cognitive abilities and emotions affect each other and should both be addressed during rehabilitation. The music therapy treatment protocol used in this study should address cognitive functional gains and emotional needs together.

Empirical research that focuses on functional outcomes neglects the emotional experience of ABI and treatment. Qualitative approaches are able to capture the emotional benefits of music therapy, the experience of ABI, and the experience of music therapy. However, they lack the ability to simply communicate outcomes to non-music therapists. Qualitative research methods do not produce results of sufficient external validity to be able to generalise the effects of treatment to other survivors. The issues of communicating outcomes in a simple way and the need to generalise the effects of treatment are addressed through the use of quantitative research methods.

Small sample sizes are an issue when conducting experimental research with ABI populations, particularly when using independent groups or matched groups designs. This problem could be addressed through the use of a repeated measures design in which each participant experiences all conditions including the control condition. This eliminates the need for an independent control group and makes it more feasible to conduct experimental research. So, in order to explore the effects of music therapy on cognitive functional gains and emotional needs a mixed methods approach may be able to provide a more comprehensive data set. This will involve quantitative and qualitative data collection and a repeated measures design experiment.

## **2.6 Research Questions**

The previous sections have described the impact of ABI, the needs of ABI survivors, the models of rehabilitation used to address these needs and challenges, and the research about the use of music therapy to address cognitive and emotional needs. Research results and designs have been discussed, and important issues revealed for researchers conducting studies with brain injury populations. This has lead to the formulation of a main research question with a set of sub-questions.

The overarching aim of the research has been to determine the effectiveness of brief group music therapy for ABI rehabilitation. This aim predetermines the focus on dosage, i.e. number of sessions. This means that the study must consider the number of sessions and its effect on outcomes. The second important area of focus is on the effect of brief group music therapy on attention, memory recall, and emotional needs. This selects these areas as the most pertinent ones for a music therapy research study, especially as music activates brain networks involved in cognition and emotional processing simultaneously. The third important area of focus is the use of group music therapy to address these needs. The decision to use group music therapy acknowledges the assertion that ABI survivors are

responsive to relationships and also that emotional needs are connected to social needs and feelings of social isolation. So, the main research question is:

How can brief group music therapy address cognitive functional gains and emotional needs of people with acquired brain injury?

This question is not only concerned with whether or not the intervention can address these needs. It is also concerned with the therapeutic process and the experience of therapy.

Therefore, the study will aim to reveal the opinions and experiences of the participants to expand the current knowledge on the subject and to help shape future treatment protocols.

Four sub-questions were drawn from the main one:

- Does treatment have an effect on attention functioning?
- Does treatment have an effect on memory functioning?
- Does treatment have an effect on emotional needs?
- How does time-limitation affect treatment delivery?

The first three questions isolate attention, memory, and emotional needs, and ask separately whether there is an effect of treatment on them. The fourth question is concerned with the effect of the length of treatment or dosage on effectiveness. It is also concerned with the experience of brief treatment. The research questions will be discussed more in Chapter 3.



## **CHAPTER 3**

### **3 METHOD**

This chapter presents the method used in the study of brief group music therapy with brain injury survivors in community rehabilitation. It begins with a brief discussion of the methodological thinking. This includes presentation of the research problem and consideration of the methodological implications of the research question and sub-questions; the topic under investigation; and the researcher's position, the population, and the setting in relation to the study. The chapter then describes the study design, sample, participants, treatment protocol, data collection and data analysis used in the study. It concludes with a summary of the method.

#### **3.1 Introduction to the methodology**

The purpose of this study was to assess how brief group music therapy could meet the needs of people with acquired brain injury in the areas of cognitive functional gains and emotional needs. The need for music therapy research in cognitive rehabilitation has been highlighted in the literature (Thaut, 2008; Bradt, et al., 2010) as well as the need for holistically addressing emotional and functional needs in music therapy intervention (Wit, et al., 1994; Gilbertson and Aldridge, 2008).

The client group was selected from the researcher's experience in community rehabilitation. Music therapy was used in this setting. However, at the time, there was a lack of research in music therapy with this client group in this milieu compared to medical settings and also compared to rehabilitation in earlier phases of recovery. So, the present study was designed to focus on music therapy with clients in community rehabilitation settings.

### **3.2 Research questions**

In thinking about the methodology and the selection of a suitable paradigm through which to view this study it was first necessary to consider the main research question at the focus of this study:

How can brief group music therapy address cognitive functional gains and emotional needs of people with acquired brain injury?

This was an exploratory question about treatment and the experience of treatment. It implied a study concerned with the effect of group music therapy on cognition and emotional needs and how the treatment is perceived by those engaged in it. From a quantitative perspective, this is defined as a discipline research topic in the sub-topic area of treatment research (Bruscia, 2005). Treatment questions are concerned with before-after comparisons involving experimental manipulation of independent variables. This research question is about treatment and implies a focus on measuring the effectiveness of treatment or discovering the effects of treatment.

The main research question also suggests the need to subjectively assess the effects of the intervention. Focus and purpose are the two primary components of questions in qualitative research (Bruscia, 2005). From a qualitative perspective, the focus is brief group music therapy in community rehabilitation, and the purpose of this study is to gain an understanding of how this intervention addresses cognitive functional gains and emotional needs. This understanding is sought from the experiences, thoughts, and opinions of the participants and the clinician. These are facets of experiences that are hidden from the view of tools used to measure overt processes, such as in quantitative research. The qualitative purposes of this study are interpretation and theory building. At the level of interpretation, the aim was to derive or create meaning from the data (Bruscia, 2005). This was achieved using the researcher's implicit comprehension of the

phenomenon informed by, and compared with, theoretical knowledge, or interpretations by others, relevant to the data. At the level of theory building, the aim was to improve knowledge in this research area.

In asking ‘*how*’ the treatment addressed the needs of the participants, the question suggested a complex exploration of the treatment. This required a more complete, multidimensional view of the topic to encompass objective measurement and subjective evaluation of the intervention. The question assumed the effectiveness of treatment. This assumption was extrapolated from the music therapy literature on the topic, such as Baker and Tamplin (2006), Sarkamo, et al. (2008), and Thaut (2008, 2010). So, the main research question implied the use of both qualitative and quantitative methodologies. It suggested the use of observational methods to describe what was occurring in the intervention, survey methods to describe attitudes and opinions about it, and experimental methods to determine a causal link between the intervention and changes in cognition and emotional needs. Although this meant that the research study would be multifaceted, it did not necessarily indicate a diffuse focus. Instead, it influenced the development of a study that was more comprehensive in its view of the phenomenon, and thus, provided richer data that could be used together to understand the phenomenon more clearly and in more depth. According to Shaughnessy, Zechmeister and Zechmeister (2003), the experimental method is the best available research method for identifying causal relationships, but the multi-method approach is the best overall approach. This approach allowed the researcher to be more confident in conclusions due to gaining comparable answers to the research question by using different methods. “Conclusions are then said to have *convergent validity*. Each method has different shortcomings, but the methods have complementary strengths that overcome these shortcomings” (Shaughnessy, Zechmeister, and Zechmeister, 2003, p.196).

The overarching research question derived four sub-questions. These addressed the effectiveness of music therapy treatment, the process of brief music therapy, the techniques or methods that would be clinically useful, and the experience of brief group music therapy. The sub-questions are:

- Does treatment have an effect on attention functioning?
- Does treatment have an effect on memory functioning?
- Does treatment have an effect on emotional needs?
- How does time-limitation affect treatment delivery?

The first sub-question asked: Does treatment have an effect on attention functioning? This implied quantitative measurement of attention before, during, and after treatment to obtain numerical data that would measure any change in attention due to the intervention.

Objectivity and the testing of a causal relationship were primary goals suggested by this question and, therefore, an experimental method was necessary.

The second sub-question asked: Does treatment have an effect on memory functioning?

This also indicated quantitative measurement of memory before, during, and after treatment to measure change in memory due to the intervention. The same goals that applied to the above sub-question about attention functioning also applied here. Although, these first two sub-questions seemed quantitatively oriented they were also approached qualitatively from the participants' subjective experience and internal assessment. The participants were involved in the assessment of the effectiveness of the treatment. This was essential to gain an understanding of the perceived effect of brief group music therapy.

The third sub-question asked: Does treatment have an effect on emotional needs? This sub-question implied quantitative measurement of emotional needs before and after treatment to measure the effect of treatment. De Haan, et al. (1993) state that quality of life investigations are useful for evaluating the efficacy of therapeutic interventions. They state

that improvements in neurological function may not necessarily lead to improvements in quality of life. De Haan, et al. (1993) suggest that evaluation of patients' subjective health and well being is still highly relevant even when improvements in neurological functioning have been demonstrated. An experimental method was suggested by this sub-question. However, the measurement of emotional needs is a subjective measurement rather than one that can be reliably and easily obtained through objective means. This suggested a combination of quantitative and qualitative data about the effect of the treatment on emotional needs. The need for multiple perspectives in measurement of health has been noted in the literature on brain injury. Von Steinbuechel, et al. (2005) suggest that outcomes that combine objective clinical measurement with evaluation from the patient's perspective may contribute to the quality of clinical research and therapy. Therefore, quantitative and qualitative methods of data collection were considered to address this question.

The fourth sub-question asked: How does time-limitation affect treatment delivery? This sub-question had both qualitative and quantitative implications. From a qualitative perspective the question inferred an investigation into how the length of treatment (in this case, brief treatment) affected the selection of treatment methods. It also required evaluation of the subjective experiences of treatment from the perspectives of the participants and the clinician. From a quantitative perspective it suggested the measurement of the effect of treatment with varying lengths, or dosages, of the intervention.

### **3.3 The research problem and its implications for the study**

The research questions contained a combination of qualitative and quantitative elements. This reflected the position that the phenomenon (brief group music therapy) was viewed as a complex whole with interacting elements. The types of knowledge sought in this study

were both objective and value-free, but also subjective and value-laden. This suggested a mixed methods research approach that involved quantitative measurement of the effect of treatment, and qualitative investigation of subjective assessment of the treatment. It also included qualitative investigation of the participants' experiences of brief group music therapy. A purely qualitative approach was not able to adequately measure the effect of treatment and it lacked the objectivity of quantitative research. Thus, it would not be possible to make inferences about causal relationships between the treatment and observed effects. A purely quantitative approach provided adequate data for making these inferences but lacked the subjective exploration of qualitative investigation required to gain deeper insight into the therapeutic process. The aim of this research was not only to show whether the treatment would have an effect, but also why and how it did so.

To examine cognition and emotional needs together in the same study implied the use of mixed methods due to the conceptual nature of these facets of human existence: cognition was conceptualised as intellectual or abstract in nature, whereas emotional needs were conceptualised as subjectively embedded within the individual.

### **3.4 Mixed methods as the paradigm of choice**

Research conducted from the positivistic paradigm is concerned with objectivity and determining the strength of discrete causal relationships. Research from the non-positivistic paradigm is concerned with subjectivity and increasing the depth of understanding about a phenomenon (Ruud, 2005). According to some researchers, the paradigms are incompatible due to the exclusive philosophical underpinnings of each one (Wheeler, 2005; Bruscia, 1995). However, others assert that mixed methods research benefits from the strengths of both quantitative and qualitative methodologies and, if designed well, can account for the inherent weaknesses in both methodologies (Teddle and Tashakkori, 2009). When conducting mixed methods research, it is essential to

consider the paradigmatic issues that arise and the philosophies that underpin the research methods that they employ (Wheeler, 2005; Bonde, 2004).

Mixed methods research “combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration” (Johnson, Onwuegbuzie and Turner, 2007, p.123). It attempts to consider multiple perspectives and standpoints, positioning itself between the two main paradigms of quantitative and qualitative research. Thus, the purpose of mixed methods research is to find a practical solution to the research problem. Table 3.1 presents the three methodological positions with comparison of their dimensions. It demonstrates how mixed methods research occupies the middle ground between quantitative and qualitative poles by utilising aspects of both methodologies.

Table 3.1: Comparison of Research Methodologies<sup>2</sup>

<b>Dimension of research methodology</b>	<b>Quantitative</b>	<b>Mixed Methods</b>	<b>Qualitative</b>
Ontology (the nature of reality)	Reality is objective, single, simple, and can be understood	Social realities contain diverse viewpoints dependent on personal value systems	Reality is subjective, multiple, complex, and problematic
Possibility of cause-effect linkages	Can determine cause-effect linkages	Causal linkages can be inferred	Cannot determine causal relationships
Axiology (the role of values)	Value-free inquiry	Values are important in interpretation of results	Value-bound inquiry
Logic	Deductive	Both deductive and inductive	Inductive
Methods	Quantitative, mathematical, statistical, fixed, laboratory-based	Both qualitative and quantitative methods used to best answer the question	Qualitative, with less emphasis on statistical analysis, flexible, naturalistic
Epistemology (relationship of 'knower' to 'known')	Objective, passive, knower is separate from known	Both objective and subjective points of view	Subjective, active, knower and known interact and are inseparable
Data collected	Numbers, variables, measurements	Mixture of quantitative and qualitative data	Words, images, sound recordings, artworks
Data analysis	Quantitative, statistical	Both quantitative and qualitative analysis	Identifying patterns, themes, and holistic features
Possibility of generalisation	Generalisations possible	Findings from quantitative and qualitative results may corroborate to strengthen the inferences	Generalisations not possible, particularistic findings

Quantitative research methods allow the testing of hypotheses about causal relationships.

Eliminating bias in the process of collecting and analysing data is essential to this type of

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<sup>2</sup> Note: This table was constructed from various sources including, Teddlie and Tashakkori (2009); Ruud (2005); Bruscia (2005); Prickett (2005); Wheeler (2005); and Wheeler and Kenny (2005).



research (Prickett, 2005). Therefore, objectivity and the separation of the researcher from the knowledge are central requirements in quantitative research.

Qualitative research acknowledges the complexity of the human condition and experience. It must, therefore, be holistic rather than reductive in its approach. It must attempt to capture the full picture in order to gain closer proximity to the truth. A qualitative methodology would provide rich, thick descriptions, in-depth information about the phenomenon, and direct representations of subjects' opinions and experiences. Its overall goal is to discover meaning, which requires a context – human experience (Wheeler and Kenny, 2005). Subjectivity and the relationships of the knowledge to both the researcher and the participant are key components in qualitative research. It is not possible to determine causal relationships owing to the inherent bias in qualitative research.

Mixed methods research considers the nature of reality from a flexible position that allows for the inclusion diverse standpoints dependent on the topic under study and the kinds of knowledge sought. When knowledge is experience dependent, it may be more useful to adopt the mixed methods viewpoint of reality as socially constructed. The flexibility of mixed methods research limits the certainty of conclusions about causal relationships: limiting them to the level of inference rather than determination. However, this may be appropriate for this exploratory study. Quantitative and qualitative data may be mixed at various stages of research. For example, at the research design stage, qualitative data may influence instrument development by aiding with construct and conceptual development. Quantitative data may be used to identify representative samples for qualitative investigation (Johnson, Onwuegbuzie and Turner, 2007).

Quantitative and qualitative data collection methods differ greatly owing to the philosophical positions from which their paradigms developed. While the former is deductive and favours the laboratory experiment, the latter is inductive and naturalistic

(Bruscia, 2005). Naturalistic inquiry takes place in natural settings, rather than laboratories. It closely represents what actually occurs in clinical work and, therefore, it provides very high clinical relevance for the research (Wheeler and Kenny, 2005). The laboratory may be a useful environment in which to control variables to preserve internal validity. However, music therapy occurs in natural settings where therapy forms part of the client's history of experiences, and where other variables may produce changes in behaviour and health. Therefore, it is reasonable to argue that an experimental method should be conducted in a clinical, or natural, setting when the treatment is music therapy. This increases the external validity of the findings. The key is to maximise compatibility between experimental conditions and application of the treatment while also ensuring internal validity (Campbell and Stanley, 1963). In a mixed methods study, quantitative and qualitative data may serve different functions. For example, quantitative data may provide baseline information to avoid elite bias in a study that uses qualitative data collection and analysis methods (Johnson, Onwuegbuzie and Turner, 2007).

Quantitative and qualitative data differ in their nature and their use. Quantitative research methods produce numerical data that may be subjected to rigorous statistical analysis to determine whether the observed difference is due to the intervention or whether it may be due to chance. Quantification of data provides the researcher with a useful way of numerically describing a situation or the subject under investigation. It enables comparison of patients in treatment and control conditions, and also allows for longitudinal comparison of the effects of music therapy. Another advantage of quantification is that it enables music therapy researchers to communicate with non-musicians about the effectiveness of music therapy (Prickett, 2005). Thus, quantitative research uses a language that transcends disciplinary boundaries. The use of quantitative data also allows researchers to generalise about the effects of a treatment on a clinical population. Experimental studies provide

information that enables music therapists, other professionals, and service providers to make decisions about treatment (Prickett, 2005). This study intends to inform these groups about the effectiveness of brief group music therapy in order to consider funding it in community rehabilitation. Thus, quantitative data will be necessary.

Qualitative research methods produce descriptive data that is context-specific and value-laden. In analysing this data, certain strategies that are important include adopting a holistic perspective, the use of inductive analysis, mindfulness of the researcher's voice, and context sensitivity. The holistic perspective emphasises the position that the phenomenon under study is understood as a complex whole system (Wheeler and Kenny, 2005). This view suggests that it is not realistic to investigate a phenomenon in pieces out of context (in the laboratory) because in reality the phenomenon exists in a complex system where variables are not isolated. Qualitative researchers recognise that each situation is unique and the observations recorded are specifically connected to that context with all the nuances and peculiarities of the situation bound up within it (Wheeler and Kenny, 2005). This position affects the external validity, and intent to generalise, of qualitative research. In accepting this position the researcher acknowledges the specific nature of the phenomenon and the way in which it is viewed. Therefore, the qualitative researcher also accepts the lack of ability to generalise about treatment effects.

In mixed methods research, quantitative data may facilitate the evaluation of external validity of the qualitative data and uncover new perspectives on qualitative findings.

Qualitative data may be used to interpret, clarify, describing, and validate quantitative results (Johnson, Onwuegbuzie and Turner, 2007).

The mixing of data at the analysis stage of research is achieved through the process of triangulation. The term refers to the "combinations and comparisons of multiple data sources, data collection and analysis procedures, research methods, and inferences that

occur at the end of a study” (Teddlie and Tashakkori, 2009, p.32). Triangulation allows researchers to be more confident in their results. It stimulates the development of creative ways to collect data, and enables the collection of thicker, richer data. It leads to the synthesis or integration of theories, uncovers contradictions, and provides robust test conditions for competing theories (Johnson, Onwuegbuzie and Turner, 2007).

In mixed methods research it is important to know the rationale for mixing methods, how methods will be mixed, and at which phase in the research. It is also important to know how the data will be integrated in data collection or data analysis (Collins and O’Cathain, 2009). Table 3.2 summarises the research methodology for this study of brief group music therapy. It presents the data collection methods, their methodological origins, their purpose in the study and the rationales for mixing.

Table 3.2: Summary of mixed methods for brief group music therapy

<b>Data Collection Method</b>	<b>QUAL / QUAN</b>	<b>Purpose in the study</b>	<b>Notes / reasons for mixing</b>
Quantitative measurement of attention, memory recall, mood state and emotional needs	QUAN	To detect and measure accurately any change in attention, memory, mood state and emotional needs of each participant or the period of the study	Providing the objective measurement in the different areas. The data produced will be able to infer whether there is a causal link between the treatment and the outcomes. It may also be analysed for statistical significance.
Semi-structured interviews	QUAL	To obtain the subjective experiences, opinions and thoughts of the participants about their needs, the treatment, and its effectiveness.	The data produced will provide an alternative view of the treatment from the subjective position of the participants engaged in it. This method provides additional data not available through quantitative means. Data obtained here will be used in triangulation with the QUAN data to gain a fuller picture of the effectiveness of the treatment and how it addressed the issues of the participants.
Song analysis	QUAL	To evaluate the effectiveness of the treatment method in relation to emotional adjustment of the participants.	The data obtained from this analysis will be used to triangulate the data obtained in the QUAN measures and the semi-structured interviews. It differs from the interview data in that it is the focused product of group collaboration and discussion rather than individual opinions given in private, individual interviews.

This study was defined as mixed methods research using an overall quasi-experimental design with quantitative and qualitative data collection and analysis. It was considered to be close to the middle of a mixed methods position with a slight leaning towards qualitative dominance. A mixed methods approach was also considered to be useful in the

development of one of the instruments where qualitative data about the population could be used to develop a quantitative measurement tool. Quantitative data was obtained from measurement of cognitive functioning and emotional needs to answer questions about whether treatment was effective. This implied an experimental, or quasi-experimental design. The notion of dosage was also addressed through a quantitative research method that carried out measurements at points pre-treatment, mid-treatment, and post-treatment. Qualitative data from semi-structured interviews enabled triangulation of the quantitative data by providing multiple perspectives and realities regarding the treatment, its effects, and the length of treatment. Qualitative data from the song analysis was intended for use in triangulating data regarding emotional needs. It represented the artistic, collaborative output of the group.

### **3.5 Study design**

#### **3.5.1 Choice of Design**

The criteria for the choice of design were as follows:

- The design should be able to be applied in natural settings,
- The design should allow the use of small samples,
- The design should allow the measurement of the effect of treatment over time,
- The design should allow the comparison of the treatment condition with a control condition,
- The design should be sensitive to small changes in the dependent variables,
- The design should be efficient and feasible.

A randomised control trial was considered for this study. However, it was not suitable due to the small number of available participants and the difficulty with recruiting if participants were to be assigned to a control group. The knowledge that the participants

may be getting no treatment inhibits their motivation to take part in the research as they are being refused treatment in exchange for providing data. Also, there exists an ethical problem with denying treatment to people who might otherwise benefit from it. Campbell and Stanley (1963) noted that the random groups design is so demanding of cooperation on the part of the subjects that it is advisable to be used with captive audiences rather than the general citizen in the natural setting (Campbell and Stanley, 1963).

An appropriate design was needed for producing data about the effectiveness of a course of brief group music therapy for improving cognitive functioning and emotional needs. The repeated measures design was chosen because of its advantages over the independent groups design. This design resembles the counterbalanced design proposed by Campbell and Stanley in their description of quasi-experimental designs (Campbell and Stanley, 1963). They state that experiments that are conducted in natural settings are designated quasi-experimental designs. The experimenter may lack full control over the independent variable or the ability to randomise selection (Campbell and Stanley, 1963). Campbell and Stanley warn of the possibility that maturation (with practice of repeated testing) and history (with extraneous events) might interact with the treatment condition. However, they qualify this statement by stating that the use of multiple groups would reduce these effects, as it is less probable that they would occur in multiple groups for the same treatment condition.

When great variability is expected in the sample it may be more useful for subjects to act as their own controls rather than to compare data from different subjects. Great variability exists in special clinical populations and this can make conducting a randomised groups design unfeasible because the results may be easily confounded by individual differences in the subjects. This makes them more difficult to compare and to detect differences due to the independent variable. Examples of music therapy research that has used a repeated

measures design are Hanser, Larsen and O'Connell (1983) and Rüütel (2002). Baker (2001) conducted a study in which the participants acted as their own controls very much like a repeated measures design (although she does not use this term to describe it). According to Shaughnessy, Zechmeister and Zechmeister (2003), fewer participants are needed for repeated measures design experiments. Therefore these designs are suitable for experiments in which the available number of participants is small. "Researchers who do experiments with children, the elderly, or special populations such as individuals with brain injuries frequently have a small number of participants available" (Shaughnessy, Zechmeister and Zechmeister, 2003, pp.236-237). This design has higher validity with small samples, as each participant acts as their own control. Thus, internal validity is strengthened by elimination of differences between treatment and control subjects. This is based on the assumption that differences within subjects over time are less than the differences between subjects (in treatment and control groups). The repeated measure design provided the possibility of measuring changes in participants over time. This suited the research problem very well. This design enabled the experiment to be conducted at two sites with two groups experiencing the treatment and control conditions in a different order. The repeated measures design allowed for the treatment and control groups to be located at the same sites. This was important as it helped to control for differences that would occur if treatment and control groups were located at different sites. These differences might be due to history effects and differences in the settings. The increased sensitivity to detecting change in subjects of a repeated measures experiment was a clear advantage. The repeated measures design allowed for the study of within-subject changes over time. Repeated measures designs have been used in many areas including psychology, education, medicine and sociology. Hilari, et al. (2009) conducted a study using a repeated measures cohort design involving two stroke units at different locations over a six-month



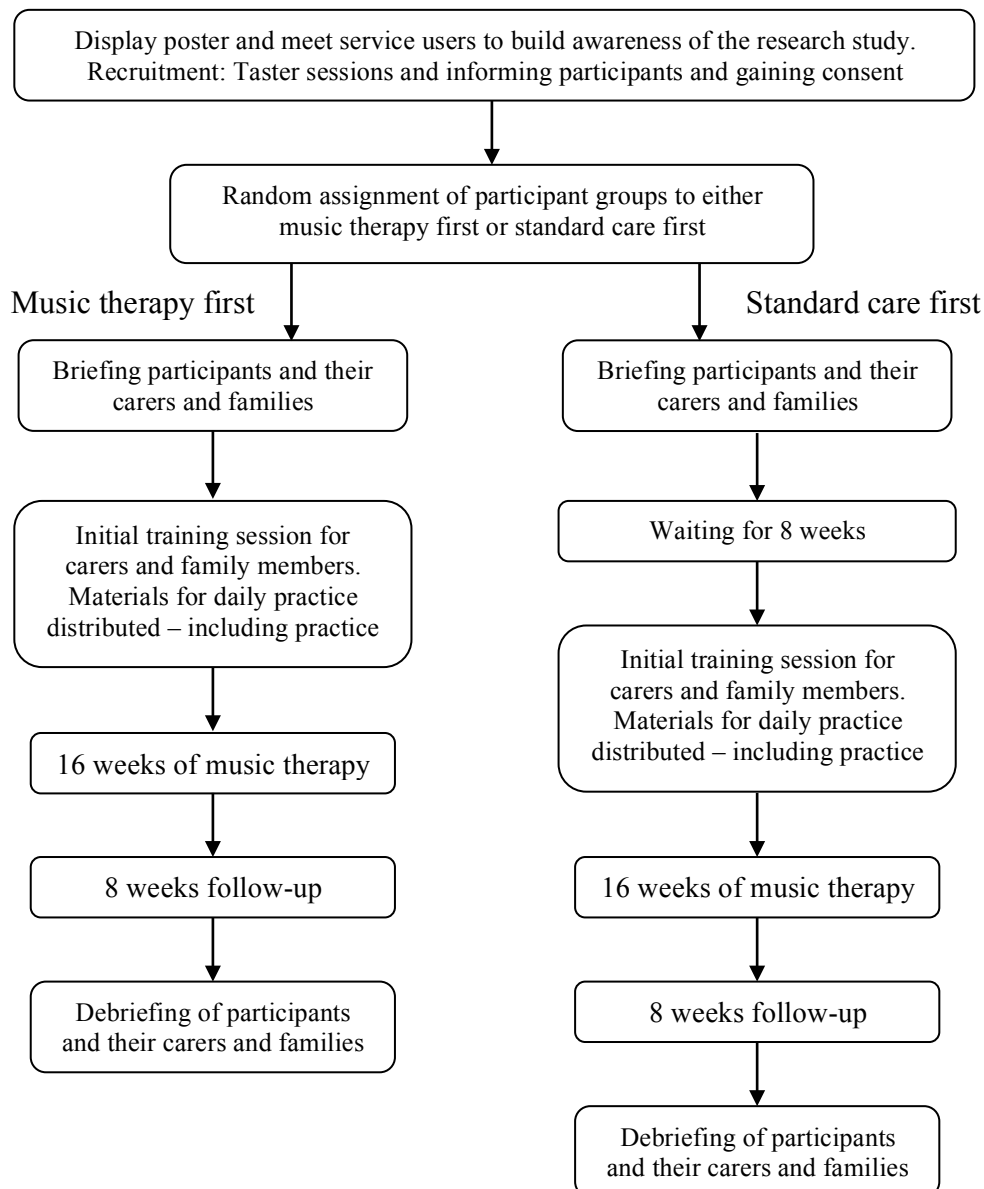
period. Cohen and Riel (1989) conducted a study with repeated measures design involving two classes in a school. The two classes in this study received two conditions in opposite orders.

In this study of brief group music therapy, quantitative measurements of attention, memory functioning and mood state were taken at stages throughout the study, i.e., pre-treatment, mid-treatment, post-treatment and eight weeks following the end of treatment. The purpose of taking measurements eight weeks post-treatment was to determine whether any improvement was retained following treatment. In addition, pre- and post-session measurements of emotional needs provide more detailed evidence of the emotional changes due to the music therapy treatment. A semi-structured interview method was conducted at the end of treatment to provide qualitative data about the experience, and perceived effectiveness, of treatment.

Figure 3.1 below shows the overall flow of events in the study. First, awareness was raised of the imminent research study by displaying posters and meeting potential participants. This, then, led to recruitment of interested participants through running a single taster group music therapy session followed by informing the participants about the research and gaining consent to participate. Following recruitment, the two groups of participants (one group at each day centre) were randomly assigned to either music therapy first or standard care first. Then, the participants and their identified carers were briefed about the experiment and the treatment protocol. This provided the participants and carers with the opportunity to ask questions regarding the project. After the briefing meeting, a training session was arranged for the participants and carers of the group that were assigned to music therapy first, in which they were given participant information packs and were trained in the use of self-led exercises. Following this, this group received treatment followed by eight weeks follow-up. One week after follow-up, a debriefing meeting was

held for the participants and their carers to discuss their experiences of the research study and to provide a clear ending to the relationships between the researcher and the participants and their carers. This final stage was also used to express gratitude towards the participants for their involvement in the study. The second group (assigned to eight weeks of standard care) waited for eight weeks before attending their training session, followed by treatment, then follow-up, followed by debriefing. The training session was given after eight weeks of standard care to ensure that the participants from the second group were not able to confound the results by practicing the between-session exercises prior to the start of treatment.

Figure 3.1: Flow chart of overall study



### 3.5.2 The repeated measures design

An incomplete repeated measures design (Shaughnessy, Zechmeister, and Zechmeister, 2003) was selected involving two groups of five participants at two different sites. In the incomplete design, each participant received the treatment and control only once. In this design the practice effects were expected to average out when the results for all the participants were combined. To balance for practice effects each condition of the

independent variable appeared in each ordinal position equally often using the rule for all possible orders for balancing practice effects. This is the preferred technique for balancing practice effects in the incomplete repeated measures design. Therefore, where  $T = \text{treatment}$  and  $W = \text{no treatment}$ , and all possible orders of the conditions is  $2! = 2 \times 1$ :

*Group 1:*       $T, W$

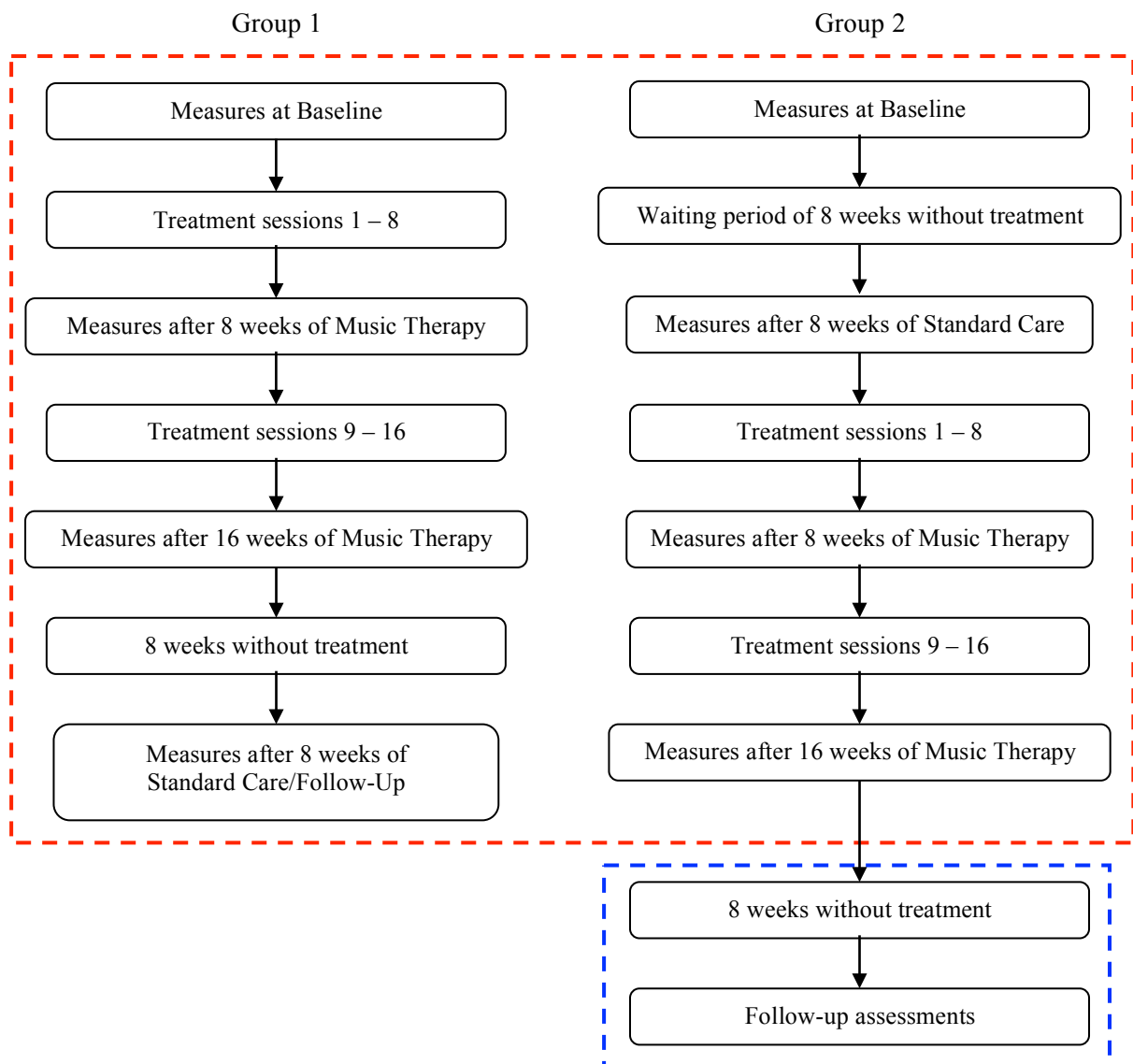
*Group 2:*       $W, T$

For this technique to be effective, the number of participants required must be at least equal to the number of possible orders of the conditions. So, at least two participants were required. 10 were recruited at the beginning of the study. Prior to the beginning of the experiment the two groups were randomly assigned to the two conditions in all possible orders by tossing a coin. A ten pence piece was used and it was decided that if the coin landed with the Queen's head facing upward, then this would indicate that one Headway branch (known as group one) would begin treatment while the other (known as group two) had no treatment. If the coin landed with the other side facing upward, then this would indicate the opposite. A coin was tossed into the air and landed on the floor with the Queen's head facing upward. So, group one commenced treatment while group two waited eight weeks before commencing treatment.

In figure 3.2, the process in the red box is the incomplete repeated measures design. The blue box represents the additional follow-up period of no treatment for group one. This was added to increase the amount of data regarding follow-up after treatment had ended. Each group were assessed to take pre-treatment measurements. Following this, group one received eight sessions of treatment while group two experienced the control condition. A second set of measurements was then taken. Then, group one received eight more weeks of treatment and group two received their first eight weeks of treatment. A third set of

measurements was then taken. Following this, group one experienced the control condition while group two received their second block of eight sessions of treatment. This was followed by a fourth set of outcome measures. At this point group one left the study and group two experienced eight more weeks of the control condition in follow-up, ending with a final set of measures for group two.

Figure 3.2: Flow diagram of the repeated measures design



This research design depends on several assumptions. Firstly, each participant could act as his/her own control. Second, the groups were comprised of people at the day centres who would normally refer themselves to music therapy. This meant that the sample was

reasonably representative of the population of people with ABI at the two day centres that would naturally attend music therapy without coercion or financial incentive. Thirdly, music therapy is able to improve functional gains and also to address emotional needs. Furthermore, changes in functional gains and satisfaction of emotional needs could be observed with this population at periods of more than one year following a brain injury. The independent variables in this experiment were the number of sessions and the amount of self-led practice. The dependent variables were the measures of sustained attention, short-term memory/recall, mood state and satisfaction of emotional needs.

## **3.6 Sample**

### **3.6.1 Headway**

Headway<sup>3</sup> – the brain injury association is a registered charity and a company limited by guarantee. The association is national with Headway Groups being independently registered charities affiliated to the association. Headway was chosen as the organisation through which the participants would be recruited because it provides support and services specifically for people with brain injury at the phase of general rehabilitation in the community. Therefore, focusing the study at Headway Branches would be an efficient method of recruiting suitable participants. It would also enable the sample to represent more closely the natural composition of the population who attend these types of services. Therefore, there are some differences in the way each branch operate and their collection of services. The two groups of participants for the study were attendees at two different Headway day centres. These sites were in two cities, approximately 130 miles apart. For reasons of confidentiality and anonymity the sites are not identified. There were several

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<sup>3</sup> Ethics procedures included Headway's wish to be publicly named and not be anonymous. However, in order to maintain the anonymity of the participants the individual locations of the Headway sites will not be given.

reasons for using these two sites. First, due to high rates of attrition experienced in studies in the field of brain injury, a larger sample was needed than was available at one site. This would allow for two groups to take part in a related groups design while allowing for attrition during the study. Second, when the data for the two groups was combined, it would balance any differences due to local socio-economic variations. Furthermore, these sites were chosen, as the majority of attendees in both centres did not have access to music therapy provision at the time of beginning the study. Thus, they would not have had previous experience of music therapy and, so, would not confound the results. Also, these sites were chosen as they were accessible to the researcher/clinician – one site was near the university and the other was near the researcher's home. The sample was selected from the Headway sites as this was considered to be representative of the population in these settings.

### **3.6.2 Sample size and demographic characteristics**

From preliminary discussions with the Headway sites it was determined that a small sample would be able to participate in the study. Initial estimates were between four and six participants at each location. This estimate was derived from information about the service users with specific reference to interest in music, engagement in group activities and previous participation in interventions and research studies. The demographic characteristics of service users at the Headway centres is fairly broad and includes men and women of all ages and race from the local and surrounding areas. Headway includes people with any type of brain injury and level of functioning who are able to visit the centres.

## **3.7 Participants**

### **3.7.1 Recruitment and selection of participants**

Participants were recruited from the service user groups already attending the Headway branches. A poster was used to raise awareness of the research study and indicate whom to contact to find out more information. In addition, the researcher visited each site regularly to be available for questions and also to become more familiar to staff and service users. Interested participants were given the opportunity to attend a taster session to gain experiential knowledge about the treatment and to be given full explanation about the study including ethical considerations.

The participants were selected according to the following inclusion criteria:

- They were aged 18 years or older
- They were able to co-operate
- They had an acquired brain injury
- They were able to give informed consent
- They had a carer/family member able to co-operate

The participants were unable to take part in the study according to the following exclusion criteria:

- They had previous experience of music therapy with the music therapist involved in the study
- They were receiving other music therapy treatment at the same time
- They were unable to give informed consent
- They had a current drug or alcohol abuse problem



### **3.7.2 Consent and ethics**

The study was approved and registered by the Anglia Ruskin University Research Ethics Committee. Headway gave approval for the organisation to be named. Informed consent was obtained from the participants in the presence of independent witnesses provided by the Headway branches. In order to gain consent the participants were individually given a copy of the Participant Information Sheet and the contents of which were explained and discussed by the researcher. The participants were informed about the purpose of the research, their right to withdraw without penalty, any consequences that might result from withdrawal, prospective research benefits, limits of confidentiality and whom to contact for questions about the research. Any questions that arose were answered and the researcher emphasised the participants' right to withdraw from the study at any time without consequence. The method of withdrawal was also described: participants could leave the study by signing the withdrawal slip and returning it to Headway giving a reason for withdrawal. Informed consent for audio/visual recording was also obtained as part of the above process. The participants were invited to a debriefing session following the end of their involvement in the study. Examples of the referral form and consent form are given in Appendix 1 in the participant pack. Confirmation of ethical approval is shown in Appendix 12.

### **3.7.3 Family/carer involvement**

The participants were required to elicit the support of their families or carers to encourage or assist them in carrying out the post-session tasks. The participants' inclusion in the study was dependent on whether they were able to carry out these tasks outside the sessions. For some participants, family members were able to help and for others, carers

were available. Prior to beginning treatment, participants and their families/carers were invited to a briefing session in which training in the post-session tasks was given.

#### **3.7.4 Participant descriptions**

Following the recruitment and screening process ten participants met the inclusion criteria and were subsequently admitted to the study. Table 3.3 outlines the participants' age, their gender, the amount of time in years and months since the brain injury, details of their neurological injuries, their difficulties, their method of communication and the relation to them of the person aiding the between-session tasks. Note the variation in detail given about each participant's neurological injuries. This was due to several factors. Firstly, the participants and their families/carers provided the information directly and this relies on their account. Secondly, neurological examinations and scanning techniques have developed over the last 50 years and this affected the amount of detail given in older medical records. Information was sought from the general practitioner only when the participants and their families/carers were unable to provide it. Consent to access this information was obtained through the consent form.

Table 3.3: Participant descriptions

Subject	Age	Gender	Time since brain injury	Neurological Injuries	Difficulties	Communication	Person aiding between-session tasks
1	49	F	3yrs 8mths	Left-sided haemorrhage	Headaches, fatigue, memory disturbances, visual neglect of right side, dizziness, expressive aphasia, weakness in limbs on right side, anxiety	Speech, but difficulty finding words	Partner
2	74	M	4yrs 3mths	Subarachnoid haemorrhage on right side of brain	Headaches, memory disturbances, visual neglect of left side, blackouts, dizziness, speech, swallowing, weakness/numbness in limbs on left side, managing anger	Speech	Partner
3	47	F	2yrs 8mths	Stroke on left side of brain	Headaches, fatigue, dizziness, visual neglect of right side, expressive aphasia, swallowing, weakness/numbness in limbs on right side, managing her anger	Speech, but difficulty finding words	Parent
4	45	F	1yr 11mths	Subarachnoid haemorrhage to right of brain, sub-acute bacterial endocarditis	Headaches, fatigue, memory disturbances, blackouts, dizziness, speech, visual neglect of left side, weakness/numbness in limbs on left side, heightened emotions, anxiety	Speech	Partner
5	45	M	1yrs 3mths	Traumatic brain injury due to road traffic accident. Severe frontal lobe damage, also damage to other areas	Headaches, fatigue, memory disturbances, dizziness, speech, heightened emotions, anxiety	Speech	Partner

Subject	Age	Gender	Time since brain injury	Neurological Injuries	Difficulties	Communication	Person aiding between-session tasks
6	58	F	9yrs	Subarachnoid haemorrhage to right side of brain	Headaches, memory disturbances, dizziness, visual neglect of left side, speech, weakness/numbness in limbs on left side, anxiety	Speech	Partner
7	41	M	13yrs	Traumatic brain injury from a fall. Right-frontal contusion resulting in damage to cerebellum and frontal lobe	Headaches, some memory disturbance, visual problems with focusing, left-sided facial difficulty with speech, left-sided weakness in limbs	Speech, but sometimes unclear articulation	Parent
8	63	F	37yrs	Stroke due to a small right hemisphere lesion. Congenital atrophy producing visual disturbances and seizures	Headaches, memory disturbance, dizziness, visual problems, anxiety	Speech, but sometimes inappropriate use of rhyming and joking	Son
9	62	M	41yrs	Traumatic brain injury due to road traffic accident. Cranial injury with prolonged coma. Right-sided damage to brain	Headaches, left-sided weakness in limbs.	Speech, but sometimes unclear articulation	Support worker
10	54	F	1yr 9mths	Large subarachnoid haemorrhage, damage to right frontal lobe right frontoparietal region	Memory disturbances, dizziness, left-sided weakness in limbs, emotional lability.	Speech	Partner

## **3.8 Treatment Protocol**

### **3.8.1 Overview of treatment**

The two groups of participants were invited to attend weekly one-hour group music therapy sessions and to carry out practice exercises at home. The group music therapy took place at two branches of Headway. Each branch provided a meeting room in which the music therapy sessions would be held. There were several requirements of the space that was used for delivering the treatment. First, the space was to be private and that unnecessary interruptions could be avoided. Second, it had to be large enough to accommodate six people seated in a circle with instruments in the middle of the group or on a table to the side. Third, it had to be well lit and at a comfortable temperature. Fourth, it had to be accessible to all participants.

The length of treatment was defined by the number of sessions. Brief therapy is considered to last between six and 16 sessions, and, according to Parry, Roth and Kerr, (2007) it is reasonable to expect clinically significant change to occur after 16 sessions. The number of sessions chosen for the music therapy treatment in this study was 16, divided into two blocks of eight sessions. The length of treatment met the criteria for being considered brief therapy while allowing time for the NMT techniques and song writing.

Table 3.4 shows the treatment schedule for both groups. The start of the study is given as week number zero, and the study was conducted over 36 weeks. Baseline measures (at BL) were taken for both groups at week zero. Then, from weeks one to eight, group one were given music therapy, whereas group two were given standard care without music therapy. At week nine, measures were taken for both groups: after eight weeks of music therapy (MT) for group one, and after eight weeks of standard care (SC) for group two. From weeks ten to 17, both groups were given music therapy. Then, at week 18, measures were taken for both groups: after 16 weeks of MT for group one, and after eight weeks of MT

for group two. Semi-structured interviews were also conducted at this timepoint with participants from group one only. From weeks 19 to 26, group one were given standard care and group two were given music therapy. At week 27, measures were taken for both groups: after eight weeks of SC/follow-up (FU) for group one, and after 16 weeks of MT for group two. Semi-structured interviews were carried out with participants from group two at this timepoint. Group one finished their involvement in the study after this timepoint. Then, from weeks 28 to 35, group two were given standard care and measures were taken for group two in week 36: after eight weeks of FU.

Table 3.4: Treatment schedule

Week number	Treatment Event	
	Group 1	Group 2
0	Measures at Baseline (At BL)	Measures at Baseline (At BL)
1	Music therapy session 1	Waiting week 1
2	Music therapy session 2	Waiting week 2
3	Music therapy session 3	Waiting week 3
4	Music therapy session 4	Waiting week 4
5	Music therapy session 5	Waiting week 5
6	Music therapy session 6	Waiting week 6
7	Music therapy session 7	Waiting week 7
8	Music therapy session 8	Waiting week 8
9	Measures after 8 weeks of Music Therapy (After 8 weeks of MT)	Measures after 8 weeks of Standard Care (After 8 weeks of SC)
10	Music therapy session 9	Music therapy session 1
11	Music therapy session 10	Music therapy session 2
12	Music therapy session 11	Music therapy session 3
13	Music therapy session 12	Music therapy session 4
14	Music therapy session 13	Music therapy session 5
15	Music therapy session 14	Music therapy session 6
16	Music therapy session 15	Music therapy session 7
17	Music therapy session 16	Music therapy session 8
18	Measures after 16 weeks of MT (After 16 weeks of MT)	Measures after 8 weeks of MT (After 8 weeks of MT)
19	Follow-up week 1	Music therapy session 9
20	Follow-up week 2	Music therapy session 10
21	Follow-up week 3	Music therapy session 11
22	Follow-up week 4	Music therapy session 12
23	Follow-up week 5	Music therapy session 13
24	Follow-up week 6	Music therapy session 14
25	Follow-up week 7	Music therapy session 15
26	Follow-up week 8	Music therapy session 16
27	Measures after 8 weeks of SC or Follow-Up (After 8 weeks of SC/FU)	Measures after 16 weeks of MT (After 16 weeks of MT)
28		Follow-up week 1
29		Follow-up week 2
30		Follow-up week 3
31		Follow-up week 4
32		Follow-up week 5
33		Follow-up week 6
34		Follow-up week 7
35		Follow-up week 8
36		Measures after 8 weeks of Follow-Up (After 8 weeks of FU)

The treatment was administered while the participants were beyond the early phases of rehabilitation, and in the later stages of community integration (Baker, 2006). Group music therapy was chosen as the method of delivering treatment. This method utilised the therapeutic factors of group psychotherapy described by Yalom (2005) including instilling hope, universality, imparting information, altruism, and developing socialisation techniques. Therefore, it would be a suitable intervention to meet important needs of the participants and might counteract the social isolation experienced by many in this population (Durham, 2002).

As part of the research study, the participants were provided with packs that included the participant information sheet, a copy of their signed consent form with withdrawal slip, the research schedule, instructions for the self-led exercises and log sheets to record details of self-led practice. An example of a participant pack is provided in Appendix 1.

### **3.8.2 Session design**

The music therapy sessions were designed based on functional training techniques taken from Neurologic Music Therapy practice (Thaut, 2008) and a song writing method taken from Baker and Tamplin (2006). The rationale for combining functional techniques with song writing was that in order to access therapeutic intervention people with acquired brain injury require support in developing and maintaining attention and memory functions. These functions are necessary in learning and also in being able to sustain engagement in, and reflect on musical and social experiences in music therapy. Also, the attention and memory exercises were intended to prepare the group members for the song writing task, which brings together multiple cognitive functions and engages the group members emotionally. Each session followed the same format while allowing the therapist and group to explore themes and issues as they arose during treatment. The one-hour session protocol was designed as follows:



### Music Therapy Session Protocol

1. Welcome and orientation
2. Remind all about structure of session
3. Warm up with some simple exercises in attention and memory training.
4. Open discussion and free improvisation
5. Song writing
6. Consolidation and Goodbye

Knowing the date, one's location and the people in one's company are important pieces of information needed for independence. Each music therapy session began with a welcoming statement followed by asking the group members to state the date, the names of their fellow group members and the purpose of the music therapy group. This was carried out to exercise the participants' sense of time and place, to familiarise them with the purpose of the group and to enable group interaction.

Following the orientation exercise each participant was asked to choose one of the percussion instruments to play. Then, the clinician directed them through an exercise that was designed to develop the attention functioning of each participant. The exercise was based on a musical attention training exercise developed by Thaut (2008) in Neurologic Music Therapy. This was designed using the clinical model of attention put forward by Sohlberg and Mateer (1989). They identified the levels of attention as focused, sustained, selective, alternating and divided. Over the course of the treatment the clinician facilitated the exercise of the increasing levels of attention as the participants improved in their abilities to perform the exercises. In order to assess the levels of attention of the group members the clinician began with a musical exercise at the lowest level of attention –

focused attention. This exercise required the participants to respond to a musical stimulus provided by the clinician – a guitar chord or musical gesture. The participants would respond positively by playing one beat on their instruments. A lack of response would indicate that the participants could not focus their attention. Once the clinician was confident that all the participants were able to perform well in the focused attention task the next level of attention was exercised – sustained attention. The participants were shown a short, simple rhythm and were instructed to repeat it in a continuous looping pattern for a limited time period, beginning at about 10 – 20 seconds. The clinician observed each participant's performance and then signalled to the group to stop playing. Following this exercise the group were encouraged to reflect and comment on the exercise. When the clinician had observed that all group members were able to perform this exercise with some degree of success the next level of attention was addressed – selective attention. This was achieved by introducing a distraction. At this point it was possible to give individual group members different roles in an exercise so that they were not all playing in unison. The distraction introduced was in the form of participant who would play loudly, and in a distracting manner. This role was called the 'heckler'. A 'leader' was chosen whose role was to play a repetitive rhythm continuously until instructed to stop. The rest of the group followed the leader by playing the leader's pattern in unison with the leader. The heckler was instructed to alternately start and stop at their discretion and to play in as disruptive a manner to distract the other participants. The group were encouraged to reflect and comment on the exercise and their performance when it had finished. By this stage the participants in the group were assigned different roles by the clinician each week. This was to ensure that each participant would be able to exercise each level of attention. As the group improved in performing the exercise the complexity was increased and the next level of attention added to the exercise. So, then, two roles were added to the group attention

exercise – the signaller and the responder. The signaller was to indicate to the responder intermittently join in with the leader's rhythm. Initially, the signal was in the form of a raised or lowered hand signal, raised meaning to play; and lowered meaning not to play. The responder's role was to join in with the leader's rhythm and to stop according to the signaller's indications. So, the signaller was exercising alternating attention and the responder was exercising divided attention.

This exercise was designed to train the participants' immediate and short-term memory function. The leader played a short rhythm over three or four beats at a tempo of approximately 60 beats per minute. The group were instructed to repeat the rhythm back once at the same tempo. The clinician used a range of rhythms in simple time, compound time and using straight, dotted rhythms and triplets. Once the clinician had established that all participants were able to do this successfully a pause of one beat was introduced between the leader's rhythm and the group's response. During the course of the treatment the group became more successful in performing this exercise. Then, the clinician increased the length of the pause in number of beats. Towards the end of the treatment the clinician encouraged the participants to adopt the role of leader in the exercise. At the end of each exercise the group were also encouraged to reflect and comment on the exercise. A song writing exercise was chosen as it was considered to be an effective technique for aiding emotional adjustment following brain injury and other traumatic experiences (Baker and Tamplin, 2006; Pennebaker, Mayne and Francis, 1997). Also, due to its goal-oriented nature, it seemed an appropriate treatment method to use in a brief treatment period. This song writing exercise was based on the method described by Baker and Tamplin (2006). They found this nine-stage process was appropriate for acquired brain injury patients. The process is outlined as follows:

“Stage 1: Generate a range of topics to write about. This can be achieved by asking the patient to just talk about what issues or concerns he or she is experiencing at that moment. If the patient has difficulty initiating thoughts, the therapist can ask more direct questions, such as ‘What is the thing you like and dislike most about being in hospital?’

Stage 2: Select a topic for further exploration. Encourage the patient to identify one topic he or she would like to explore in the song writing process.

Stage 3: Brainstorm ideas directly related to the chosen topic. Encourage the patient to explore the dimensions of the topic and use general counselling and probing techniques to support and facilitate the process. Ask the patient to expand on what he or she is saying. Question the patient to facilitate explorations.

Stage 4: Identify the principal idea/thought/emotion/concept within the topic (which functions as the focus of the chorus). Sometimes the patient is able to identify this, but at other times the clinician will need to offer her or his own thoughts.

Stage 5: Develop the ideas identified as central to the topic. Once the main idea has been identified, develop it further.

Stage 6: Group related points together. Ask the patient to review all the ideas and ask him or her to begin grouping ‘like’ themes together. These groups of ideas can be used to create the song verses.

Stage 7: Discard the irrelevant or the least important points. Ask the patient to identify which points are the least relevant or irrelevant to the song’s topic, and discard these.

Stage 8: Construct an outline of the main themes within the song. Ask the patient to order the groups of ideas into logical flow. Sometimes there will be an obvious progression of ideas, but at other times it might be merely a patient preference.

Stage 9: Construct the lyrics of the song.”

(Baker and Tamplin, 2006, pp.203-204)

Once the lyrics had been constructed the music was discussed and organised with reference to the lyrics and then the group rehearsed the song in order to record it in session 15.

### **3.8.3 Instrumentation and equipment**

The equipment used at each session consisted mainly of simple percussion instruments as follows: a large djembe, a medium djembe, a small djembe, a small dumbuke, one pair of bongos, a guiro, a pair of claves, a pair of Aboriginal claves, two calimba, a musical frog, a pair of castanets, assorted beaters, one pair of drum sticks and two pairs of brushes, a tambourine, a pair of maracas, one temple block, and a floor tom.

Percussion instruments were used because the exercises focused mainly on using rhythm.

Short, transient sounds were considered to be clearer indicators of timing in rhythmic music making. A classical guitar was also used due to its portability and it was the therapist’s principal instrument. Also, as all the group members had highlighted pop music as a preferred choice, the use of the guitar seemed appropriate for working with them.

Additionally, a digital video recorder – a Flip Ultra HD –with clamp was used to record each session to allow the clinician to review each session, reflect on progress and the therapeutic process. Reviewing material from the sessions facilitated clinical supervision.

A therapist’s notebook was also brought to enable the clinician to remain aware of the progress of the groups within the frame of the brief 16-week treatment. The songs were recorded using a ZOOM H2 Digital Handy Recorder. This is a digital audio recording device with built-in microphones designed to capture audio at high quality. It was set so

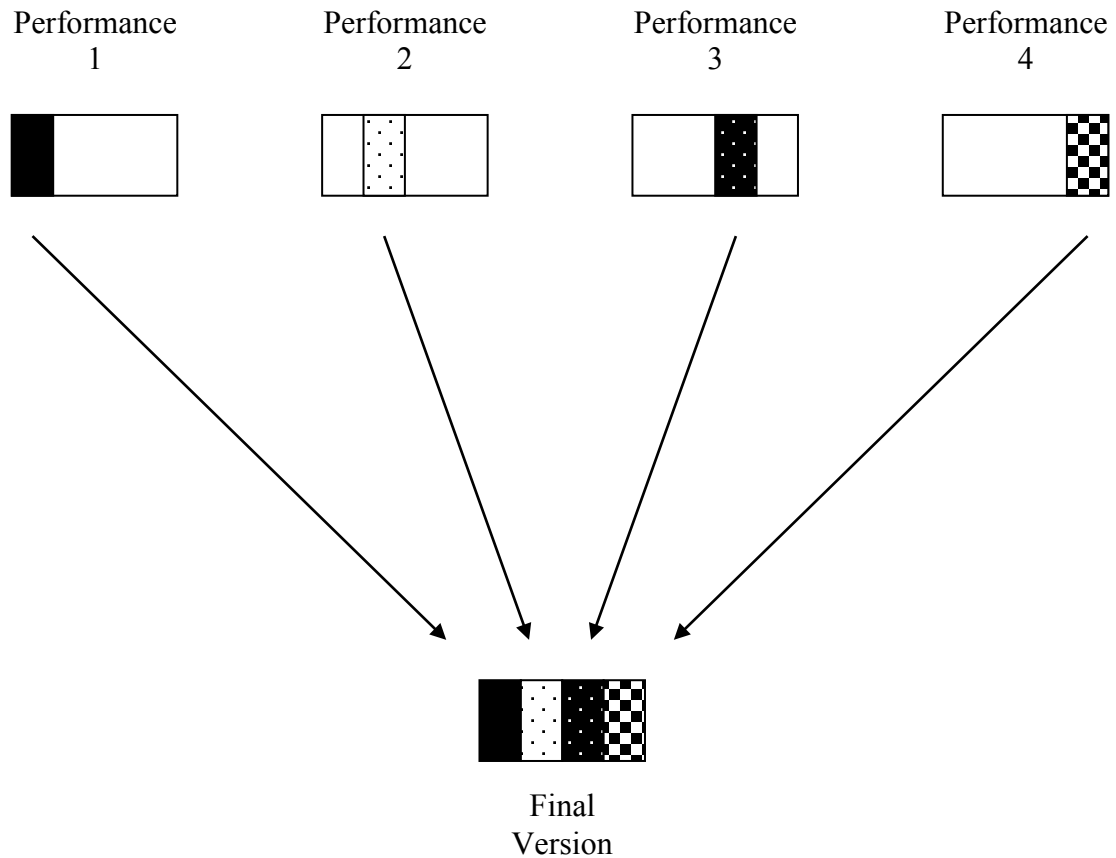
that it would produce two synchronised stereo recordings of the group from a location in the centre of the group. Therefore, members could face each other, as in a group setting. Thus, the use of this device enabled the group to perform with as little alteration to position and, hence, group experience as possible. The intention was to limit the level of anxiety that might be aroused by the use of multiple microphones and conspicuous, bulky equipment. The added advantage was also that the number of cables used during recording was limited to only one. This allowed the music therapist to maintain a safe working site with a minimum of trip hazards.

### **3.8.4 Audio recording and editing procedure**

In sessions 14 and 15 the songs that were composed by the two groups were rehearsed, performed and recorded using the ZOOM H2 Digital Handy Recorder. Multiple performances of the songs were recorded to produce a collection from which the ‘best’ performances could be taken. The music therapist undertook this task after the recording sessions without the participants, but with their consent. Audio editing is a time-consuming activity and requires deep concentration and significant training in audio editing techniques and use of the software. For these reasons it was considered not to be of therapeutic benefit to involve the participants in this part of the process. In the editing process the music therapist auditioned the recordings and selected the most suitable versions of each of the sections of the songs. The criteria for this selection process were clarity of singing, rhythm of singing and accuracy of sung lyrics with reference to written lyrics. Following selection of the most suitable recordings the music therapist used an audio editing software application – ProTools LE - to digitally splice together the different versions of each song. Thus, the result was one continuous version of each song comprised of the most suitable recordings of each song section. The final version was then burnt onto audio compact disks

to be presented to each participant. The diagram below illustrates the process of compiling the final versions of the songs.

Figure 3.3: Audio editing procedure



### **3.8.5 Researcher as clinician**

The researcher was chosen to deliver the treatment for several reasons. First, the researcher was trained in the NMT techniques and had more than 20 years experience of writing songs and at least ten years experience of recording songs. Second, the researcher understood the theoretical orientation of the study. Third, the researcher's personal commitment to the research implied that this commitment would transfer into the role of clinician. Thus, ensuring that there would be no loss of clinician during the course of the experiment. The distance between the two sites for the two groups was a significant factor in the decision, as it would be difficult to find a clinician willing to undertake running two

music therapy groups 130 miles apart. Using multiple therapists may have introduced confounding due to differences in personality, practice, techniques, counselling style, musical abilities and music therapy training, theoretical orientation and experience. Therefore, using the same therapist for both groups controlled for these potential threats to validity.

During the delivery of treatment the clinician undertook monthly clinical supervision with a qualified music therapy supervisor. Criteria for selection of the supervisor were considerable experience in the field of music therapy and neuro-disability and Neurologic Music Therapy fellowship. The purpose of supervision was to support the clinician in the delivery of therapy and to facilitate deeper reflection on the therapeutic processes. Clinical supervision also enabled the clinician to be aware of the different feelings and thoughts derived from having both roles as researcher and clinician.

### **3.8.6 Between-session exercises**

Participants were encouraged to practice exercises at home using the instructions given in the participant pack. The exercises focused on attention, memory functioning and the learning of lyrics to either a well-known traditional song or a song written by the researcher, which would not be familiar to the participants. The participants were not assessed in these exercises, which were intended as an additional support to the group music therapy sessions. However, the participants were given log sheets to record when they practiced. This was intended to motivate them to practice and to enable them to monitor themselves. The procedures for the between-session exercises are given in Appendix 1 under the heading 'Music Therapy Daily Exercises'.



### **3.8.7 Roles of clinician and families/carers**

The clinician facilitated the group music therapy sessions and trained the participants and their families/carers in the administration of the between-session exercises. The families/carers were instructed to facilitate the practice of these exercises in the participants' homes. The clinician emphasised in the training session that the role of the families/carers was to facilitate, encourage and record the practice of the exercises rather than to coerce or force the participants to carry them out. In this way the participants were empowered and given ownership over the amount of practice of between-session exercises. Families/carers recorded information about the exercises carried out in the practice diary, which the clinician reviewed during the group music therapy sessions.

## **3.9 Data collection**

The following section will describe the data collection method, the use of standardised and non-standardised measures. It will provide information about the reliability and validity of the measures used. It will also describe the visual analogue scale and semi-structured interviews, which were developed specifically for the participants in this study.

Quantitative measures of attention, memory, and mood state were carried out at periodic intervals throughout the study over 36 weeks. Pre-post session measurements of emotional needs were taken for each of the 16 sessions. Semi-structured interviews were conducted at the end of treatment. Two group songs were recorded on a digital audio recorder. Video of the sessions was recorded using a digital video camera.

### **3.9.1 Periodic outcome assessments**

At weeks 0, 9, 18, 27 and 36 standardised tools were used to measure sustained attention functioning, immediate memory recall and mood state. Refer back to table 3.4 for clarity. The periodic outcome assessments were carried out in two meeting rooms – one in each

Headway branch. The rooms were well lit and quiet. A sign was placed on the outside of the door to ensure that there were no unnecessary interruptions. The tests were conducted individually and the same test administrator conducted the tests each time.

### **3.9.1.1 Attention test: Test of Everyday Attention**

The test used for measuring sustained attention was the Lottery subtest from The Test of Everyday Attention (TEA) (Robertson, et al., 1994). The test conditions for this were those described in 4.5.1. The TEA is a battery of tests designed to measure aspects of attention systems viewed as discrete functional systems (Posner and Peterson, 1990). It was intended to identify attention problems and to provide information to enable the prediction of recovery of function in daily life activities following brain injury and has been cited in research studies (Mazer, et al., 2003; Sterr, 2004; Ziino and Ponsford, 2006). In the Lottery subtest, the participants were instructed to listen to a 10-minute announcement of winning lottery number tickets. The announcement was presented using a CD player. The series of letters and numbers appeared in the form 'HL425', where two letters preceded three numbers. The participants were asked to listen for tickets ending in 55 for Version A (88 or 33 for Versions B and C respectively) and then, to write down on the sheet provided the first two letters of the winning ticket. The instructions to the administrator are given in Appendix 2.

There were ten target tickets in each 10-minute recording. A response was considered correct if at least one of the letters was in the correct position. For example, if a participant wrote 'AL' instead of 'HL', then he or she would be given one full point. However, if he or she wrote 'LH' instead of 'HL', then no point would be given. The versions of the test were rotated as the manual suggests (A, then B, then C, then A, then B, etc.) for each group of assessment sessions held every nine weeks. Rotation was carried out in this way

to ensure that the participants could not learn the correct responses and confound the results.

The following data regarding the reliability of the attention test was taken from the *Test of everyday attention: Manual* (Robertson, et al., 1994). In testing the reliability of this subtest the test developers recruited 154 normal volunteers, for a normative sample, ranging in age (from 18 to 80) and IQ level. The age range was divided into four bands: 18-34, 35-49, 50-64 and 65-80. The IQ range was divided into two bands: IQ above 100 and IQ below 100. The sample included 69 males and 54 females. All 154 subjects were given Version A of the test, a subset of 118 subjects was given Version B one week later and a further subset of 39 was given Version C at a later date. In addition to the normal sample, 80 unilateral stroke patients were administered the TEA at two months post-stroke. Robertson, et al. (1994) obtained reliability data for 74 members of this sample. Their data gave a 0.77 test-retest reliability coefficient for the stroke patient sample. Therefore, the Lottery test was considered to be reliable for use in the assessment of sustained attention functioning.

In this test possible constraints on validity may have existed due to auditory difficulties, from hearing impairments and auditory processing deficits, difficulties with task comprehension and physical disabilities. To account for auditory difficulties the test was administered using a CD player placed in front of the participant to counter any auditory neglect. In order to counteract any hearing impairment the administrator auditioned the audio and asked the participants whether they were able to clearly hear the audio. The volume level was adjusted as necessary.

In order to check whether the participants comprehended the task, the test administrator asked the participants if they understood what was expected prior to initiating the test. The instructions also allowed for rehearsal of the task to enable the administrator to confirm

that the participants had comprehended the task. Some of the participants presented with aphasia and dyslexia, which became more profound when anxious. This affected their abilities to find the correct letters under test conditions. They were, however, able to indicate when they had heard the winning tickets by raising one hand or saying that it had just been announced. It was decided that, in order to fairly reflect attention functioning, this would be permitted rather than allowing the aphasia or dyslexia to falsely reduce their scores.

Robertson, et al. (1994) found that the TEA subtests correlated significantly with one or more of the following functional indices: Barthel Index (Wade and Collin, 1988), Extended Activities of Daily Living Scale (Nourri and Lincoln, 1987) and the Rating Scale of Attentional Behaviour (Ponsford and Kinsella, 1992).

The subtest scores of the control sample were compared with those of stroke patients and patients with closed head injury (Robertson, et al., 1994). The samples were matched by age category. They found statistically significant differences between stroke patients and the control sample in one age category, and also between the head injured patients and the control sample. Therefore, the Lottery test was considered to have internal and external validity for use in this study. Tables A2.1 and A2.2 present this data and are given in Appendix 2.

### **3.9.1.2 Memory test: Rivermead Behavioural Memory Test**

The Story – Immediate Recall subtest from the Rivermead Behavioural Memory Test – Third Edition (RBMT-3) (Wilson, et al., 2008) was used to measure immediate recall of verbal memory. The latter is a battery of memory tests designed to according to the following criteria: to predict every day memory difficulties in people with acquired, non-progressive brain injury; and to measure longitudinal change in memory functioning (Wilson, et al., 2008). Its developers suggest that it has valuable potential for use in

research studies that measure the effectiveness of an intervention for memory impairments and has been cited in research studies (Elixhauser, et al., 1999; O'Reilly, Grubb and O'Carroll, 2003; Sarkamo, et al., 2008). During the Story – Immediate Recall subtest participants were asked to listen to a short story read aloud by the test administrator. Then, they were asked to recall and retell the story back to the test administrator. The whole subtest was recorded using the ZOOM H2 Digital Handy Recorder. The test administrator did not take notes or write down comments during this subtest. Instead, the responses and comments were noted on the scoring sheet following the assessment session when the administrator listened to the recording. This was intended to reduce the participants' anxieties about being tested. There were two versions (1 and 2) of the subtest. The instructions to the subtest administrator are given in Appendix 3.

The two versions of the story were alternated each time the subtest was administered to the same group of participants. Therefore, the participants did not hear the same short story (1 or 2) within any eighteen-week period during the course of the study. Therefore, the participants learning the correct responses from previous assessments were unlikely to confound the memory recall results.

Each story was divided into 21 elements or 'ideas'. For each 'idea' correctly recalled identically or using a close synonym the participant was given one point. For each 'idea' partially recalled or using an approximate synonym the participant was given half a point. One point was deducted from the overall score if the participant required a prompt. If a prompt was used, then no credit was given for the first two 'ideas' of the story.

According to Wilson, et al. (2008) the reliability of the RBMT-3 was tested using a core standardisation sample and a sample of clinical cases. The core standardisation sample consisted of 333 people. Using a chi-squared goodness-to-fit test and data from the 2001 UK census they found that the core sample did not differ significantly from the general

adult population in terms of distributions of gender, age, ethnicity (when collapsed into white and non-white) and educational level. The clinical sample consisted of 75 participants from the following categories: traumatic brain injury (19 people), stroke (24 people), encephalitis (20 people) and progressive conditions (12 people). This sample was not subject to any specific demographic requirements. Wilson, et al. (2008) gathered and analysed data regarding alternate-form reliability of the subtests of the RBMT-3. They showed that the reliability of the Story – Immediate Recall subtest was 0.63 in the core standardisation sample and 0.67 in the clinical sample. This was considered to be adequate to consider the test a reliable measure of immediate recall of verbal memory.

Inter-scorer reliability was also assessed for each subtest of the RBMT-3 by adding another scorer sitting-in on each subtest. The additional scorer independently scored for the participants' responses. Wilson, et al. (2008) analysed the data using Spearman Correlations between two independent scores for each subtest. They found that the correlation coefficient for the Story – Immediate Recall subtest was 0.99. This demonstrated a high level of agreement between scorers and confirmed the inter-rater reliability of the subtest.

Wilson, et al. (2008) examined the ability of the RBMT-3 to identify memory function by comparing a clinical sample with a healthy control sample. The clinical sample consisted of 75 participants (33 females and 42 males); and the healthy control sample, of 148 participants (69 females and 79 males). The samples were matched for age, gender and educational level. Table A3.1, given in Appendix 3 reports the means and standard deviations for age and educational level for the two samples. It also provides the results of *t*-tests and demonstrates that the samples were closely matched.

The clinical validity was examined using Hotelling's  $T^2$  test. According to Wilson, et al. (2008) it revealed a highly significant overall difference between the subtest scores of both

samples, where  $p < 0.0001$ . Evaluation of scores on the individual subtests was carried out using  $t$ -tests. Their results showed that the clinical sample performed significantly more poorly than controls in the Story – Immediate Recall subtest. This comparison was highly significant,  $p < 0.001$ . Wilson, et al. (2008) also examined the effect sizes for the subtest score comparisons using Cohen's  $d$ . They concluded that, according to Cohen's classification system, the effect size for the Story – Immediate Recall subtest would be classified as medium (between 0.60 and 0.79). The effect sizes for the majority of the other subtests were greater than 0.8. Wilson, et al. (2008) noted that the composite measure of the whole test was more sensitive to group differences than the subtests that comprise it. The effect sizes for the two versions of the whole test were 1.63 for Version 1, and 1.64 for Version 2. However, for this study it was considered appropriate to use only the Story – Immediate Recall subtest to reduce the effects of fatigue on the participants when engaged in lengthy measures. Therefore, the use of the subtest was considered of adequate validity to measure immediate verbal memory recall.

### **3.9.1.3 Mood state test: Profile of Mood States Questionnaire Bi-polar Form**

The test used to measure the mood state of each participant was the Profile of Mood States Questionnaire – Bipolar form (POMS-Bi) (Lorr, McNair and Heuchert, 2003). The profile of mood states questionnaire, in its original form, in the bipolar form, and in a shortened form of the bipolar form, has been used in previous music therapy that assessed patient responses to treatment (Magee and Davidson, 2002; Koelsch, Offermanns and Franzke, 2010). The POMS-Bi is a questionnaire form that consists of 72 adjectives or phrases that are grouped into six mood states. A scale of 12 adjectives or phrases defines each mood state. The mood states are characterised as composed-anxious, agreeable-hostile, elated-depressed, confident-unsure, energetic-tired and clearheaded-confused. The participant

was instructed to look each word in the list of descriptors and to rate his or her mood against the various mood descriptors by circling one option from a list of items. They were asked to rate the words that best described how they had been feeling during the past week, including the present day. The list of items for each descriptor was: much like this – 3, slightly like this – 2, slightly unlike this – 1, much unlike this – 0.

According to Lorr, McNair and Heuchert (2003), the general population completed the form in ten minutes. However, due to the significant levels of cognitive disabilities presenting in the population under investigation was necessary to reduce the number of adjectives on the form. The number of adjectives was reduced from 72 to 48. This reduced the number of mood scales from six to four. This was considered appropriate in order to minimise the effects of fatigue and cognitive impairments of the population. The remaining four scales were composed-anxious, agreeable-hostile, elated-depressed and energetic-tired. These were considered to be the most relevant scales for inclusion in the study and this reduction concurs with other research using the POMS-Bi with neurological patients (Magee and Davidson, 2002).

The POMS was evaluated as having highly satisfactory internal consistency (Lorr, McNair and Heuchert, 2003). However, the developers acknowledge the difficulty in accurately assessing the reliability of mood state measures due to the nature of fluctuations of mood. This is even true when the conditions of an experiment to assess test-retest reliability are tightly controlled.

Lorr, McNair and Heuchert (2003) state that the replications during the development of the POMS provided evidence of the validity of the POMS mood factors. They also assert that the construct validity of the POMS is evidenced in several areas of research, including brief psychotherapy studies and studies in neurology and neuropsychology.



#### **3.9.1.4 Order of tests**

The order in which the participants were presented with the tests was as follows:

1. Lottery
2. Story
3. POMS-Bi

The order remained the same throughout the study. This was to ensure that all participants experienced the same test conditions. Randomisation of the order of tests was considered. However, there were not enough assessment sessions to allow each participant to be presented with the tests in all possible orders, as each participant would have needed to be administered the tests on six separate occasions. The test order was chosen that would be least likely to induce participant fatigue, where the Lottery test, Story test, and POMS-Bi questionnaire were designed to take ten minutes, 5 minutes, and 10 minutes to administer, respectively. The participants were permitted to rest for short periods between tests if necessary. Overall, the tests took approximately 30 minutes to complete. At the end-of-treatment assessment session, semi-structured interviews were carried out for each participant in addition to the three standardised tests. The interviews followed a short break after the tests.

#### **3.9.1.5 The test administrator**

The test administrator was selected based on completion of postgraduate training in music therapy or psychology. This ensured the assessor's experience of conducting assessment and an awareness of ethical issues regarding test administration. The administrator was also briefed on the importance of boundaries and how to respond if participants made disclosures or attempted to engage the administrator in dialogue about the music therapy sessions. The administrator was advised to ask the participants to consult the clinician on

these matters. A second assessor was also recruited to safeguard the periodic outcome assessments in the event of the primary administrator being unable to conduct them. Both administrators were trained in the same way.

The test administrators were not informed about which timepoint each participant was at in the treatment schedule. Therefore, the administrators were blinded to the treatment conditions for each participant.

### **3.9.2 Semi-structured interviews**

Semi-structured interviews were chosen to obtain qualitative data to enable description of the participants' opinions and experiences of the music therapy treatment. This type of interview was chosen because it provided a clear question schedule while also allowing the participants and interviewer to discuss and explore areas of interest that arise during the course of the interview. Smith and Osborn (2003) suggested that semi-structured interviewing is a very useful way to collect data for a study involving IPA and highlight the flexibility of this interview method. The interview was designed to be short to reduce the potential effects of fatigue experienced by the participants. Therefore, the question schedule was to be administered within 30 minutes. The semi-structured interviews were conducted at the end-of-treatment assessment session. This was chosen as the most reasonable time for the interviews because it was after the treatment period but not so far after it that the participants might forget valuable or useful thoughts about it. The questions were constructed based on the information sought by the research sub-questions.

Therefore, interview questions focused on these subject areas. The aim was to focus on the participants' views about their needs, the effectiveness of the music therapy treatment in meeting those needs, the participants' opinions about the length of treatment, and improvements that the participants would make to the treatment. The question order followed this logical progression from the participants looking inwardly to looking

outwardly at the treatment. Questions were constructed using simple, direct language that would be familiar to the participants. The research supervisor was consulted during the development of the question schedule. After piloting the schedule with colleagues prompts were added to support the interviewer in eliciting responses.

The question schedule for the interviewer is given below. The words in italics appeared only in the interviewer's instructions, and the participants were not shown this document. Instead, they were shown the participants' version, with the italicised instructions omitted. The presentation of the printed version of the question schedule was intended to reduce any effects of attention and memory deficits in attending to, and remembering, the questions asked, or parts thereof. The interview room was required to be private, maintained at a comfortable temperature, free from distractions and unnecessary interruptions. The interviewer was trained and given a script. The interviewer's script is given in Appendix 4.

The interviewer recorded the interviews using the ZOOM H2 Digital Handy Recorder. This enabled the interviewer to remain focused on developing and maintaining a rapport with the participants while also paying attention to the questions and the flow of the discussion. Prior to beginning the interview the interviewer informed the participants that the interview would be recorded. The interview schedule was used to ensure that the questions were asked in the same order for each participant. For each question in the schedule, the interviewer asked one question and then facilitated a discussion about it, while also allowing the conversation to follow the participants' interests. The interviewer noted participants' responses that were required for reference in subsequent questions, for example the responses from question one for use in question two. If the participant was having difficulty in answering the question, the interviewer could rephrase it or refer to the script to help draw out more information from the participant without indicating desired

responses to questions. The participants were informed throughout the interview that it was important to give an honest response rather than one that they judged to be favourable to the researcher.

### **3.9.2.1 The interviewer**

The interviewer was selected from a university psychology department. The criteria for selection were that the individual had experience of conducting tests and interviews, and that he or she would be available to conduct all tests and interviews at each of the periodic assessment intervals. This was intended to eliminate any possible differences inherent in using different test administrators on different dates, and also in using different interviewers on different dates. The selected test administrator, and interviewer, was a female PhD psychology student in the final stages of her doctoral study. She was trained in the use of the standardised outcome measures for attention, memory recall and mood state. She was also involved in developing the question schedule by running through the questions and feeding back in discussion with the researcher. All of the standardised tests and the interview schedule had clear instructions and scripts to follow in the event that another administrator or interviewer would be needed.

The semi-structured interview method described was considered to be of acceptable reliability due to the consistency of administration and measurement. The interviewer was instructed to ask the questions in the same order each time and to record the interviews on an audio recording device. Thus, the method controlled for interviewer bias within reasonable expectations. The questions seem to correspond well with the areas of research interest and, therefore, were considered to be of acceptable validity.

### **3.9.3 Pre and post-session assessment: Visual Analogue Scale of Emotional Needs**

The decision for studying cognition and emotional needs within the same study was supported in the literature, where researchers noted the problem of insufficient information when only evaluating cognitive changes and neglecting any measurement of subjective health, and vice versa (Von Steinbuechel, et al., 2005). They advise that brain injury rehabilitation should include both intensive cognitive therapy and attention to emotional changes. Most brain injury survivors (and their carers) have to live with cognitive disturbances and changes in quality of life (Von Steinbuechel, et al., 2005). Von Steinbuechel, et al. (2005) propose that the value of health-related interventions may be assessed via the measurement of the effect on quality of life.

A test was required in order to measure the effect of the music therapy sessions on the participants' emotional needs. The most suitable tool for this measurement seemed to be a pre-post session outcome measurement that could detect the within-subject changes in the satisfaction of emotional needs. The tool was required to produce quantitative data, possibly in the form of a scale to allow for comparability between pre-session and post-session measurements. Standardised tools exist to measure quality of life and mood state with neurological populations. These include the Stroke and Aphasia Quality of Life Scale (SAQOL-39) (Hilari, et al., 2003) and the Visual Analogue Mood Scale (VAMS) (Stern, et al., 1997). However, there seemed to be a lack of standardised tools for measuring the satisfaction of emotional needs of people with neurological impairments. In the absence of a standardised tool, an appropriate solution seemed to be to construct one specifically for the groups involved in the study.

A visual analogue scale was chosen due to the speed and ease of administration for brain injury survivors (Stern, et al., 1997). Due to cognitive deficits and communication

disorders, people with acquired brain injury have often been excluded from studies assessing subjective quality of life and mood state (de Haan, et al., 1993; von Steinbuechel, et al., 2005; Stern, et al., 1997). Most paper-and-pencil questionnaires require some intact cognitive functioning, making less word driven measures more appropriate for use with this population. Steinbuechel, et al. (2005) argue that shorter measures are more effective because they increase the ability of people to complete them. From this, it was decided that only six items would be chosen. Steinbuechel, et al. (2005) suggest that self-rating is feasible with people with mild to moderate cognitive deficits, and that specific instruments, rather than generic ones, are more responsive to specific conditions. Visual analogue scales (VAS) were considered to be more sensitive to within-subjects changes (Price, Curless and Rodgers, 1999; Stern, et al., 1997). Due to the occurrence of hemianopia following brain injury a vertical scale was judged to be more appropriate than the traditional horizontal form of VAS (Stern, et al., 1997). Therefore, a vertical form of VAS was selected.

In order to select the most relevant items to be included in the measure it seemed appropriate to consult the participants involved in the study. Participants were asked to complete the referral form, which included data about their reasons for referring themselves for music therapy. “Measures of HRQL are particularly relevant in stroke when the key aims of rehabilitation are to facilitate adaptation to disability, to promote social and community integration, and to maximize well being and quality of life” (Hilari, et al., 2003, p. 1944). The participants were given a list of 20 items and asked to select which ones reflected best their reasons for referral. The items included socio-emotional, emotional and cognitive needs that people with acquired brain injury may feel to be important. The reasons listed were as follows: to be part of a group, to express myself, to have a private space, to feel more confident, to be respected, to be challenged, to have a new experience, to feel supported, to be heard, to feel valued, to be more independent, to

make decisions, to improve concentration, for personal enjoyment, to support others, to listen to others, to be understood, to be productive/useful, to be in control, and to improve memory. The responses of the participants are shown in table 3.5.

Table 3.5: Participants' reasons for taking part in the music therapy research study

Reason for taking part in the music therapy research	Participant										Total count
	1	2	3	4	5	6	7	8	9	10	
To be part of a group	1	1		1	1				1		5
To feel supported	1	1								1	3
To support others	1	1		1				1			4
To express myself	1	1								1	3
To be heard	1	1	1								3
To listen to others	1	1									2
To have a private space	1	1									2
To feel valued	1	1	1			1					4
To be understood	1	1					1				3
To feel more confident	1	1			1			1		1	5
To be more independent	1	1			1						3
To be productive / useful	1	1	1			1	1				5
To be respected	1	1									2
To make decisions	1	1									2
To be in control	1	1									2
To be challenged	1	1		1							3
To improve concentration	1	1	1	1	1						5
To improve memory	1	1	1			1		1			5
To have a new experience	1	1		1	1			1			5
For personal enjoyment	1	1		1	1	1	1				6

The items chosen from the list were the most popular socio-emotional reasons for referral selected by the participants in the study. Therefore, the items were considered highly relevant. The use of a bipolar VAS design with midpoint was considered to address the threat of misleading scores at low extremities identified by Stern, et al. (1997). The use of the phrases 'very much so' and 'not at all' were considered acceptable to control for participant acquiescence. The measure was named the Visual Analogue Scale of Emotional

Needs (VASEN). It was considered as having sufficient construct validity for use in this study. Examples of the VASEN can be found in Appendix 5.

### **3.9.3.1 Pre-post session test administrator**

The test administrator for the pre-post session assessment was selected from the staff available at Headway. When possible the same administrator was used. The reliability of this measure was not assessed, as this would require an additional study to be conducted, which is not within the scope of this study itself. However, this may be addressed in a future study.

## **3.10 Data analysis**

This section presents the analysis methods of the quantitative and qualitative data. It begins with the rationale for the analysis of the data from the repeated measures design experiment, followed by the statistical methods. This is followed by the statistical methods for analysing the pre-post session data. Then, the analytical methods of the qualitative data are described.

### **3.10.1 Quantitative data**

#### **3.10.1.1 Repeated measures design experiment**

The analysis of the RMD experiment is approached in two ways. This is to address two different questions. The first question is: Is music therapy different to standard care alone? The second question is: Is there any effect of carry over after 8 weeks of follow-up? The analytical approaches for the two questions are set out below.



Figure 3.4: RMD analysis for ‘Is music therapy different to standard care alone?’

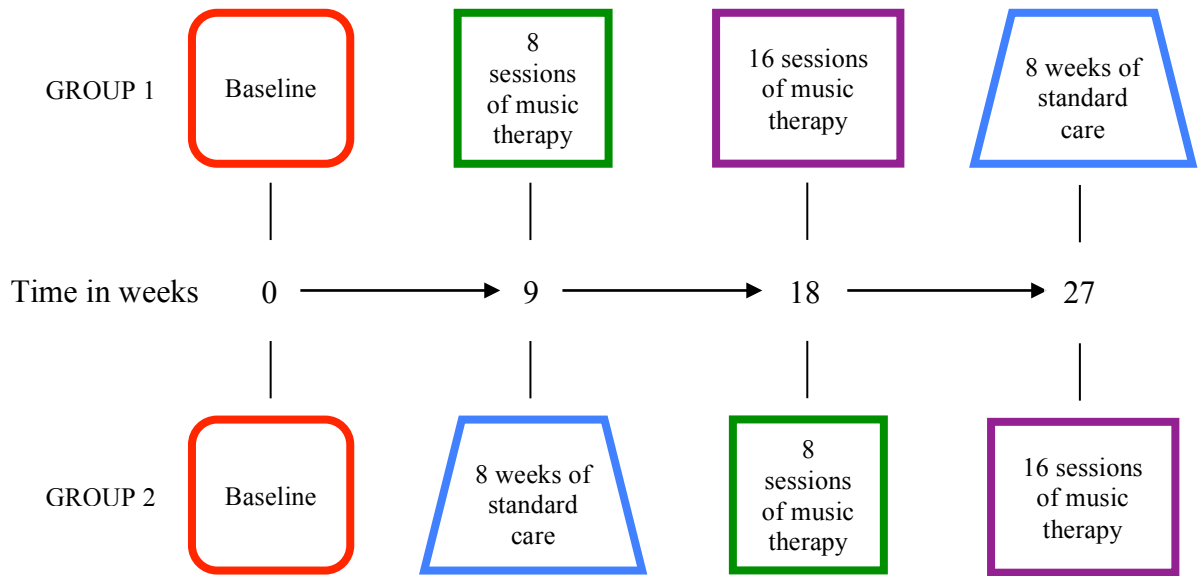


Figure 3.4 shows the first approach to the analysis in which measures for sustained attention, immediate memory recall, and mood states were taken at four timepoints: week zero, week nine, week 18, and week 27. The data gathered at these points represent the measures taken following the different treatment conditions: at baseline (BL), after eight weeks of standard care alone (SC), after eight weeks of music therapy (MT), and after 16 weeks of music therapy (MT). This approach to the data analysis addresses the following questions:

- Is there a difference between the effect of standard care and music therapy treatment? This question is addressed by comparing the means of the combined scores of the two groups at each timepoint.
- Is there a difference between the effect of 8 weeks of music therapy and 16 weeks of music therapy? This question is addressed by comparing the means of the combined scores of the two groups for 8 weeks of music therapy and 16 weeks of music therapy.

- Is there a treatment order effect? This question is addressed by considering the counterbalancing in the RMD, and by referring to the literature about the tools used in the outcome measures. It is also addressed by comparing the means of the combined scores of both groups at each timepoint, and the means of the scores of the two groups in their order sequence.

Figure 3.5: RMD analysis for ‘Is there any effect of carry over after 8 weeks of follow-up?’

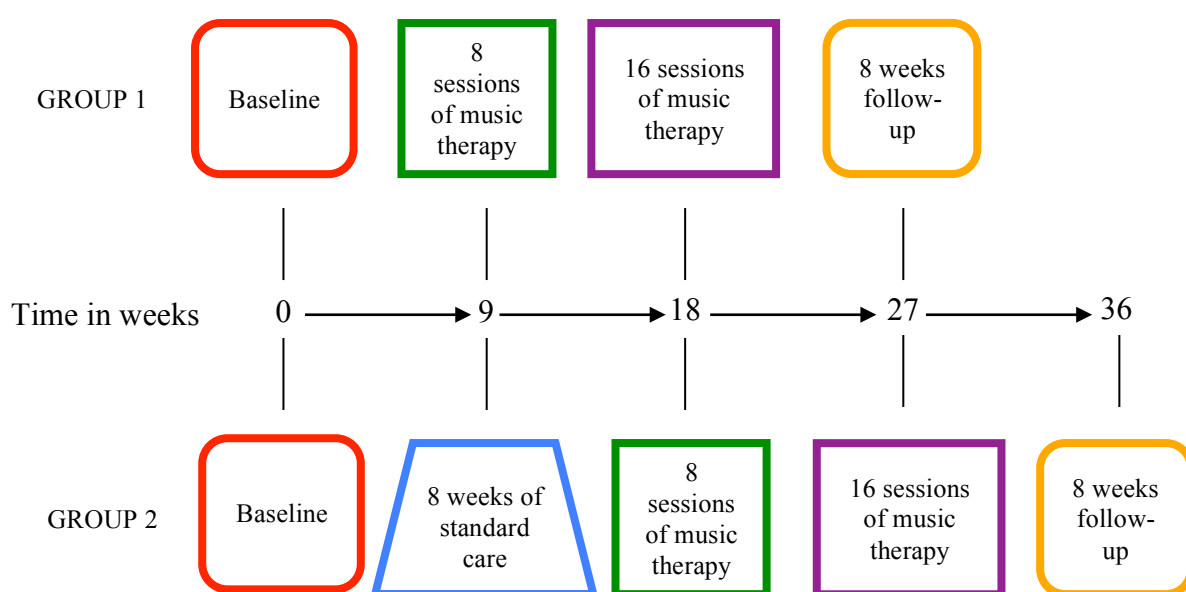


Figure 3.5 shows the second approach to the analysis in which measures for sustained attention, immediate memory recall, and mood state were taken at the intervals indicated: for group one (week zero, week nine, week, and week 27), and for group two (week nine, week 18, week 27, and week 36). It is important to note that the same data was used in both approaches given in figures 3.4 and 3.5 with three alterations to the way the data were used in figure 3.5. For group one, the condition ‘8 weeks of standard care’ was renamed ‘8 weeks follow-up’. For group two, measures were taken at 36 weeks and this data represents ‘8 weeks follow-up’. The use of the same data for different conditions when analysing it is justified in the following way. The conditions and experience of the

participants in the baseline, standard care and follow-up conditions is the same. So, at baseline, after 8 weeks of standard care, and after 8 weeks follow-up the participants were accessing the same activities and engaging in normal everyday life. Therefore, these three conditions were considered to be equivalent and could be used to answer different questions using the same data. The data gathered as indicated in figure 3.5 represent the various conditions of the independent variable: baseline, 8 weeks of music therapy, 16 weeks of music therapy, and 8 weeks follow-up. This second approach to the data analysis addresses the following question:

- Is there any carry over effect after the end of music therapy treatment? This question is addressed by comparing the means of the combined scores of the two groups for each level of the independent variable.

#### **3.10.1.1.1 Statistical analyses**

The data were analysed using several analytical methods. SPSS 18.0, a statistical analysis application, was used to produce the charts and tables, which are shown in subsequent sections. Analysis of variance (ANOVA) was computed for the RMD to estimate the significance of the differences between the sets of means for sustained attention, immediate memory recall, and mood states. ANOVA was also used to test the statistical significance of the data for emotional needs. These data were analysed in terms of immediate effect (comparing pre-post differences for each session) and longer-term effect (comparing early pre-session measurements with late post-session measurements). Effect size was also calculated to determine the size of the effect of treatment on attention, memory, mood state, and emotional needs. For the RMD data, pairwise comparisons of variance between conditions of the independent variable (baseline, standard care, eight weeks of music therapy, and 16 weeks of music therapy) were computed to determine the statistical significance of the differences between pairs of conditions.

### **3.10.1.1.2 Analysis of Variance (ANOVA) for repeated measures design experiment**

Analysis of variance tests the null hypothesis that the means for all conditions or groups are equal (Field, 2009). It produces an  $F$ -statistic or  $F$ -ratio. This compares the amount of systematic variance in the data with the amount of unsystematic variance. Analysis of variance tests for a general experimental effect rather than providing statistical data about differences between specific experimental conditions or groups. For the analysis of variance, five measurement timepoints were used: at baseline, after eight weeks standard care, after eight weeks music therapy, after 16 weeks music therapy, and after eight weeks follow-up.

### **3.10.1.1.3 Sphericity**

Sphericity becomes an issue when three or more conditions are involved in the analysis, for example when more than three observations are obtained from the same subject through time. It is denoted by  $\epsilon$  and is a condition concerned with the equality of variances across conditions and the equivalence of covariances between pairs of conditions. Thus, it holds true when there is homogeneity of variance between conditions and when the variances of their differences are also equivalent. Sphericity tests provide information about the accuracy of the  $F$ -statistic. Mauchly's test of sphericity tests the hypothesis that the variances of the differences between conditions are equal. If Mauchly's test produces a statistically significant result ( $p < .05$ ), then there are significant differences between the variances of differences. Therefore, the condition of sphericity has been violated, and the  $F$ -statistic must be viewed with caution. The opposite is true if Mauchly's test produces a non-significant result ( $p > .05$ ) (Field, 2009). If the condition of sphericity was not met,

three corrections were used to produce a valid  $F$ -ratio: the Greenhouse-Geisser correction, the Huynh-Feldt correction, and the lower-bound estimate of sphericity. These corrections adjust the degrees of freedom used to assess the observed  $F$ -ratio. When using the Greenhouse-Geisser correction, the closer its value is to 1 the closer the data are to being spherical. When estimates of sphericity are less than 0.75, or nothing is known about sphericity, the Greenhouse-Geisser correction is used. However, when this estimate is greater than 0.75 it is possible that the null hypothesis may fail to be rejected falsely. In such a case, the Huynh-Feldt correction is used (Field, 2009).

Mauchly's test of sphericity tests the hypothesis that the variances of the differences between conditions (measurement timepoints) are equal. It compares the variances between conditions. If Mauchly's test statistic is non-significant, i.e. greater than .05, then it can be concluded that the differences between the variances of differences are not significant and the condition of sphericity has been met. Then, the  $F$ -ratio can be viewed with some certainty and the statistics for 'sphericity assumed' are taken from the table of analysis of variance for within-participant effects (e.g. table 4.8). However, if Mauchly's test statistic has a probability value less than .05, then it can be concluded that there are significant differences between the variances of differences. If this occurs, the condition of sphericity is not met, and the  $F$ -ratios must be viewed with caution. If sphericity is violated, then the corrections of sphericity (Greenhouse-Geisser or Huynh-Feldt) are used. The corrected estimates of sphericity were used in the following way. If the Greenhouse-Geisser estimate is greater than .75, then the Huynh-Feldt correction is used. This is due to the risk of the Greenhouse-Geisser being too conservative and failing to reject the null hypothesis.

#### **3.10.1.1.4 Contrasts**

As already mentioned, analysis of variance tests for a general experimental effect between all the conditions in the experiment. If the *F*-ratio is statistically significant, it is then logical to test for statistical significance between pairs of groups using planned contrasts (Field, 2009). The two types of contrasts performed were simple and repeated. For simple contrasts, baseline measurements were compared with all other conditions (after eight weeks of SC, after eight weeks of MT, after 16 weeks of MT, and after eight weeks FU).

#### **3.10.1.2 Pre-post session data analysis of VASEN data**

The data from the pre-post session outcome measures of the VASEN data were analysed using analysis of variance for the short-term effects of treatment, and mixed models analysis for the immediate effects of treatment.

##### **3.10.1.2.1 Mixed models analysis**

Analysis of variance was not chosen for the statistical analysis of the immediate effects of treatment because this form of analysis in SPSS discards all data on a subject if there are any missing measurements. Over the course of the treatment some participants had been absent for some sessions. Mixed models analysis was selected as the most suitable method of statistical analysis for the VASEN data because it allows data on such subjects to be used. Mixed models analysis provides a flexible approach to statistical analysis of repeated measures data. It is a developing area of statistical analysis and only became available in SPSS at Anglia Ruskin University in October 2012. At this point in time the majority of the data had been analysed and it was not viable to re-analyse the previously analysed data using mixed models analysis. However, it was possible to analyse the VASEN data in this way to determine the immediate effect of treatment, i.e. the difference between pre- and post-session scores for each session (32 timepoints with 16 pairs of pre- and post-session

observations). The analysis produces an  $F$ -statistic and  $p$ -value to determine the effect of treatment and the probability of statistical significance of the data.

### 3.10.1.3 Effect size calculations

Three effect size calculations were used in the statistical analyses and were calculated by hand. The first equation (Field, 2009, p.480) shown here was used to determine the overall effect size in the experiment using the values produced from the analysis of variance. It provides a value for omega squared ( $\omega^2$ ), which was used to calculate the main effect size.

$$\omega^2 = \frac{\left[ \frac{k-1}{nk} (MS_M - MS_R) \right]}{MS_R + \frac{MS_B - MS_R}{k} + \left[ \frac{k-1}{nk} (MS_M - MS_R) \right]}$$

The following equation (Field, 2009, p.481) was used to calculate the effect size between individual pairs of conditions of the experiment. It also used the values from the analysis of variance. This equation computes a value for  $r$ .

$$r = \sqrt{\frac{F(1, dfR)}{F(1, dfR) + dfR}}$$

The above equations accompanied the analysis of variance of data from the measures of attention, memory, mood state, and short-term effects on emotional needs. The following equation for  $d$  was used to calculate effect sizes for the mixed models analysis of the immediate effects on emotional needs. It was necessary to use this equation because it involves the use of the correlation coefficient from the mixed models analysis of 16 pairs of pre-post repeated measurements. Thus, it corrects for the dependence between pre-post means. It is taken from Morris and DeShon's Equation 8 (Morris and DeShon, 2002, p.109).

$$d = \frac{\mu_D}{\sigma \sqrt{2(1 - \rho)}}$$

Where  $\sigma$  represents the average standard deviation from two means (pre-session and post-session measures),  $\mu_D$  represents the difference between the two means of pre-post measurements, and  $\rho$  represents the correlation between pre-post measurements produced from the mixed models analysis.

Table 3.6 presents a comparison of measures of effect size. The table shows three levels of effect size with corresponding values for three types of effect size measures. The levels are taken from Field (2009).

Table 3.6: Effect size comparisons

Effect size	Cohen's $d$	Pearson's $r$	$\omega^2$
Small	.2	.10 to .29	.01
Medium	.5	.30 to .49	.06
Large	.8	.50 to 1.0	.14

### **3.10.2 Qualitative data**

#### **3.10.2.1 Interpretative phenomenological analysis of semi-structured interviews**

The aim of the analysis of the interview data was to make detailed analyses about the perceptions and opinions of the subjects. Interpretative phenomenological analysis (IPA) was chosen for this analysis as it was considered a good match for the semi-structured interview method (Smith and Osborn, 2008). The interview recordings were transcribed as follows. The researcher reviewed the interview audio recordings twice. During the first review the words were transcribed as they were spoken on the audio recording. The speech of the interviewer and the respondent were differentiated in a similar way to the way they are in a script. For example:

*Interviewer: Can you describe your needs just after your brain injury?*



*Respondent: I couldn't move around as well as before.*

Pauses were indicated by three dots (...), for example *it's like ... em ... you know ... like I can't move my arm so high anymore*. During the second review the transcription was checked and significant observations of tone of voice and other extra-textual information were annotated using square brackets ([ ]).

After transcription themes were identified using the left-hand margin to annotate what seemed significant in the text. This included associations, similarities, differences, and contradictions (Smith and Osborn, 2008). This was carried out for the whole of the transcript. Then, the transcript was read again and the right-hand margin was used to note the “emerging theme titles” (Smith and Osborn, 2008, p 68). A list of the emergent themes was compiled to enable identification of connections between themes. Themes that emerged in chronological order were grouped into clusters or super-ordinate concepts (Smith and Osborn, 2008). At this stage, the clustering of themes was compared with the transcript to ensure that the connections remained faithful. A table of themes was then produced in which the clusters of themes were identified and given names (Smith and Osborn, 2008). These theme clusters represented super-ordinate themes. Key words and the location of instances of the themes in the text were added to the table of themes (Smith and Osborn, 2008). The purpose of this was to facilitate finding the themes in the original source material.

The process was repeated for subsequent transcripts. Each transcript was approached in isolation, without the tables of themes from other analyses. The purpose of this was to preserve the identity and authenticity of each transcript. It also ensured that similarities that were discovered were not due to bias in the analysis (Smith and Osborn, 2008). When all the transcripts had been analysed a master table of super-ordinate themes was constructed

(Smith and Osborn, 2008). The number of themes was reduced and prioritised based on prevalence, richness of the passages that contain the themes, significance of the themes within the data, and how they relate to other themes (Smith and Osborn, 2008). The master table of themes formed the basis for narrative accounts of the participants' responses and the results are presented in section 5.1.

### **3.10.2.2 Thematic analysis of song lyrics**

The song recordings were analysed using thematic analysis to relate themes to emotional adjustment and emotional needs of participants, and hence effectiveness of treatment. Using a constructionist paradigm, thematic analysis was used to provide a detailed account of how music therapy addressed the emotional needs and adjustment in community rehabilitation for ABI survivors. The analysis conducted used a theoretical (deductive) approach driven by the analyst's knowledge of this area of study. The coding of themes was at the latent level and was interpretative: examining underlying ideas, assumptions, and conceptualisations that are theorised as shaping and informing the semantic content (Braun and Clarke, 2006). The thematic analysis sought to answer the question 'How does music therapy address emotional needs and adjustment in community rehabilitation for ABI survivors?'

The songs were first transcribed. Then the entire data set was read through a few times until the researcher was familiar with the depth and breadth of the content. The transcript was read, looking for meanings and patterns. Initial notes were made and ideas marked for coding. Then, initial codes (category labels) were produced for interesting features in the latent content across the entire data set. From this coding process an initial thematic map was constructed (Braun and Clarke, 2006). This contained "an overall conceptualisation of the data patterns and relationships between them" (Braun and Clarke, 2006, p 89). Then the codes were analysed and broader themes created to encompass them. Themes were

determined by salience with reference to brain injury and prevalence within the data. The themes were then reviewed to consider whether the data supported the existence of certain themes. Themes were merged to form broader ones and separated to form themes of narrower meaning, ensuring that the codes and data within themes fitted together in a meaningful way (Braun and Clarke, 2006). The extracts were reviewed to consider whether they formed a logical and consistent pattern within each theme. Then, the validity of themes was considered in relation to the full data set and whether the thematic map precisely reflected the meanings apparent (Braun and Clarke, 2006). The thematic map was used to test these relationships. Following this the themes were defined and distilled to draw out the essence of the meaning of each theme. The thematically collated data extracts were reviewed and organised into a logical account with associated narrative, presented in section 5.2.

### **3.11 Summary of the method**

This was a quasi-experimental study in a natural setting. It used an incomplete repeated measures design with counterbalancing to address practice effects. Data collection was carried using quantitative standardised, and non-standardised, measures of attention, memory recall, mood state, and emotional needs; semi-structured interviews; and audio recording of songs. Data analysis involved quantitative analysis of the numerical data, IPA of the interview data, and thematic analysis of the song lyric data. The quantitative and qualitative data provided this exploratory study with convergent validity that allowed for stronger inferences to be asserted in the discussion of the research findings. The results for the qualitative and quantitative data are synthesised and discussed in relation to the published literature in chapter 6.

## **CHAPTER 4**

### **4 RESULTS: QUANTITATIVE DATA**

The following chapter presents the quantitative data collected from the participants and the population of service users at the brain injury centres from which the samples were drawn, the data from the Repeated Measures Design (RMD) experiment, and the pre-post session outcome measures taken during the treatment. The chapter begins with a presentation of the participant and local population characteristics. Then analysis of the RMD data for sustained attention, immediate memory recall, and mood states is presented. This is followed by the pre-post data for satisfaction of emotional needs.

#### **4.1 Presentation of data**

##### **4.1.1 Bar charts**

Bar charts were chosen to present data for comparing means of values for each condition (measurement timepoint). Some bar charts show comparison of mean values for the two groups combined, whereas other bar charts show the mean values for each condition for each group separately. The bar charts showing the data from the combined groups (for example, in section 4.3.1) do not present the conditions (measurement timepoints) in chronological order. However, the bar charts showing the data for the groups separately (for example, in section 4.3.2) present the mean values for the conditions in chronological order. This enables some interpretation about practice effects of the outcome measurement tools, order effects of experimental conditions, and carry over effects of treatment. For each bar in these charts, error bars indicate the confidence intervals for each mean value calculated. The 95% confidence limits given in the bar charts have been produced by SPSS after the repeated measures analysis of variance, and use the estimate of variance from that analysis.

#### **4.1.2 Line charts**

Line charts were chosen to display the data that were collected over multiple sessions, i.e. over time. This enabled visual exploration of patterns and trends in the data, and also identification of interesting or unexpected changes in values.

#### **4.1.3 Tables**

Tables present the data for the descriptive statistics and the results of statistical analyses.

#### **4.1.4 Abbreviations**

A list of the abbreviations used in the data analyses are given below:

AVM = Arteriovenous malformation

CVA = Cardiovascular accident (stroke)

TBI = Traumatic brain injury

M = Male

F = Female

BL = Baseline

MT = Music therapy treatment

SC = Standard care

FU = Follow-up

#### **4.1.5 Cautionary note regarding statistical analyses**

The overall sample size used in this study was small: initially,  $n=10$ , becoming  $n=8$  by the end of the study. When the two groups were analysed separately, the sample sizes for group one and two became  $n=3$  and  $n=5$ , respectively. Therefore, caution is needed when interpreting the data, and less certainty must be used when stating that there was or was not an effect of treatment. The reader is advised to hold this in mind when reading the statistical analyses.

## 4.2 The characteristics of the samples and their local populations

The term local population used here is taken to mean the total number of service users attending each Headway branch. It is not assumed that these are perfectly representative of the whole population of people with ABI. The information from the participants and Headway branches was used to produce basic demographic data. This was sought to present the characteristics of the samples and their local populations and to briefly evaluate the extent to which the samples might represent the populations from which they were drawn. This data also enabled some comparison of the two samples from a demographic perspective. The local population data was gathered by request from each Headway site. The individual participant data was obtained from each participant during the referral process and also from medical records with the consent of the participants. This latter method of data collection was used when incomplete or unclear information was given. Table 4.1 shows the basic descriptive data from two Headway sites. It presents comparisons of the total number of service users attending the two sites together with the distributions of sex and age. Figures given in the table under sex and age distribution represent the number of service users followed by the percentage of the whole (given in brackets underneath).

Table 4.1: The basic descriptive data from Headway sites

Headway site	Total number of attending service users	Sex		Age distribution (years)					
		M	F	<21	21-30	31-40	41-50	51-60	>61
1	144	92 (63.89%)	52 (36.11%)	2 (1.39%)	0 (0%)	0 (0%)	82 (56.94%)	56 (38.89%)	4 (2.78%)
2	67	49 (73.13%)	18 (26.87%)	1 (1.49%)	7 (10.45%)	5 (7.46%)	19 (28.36%)	21 (31.34%)	14 (20.90%)

The above table shows that the number of service users for site 1 is more than twice that of site 2. The sex distribution in each site is similar with males providing the greater

percentage of service users at each site. The age distribution of the two sites is dissimilar. Despite a greater number of service users attending site 1, it did not serve people with ABI between the ages of 21 and 40 years old. In contrast, site 2 served individuals from each age band. At both site 1 and site 2 the greatest percentage of service users were aged between 41 and 60 years. At site 1 the largest percentage of service users were between 41 and 50 years of age, whereas at site 2 they were between 51 and 60 years of age. At both sites the smallest percentage of service users were found below 40 years of age.

Table 4.2 presents a comparison of the ranked distribution of the five most common types of brain injury of service users at the two Headway sites. The number of cases determined the ranking. Site 1 provided the ranking without specific numbers, whereas site 2 provided the specific numbers without the ranking.

Table 4.2: Ranked distribution of most common brain injury types from Headway sites

Headway site	Ranked distribution of 5 most common brain injury types (1 = most common, 5 = least common)				
	1	2	3	4	5
1	CVA	TBI	Encephalitis	Hydrocephalus	AVM
2	TBI	CVA	Tumour	Toxicity	Hypoxia

Table 4.2 shows that the most common types of brain injury of service users at both site 1 and site 2 are cardiovascular accident (CVA) and traumatic brain injury (TBI). The most common form of brain injury reported at site 1 is CVA, whereas at site 2 the most common form is TBI.

Table 4.3 presents the basic descriptive data about the participants in the study. For each participant it provides the sex, age, type of brain injury and time between brain injury and referral to the music therapy group. The table also identifies the music therapy groups to which the individual participants were assigned.

Table 4.3: The basic descriptive data of the samples

Participant	Group	Sex	Age (years)	Type of brain injury	Time elapsed between brain injury and referral to the music therapy group (years)
1	1	F	49	CVA	3.66
2	1	M	74	CVA	4.25
3	1	F	47	CVA	2.66
4	1	F	45	CVA	1.92
5	1	M	45	TBI	1
6	2	F	58	CVA	9
7	2	M	41	TBI	13
8	2	F	63	CVA	37
9	2	M	62	TBI	41
10	2	F	54	CVA	1.75

From the above table the following two tables of descriptive statistics were produced.

Table 4.4 compares descriptive statistics for the sex and age distribution for group one and group two.

Table 4.4: Descriptive statistics for the sex and age distribution in group 1 and group 2

Group	Sex		Age distribution (years)									
	Male	Female	<21	21-30	31-40	41-50	51-60	>61	Mean	Variance of sample	Standard deviation of sample	Range
1	2 (40%)	3 (60%)	0 (0%)	0 (0%)	0 (0%)	4 (80%)	0 (0%)	1 (20%)	52.00	154.00	12.41	45-74
2	2 (40%)	3 (60%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)	2 (40%)	2 (40%)	55.60	79.30	8.91	41-63

The sex distribution for both groups is identical. However, the numbers of female participants in each group are greater than the numbers of male participants. This does not reflect the sex distributions given in Table 4.1, where males comprise the larger proportion of attending service users at the Headway sites. The age distribution shows that all participants were aged 41 years and older. However, 80% of the participants in group one were aged between 41 and 50 years, and in group two, only 20% of the participants were within this band. The remaining 80% of participants in group two were aged 51 years and



older. There were no participants in group one who were aged between 51 years and 60 years old. The mean age for group one was 52 years ( $SD = 12.41$ ), and 55.6 ( $SD = 8.91$ ) for group two. The age ranges of each group were similar 45-74 for group one, and 41-63 for group two.

Table 4.5 presents the descriptive statistics for the two groups for brain injury type and the time between brain injury and referral to the music therapy group. This data is necessary to allow for commentary regarding expected recovery of function.

Table 4.5: Descriptive statistics for brain injury type and the time between brain injury and referral to the music therapy group for group 1 and group 2

Group	Brain injury types		Time elapsed between brain injury and referral to the music therapy group		
	CVA	TBI	Mean time elapsed (years)	Standard deviation of sample	Range (years)
1	4 (80%)	1 (20%)	2.70	1.31	1-4.25
2	3 (60%)	2 (40%)	20.35	17.55	1.75-41

Table 4.5 shows that CVA was the most common type of brain injury in the two groups. 80% of the participants in group one suffered a CVA compared with 60% of those in group two. This may be due to the fact that the groups consisted of a larger percentage of women, and men are more likely to suffer a TBI. The data for time elapsed between brain injury and referral to the music therapy group show that mean values differ greatly. The mean value for group one is 2.70 years ( $SD = 1.31$ ), whereas the mean value for group two is 20.35 years ( $SD = 17.55$ ). This is probably due to the difference between the groups in the ranges of time elapsed: 1-4.25 years for group one, and 1.75-41 years for group two. The data shown in Tables 4.1-4.5 suggest that the groups are comparable to a limited extent. The samples are very heterogeneous and this characteristic is reflected in the population. Heterogeneity is a common problem in research in the field of brain injury and

is noted in several studies. This supports the use of a repeated measures within-subjects design.

### 4.3 Sustained attention

#### 4.3.1 Music therapy compared with baseline and standard care

The raw data for the sustained attention outcome measurements is given in Appendix 6.

Figure 4.1 and table 4.6 show the mean values for sustained attention of the combined groups. The terms used to label each timepoint, for example at BL and after eight weeks of SC, are explained in more detail in table 3.4 and in section 3.10.1.1.

Figure 4.1: Combined scores comparing measures of sustained attention taken at different timepoints

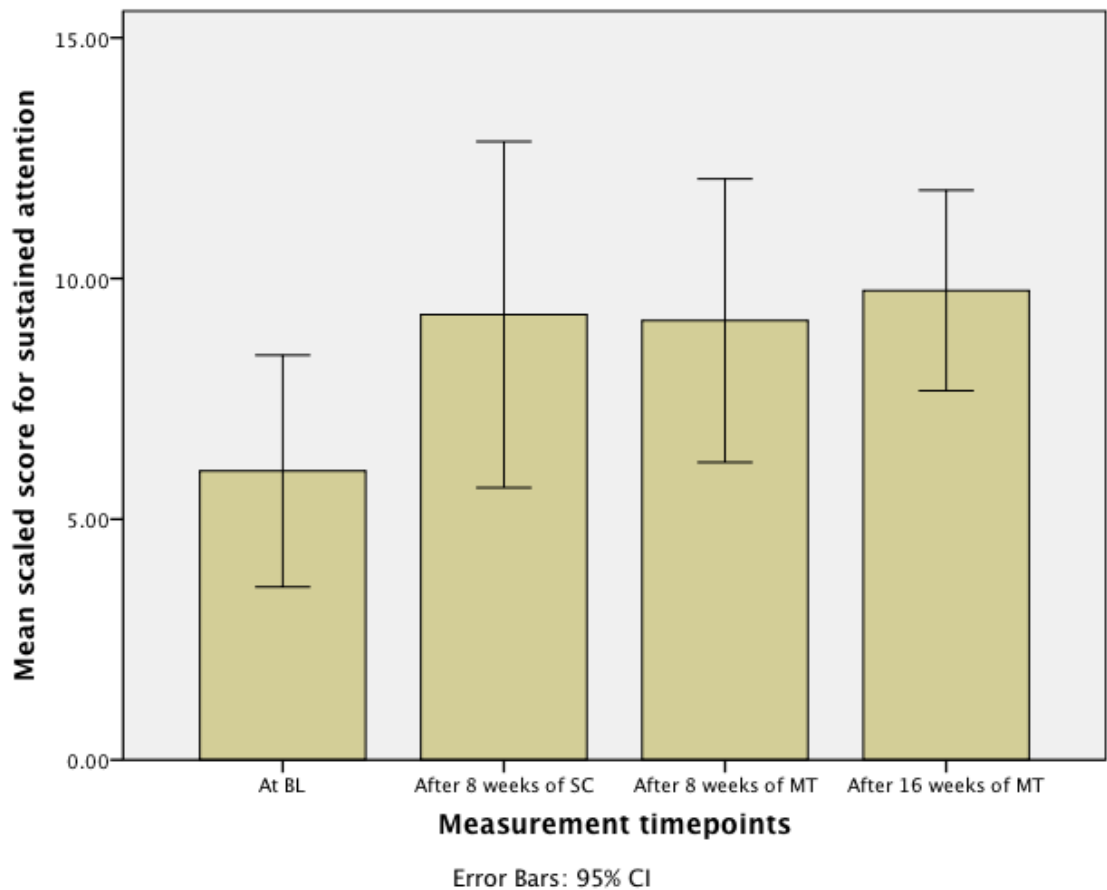


Table 4.6: Descriptive statistics for combined scores comparing measures of sustained attention taken at different timepoints

Measurement timepoints	Mean	Std. Deviation	N
At BL	6.000	2.878	8
After 8 weeks of SC	9.250	4.301	8
After 8 weeks of MT	9.125	3.523	8
After 16 weeks of MT	9.750	2.493	8

Participants' scores of sustained attention improved with MT and SC compared with BL. 16 weeks of MT appears to show the greatest improvement. There also seemed to be a continuing development i.e. 16 weeks of MT was slightly improved over 8 weeks of MT. However, this improvement seems only slightly greater than 8 weeks of MT and 8 weeks of SC. A large improvement (a difference of 3.25 between the means) was observed from BL to the timepoint after eight weeks of SC. The improvement following 8 weeks of SC may be due to natural recovery of function. This suggestion is supported by the fact that there is no significant difference between SC and MT. However, this is unlikely because the participants were all beyond the period of time many call the period of natural recovery. Anxiety effects may have decreased in the second timepoint as the participants became more familiar with the assessment process. Practice effects are unlikely due to the outcome measures having several versions to account for practice effects. Therefore, it is possible that order effects are confounding the data for group one due to improvements in attention being retained following the music therapy treatment. The data for SC in the combined groups scenario is composed of SC before treatment for group one and SC after treatment for group two. Therefore, the data for the two groups are presented separately in sections 4.3.2 and 4.3.3 and order effects are discussed. There was a slight decrease in the mean value from eight weeks of SC to the timepoint after eight weeks of MT. A small increase was observed from eight weeks of MT to the timepoint 16 weeks of MT. The

error bars show the variation in the data and indicate that statistical significance may not be reached. Statistical analyses and differences between conditions are shown next.

Table 4.7: Mauchly's Test of Sphericity for combined scores comparing measures of sustained attention taken at different timepoints

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lowerbound
Measurement timepoints	.285	7.190	5	.213	.688	.980	.333

From table 4.7 Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,  $\chi^2(5) = 7.190, p = .213$ .

Therefore, sphericity was assumed in table 4.8.

Table 4.8: ANOVA of within-participant effects for combined scores comparing measures of sustained attention taken at different timepoints

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Sphericity Assumed	70.094	3	23.365	2.754	.068
Error	Sphericity Assumed	178.156	21	8.484		

The results in table 4.8 show that, overall, the scores of sustained attention were not significantly affected by the treatment condition (baseline, eight weeks of standard care, eight weeks of music therapy, or 16 weeks of music therapy),  $F(3, 21) = 2.754, p > .05$ .

The very small sample size may have reduced the power of the experiment to show statistical significance in the data.

The main effect size given in table A7.2 in Appendix 7 was large,  $\omega^2 = .11$ .

Table 4.9: Tests of Within-Subjects Contrasts

Source	Measurement timepoint	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size ( <i>r</i> )
Measurement timepoints	8 weeks of SC vs. BL	84.500	1	84.500	2.823	.137	.536
	8 weeks of MT vs. BL	78.125	1	78.125	6.018	.044	.679
	16 weeks of MT vs. BL	112.500	1	112.500	12.805	.009	.804
	8 weeks of SC vs. 8 weeks of MT	.125	1	.125	.007	.936	.031
	8 weeks of MT vs. 16 weeks of MT	3.125	1	3.125	.179	.685	.158
Error	8 weeks of SC vs. BL	209.500	7	29.929			
	8 weeks of MT vs. BL	90.875	7	12.982			
	16 weeks of MT vs. BL	61.500	7	8.786			
	8 weeks of SC vs. 8 weeks of MT	124.875	7	17.839			
	8 weeks of MT vs. 16 weeks of MT	121.875	7	17.411			

The difference between 8 MT and BL was statistically significant,  $p < .05$ , and showed a large effect,  $r = .68$ ; and the difference between 16 MT and BL was also statistically significant,  $p < .05$ , with a large effect,  $r = .80$ . However, the difference between SC and BL was not statistically significant,  $p > .05$ , and showed a large effect,  $r = .54$ . Neither of the differences between SC and 8 MT, or between 8 MT and 16 MT were statistically significant. The effect sizes for these contrasts were nil,  $r = .03$ , and small,  $r = .16$ , respectively. As the main effect of treatment condition was not statistically significant, caution must be exercised in interpreting the data regarding individual differences between conditions.

The participants were unable to provide evidence of practicing the between-session exercises. The reasons given were:

1) they had practiced but had not recorded their practice in the log sheet,

- 2) they could not find their log sheets or Participant Packs,
- 3) they had not practiced the between-session exercise.

The lack of evidence of between-session practice means that it is not possible to provide descriptive or statistical analyses of any data about this independent variable and its effect on sustained attention.

#### **4.3.2 Order effects, carry-over effects, contrasts and effect sizes for sustained attention for group 1**

This section and section 4.3.3 present the sustained attention data for group one and group two separately. The order of the measurement timepoints is shown in chronological order to enable discussion of order effects. Data from the follow-up assessments are provided to determine whether there were any carry-over effects of music therapy treatment.

Figure 4.2: Order effects for sustained attention for group 1

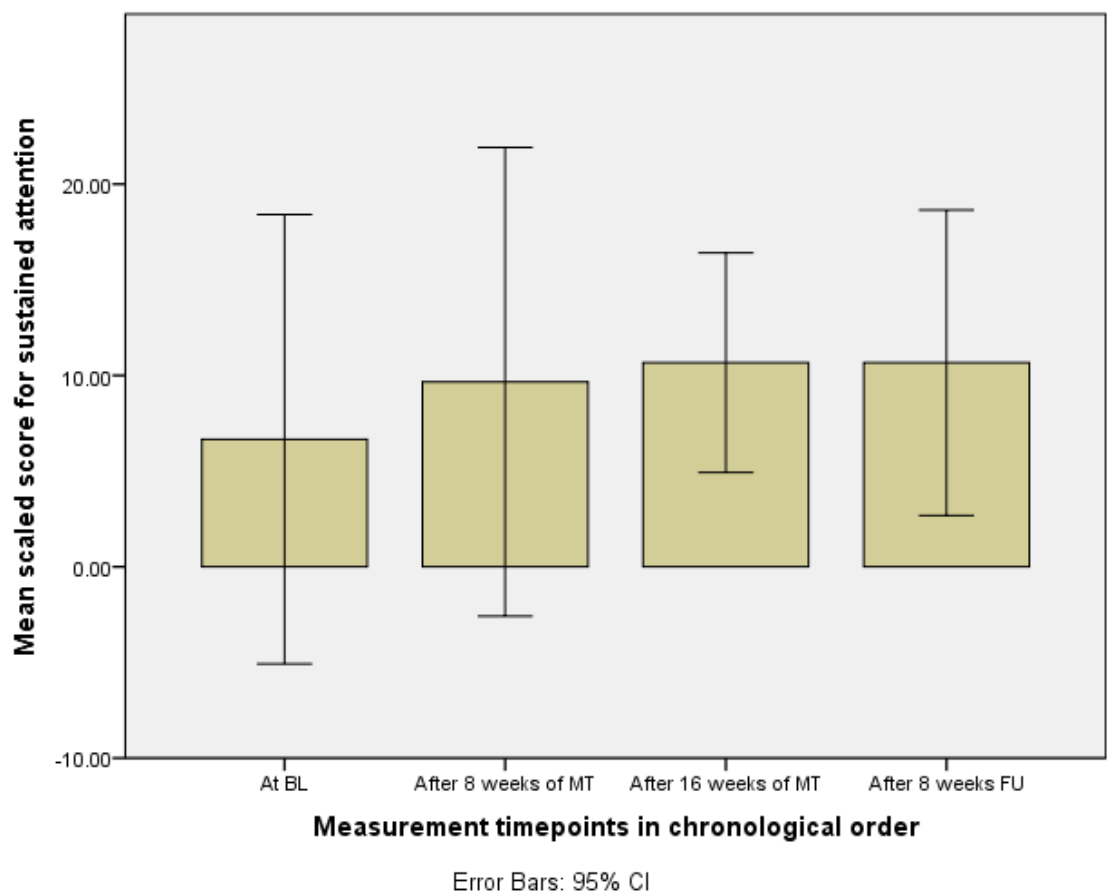


Table 4.10: Descriptive statistics for group 1 for sustained attention

Measurement timepoints	Mean	Std. Deviation	N
At BL	6.667	4.726	3
After 8 weeks of MT	9.667	4.933	3
After 16 weeks of MT	10.667	2.309	3
After 8 weeks FU	10.667	3.215	3

Figure 4.2 and table 4.10 show the descriptive statistics for group one's sustained attention results in chronological order. The means show a continuing increase in sustained attention over the course of the experiment, with the greatest increase occurring between BL and the timepoint after eight weeks of MT. The error bars in the bar chart show wide confidence intervals of the data for the first two timepoints particularly. The very small sample size may have contributed to these very wide confidence intervals. The mean value for sustained attention increased further between eight weeks of music therapy and the timepoint after 16 weeks of MT. There was no change in the mean value between the timepoints after 16 weeks of MT and after eight weeks FU. This sustained mean value may indicate a carry over effect of treatment. The lack of further increase may be due to ceiling effects in the outcome measure used.

Table 4.11: Mauchly's Test of Sphericity for group 1's sustained attention scores

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.000	.	5	.	.621	1.000	.333

Mauchly's sphericity test was not able to provide a figure for the statistical significance of the sphericity test. Therefore, it is necessary to refer directly to the Greenhouse-Geisser estimate, as advised by Field (2009). The estimate is less than 0.75. Therefore, the Greenhouse-Geisser correction was used to determine statistical significance.



Table 4.12: ANOVA of within-participant effects for mean scores of sustained attention  
for group 1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Greenhouse-Geisser	32.250	1.862	17.319	.608	.580
Error	Greenhouse-Geisser	106.000	3.724	28.462		

Using the Greenhouse-Geisser correction, the results in table 4.12 show that, overall, the differences between the scores of sustained attention for group one at each timepoint were not statistically significant,  $F(1.86, 3.72) = .61, p > .05$ . Therefore, the scores for sustained attention were not affected significantly by treatment condition for group one.

The main effect size is given in table A7.4 in Appendix 7. This shows that  $\omega^2 = -0.12$ .

When the  $F$ -ratio is less than 1, the value for  $\omega^2$  may be negative. In this case it is converted to 0.0 (Meyers, Gamst & Guarino, 2006). Therefore,  $\omega^2 = 0.0$ , indicating no effect.

The following table 4.13 shows the contrasts calculated for differences between pairs of conditions/timepoints. The statistical significance and degrees of freedom of the  $F$ -ratios for each contrast are given. The data is used to determine the statistical significance of each contrast. Effect sizes for each contrast were calculated from the data in this table.

Table 4.13: Within-subjects contrasts for group 1's sustained attention scores

Source	Timepoints	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size ( <i>r</i> )
Measurement timepoints	8 weeks of MT vs. BL	27.000	1	27.000	1.421	.355	.644
	16 weeks of MT vs. BL	48.000	1	48.000	2.286	.270	.730
	8 weeks FU vs. BL	48.000	1	48.000	.787	.469	.531
	8 weeks of MT vs. 16 weeks of MT	3.000	1	3.000	.070	.816	.184
	16 weeks of MT vs. 8 weeks FU	.000	1	.000	.000	1.000	.000
Error	8 weeks of MT vs. BL	38.000	2	19.000			
	16 weeks of MT vs. BL	42.000	2	21.000			
	8 weeks FU vs. BL	122.000	2	61.000			
	8 weeks of MT vs. 16 weeks of MT	86.000	2	43.000			
	16 weeks of MT vs. 8 weeks FU	50.000	2	25.000			

The significance values for the contrasts shown in table 4.13 show that the sustained attention scores for group one at each timepoint compared with BL were not statistically different. The effect sizes were calculated to identify potential comparisons between conditions and to allow clinically relevant interpretation of the data. The difference between eight weeks of MT compared with BL yielded a large effect size,  $r = .64$ . The difference between 16 weeks of MT compared with BL yielded a large effect size,  $r = .73$ . The difference between eight weeks FU compared with BL showed a large effect,  $r = .53$ . The smaller effect size for the comparison between FU and BL may be due to greater variance in the data. Thus causing the residual mean square for this contrast to be much higher than for that calculated in the other two contrasts. This suggests that carryover may have been observed for some, but not all, of the participants. The significance values also show that none of the contrasts between consecutive timepoints were statistically

significant. Two of the three comparisons of consecutive timepoints yielded small and nil effect sizes: for eight weeks of MT compared with 16 weeks of MT,  $r = .18$ ; and for 16 weeks of MT compared with eight weeks FU,  $r = .00$ .

### 4.3.3 Order effects, carry-over effects, contrasts and effect sizes for sustained attention for group 2

Figure 4.3 and table 4.14 present the descriptive statistics for group two's results in chronological order of data collection.

Figure 4.3: Order effects for sustained attention for group 2

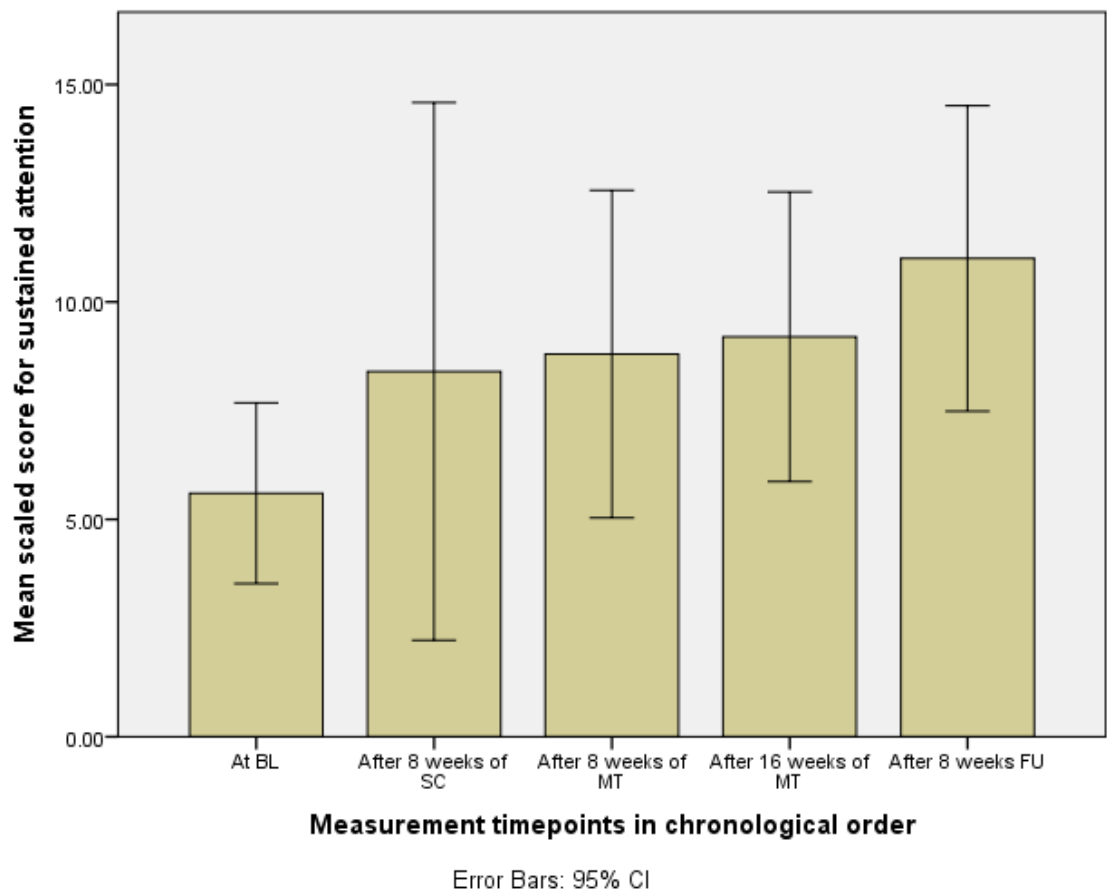


Table 4.14: Descriptive statistics for sustained attention for group 2

Measurement timepoints	Mean	Std. Deviation	N
At BL	5.600	1.673	5
After 8 weeks of SC	8.400	4.980	5
After 8 weeks of MT	8.800	3.033	5
After 16 weeks of MT	9.200	2.683	5
After 8 weeks FU	11.000	2.828	5

Figure 4.3 and table 4.14 show a continuing increase in sustained attention scores over the course of the experiment. A large increase in sustained attention is shown between BL and after eight weeks of SC, followed by a small increase after eight weeks of MT, followed by a small increase after 16 weeks of MT, and then a large increase at eight weeks FU. This large increase in sustained attention eight weeks following the end of treatment may suggest delayed recovery of function (Wilson, 2012).

Table 4.15: Mauchly's Test of Sphericity for group 2's sustained attention scores

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.003	13.887	9	.208	.359	.506	.250

From table 4.15 Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,  $\chi^2(9) = 13.887, p = .208$ . Therefore, sphericity was assumed in table 4.16.

Table 4.16: ANOVA of within-participant effects for mean scores of sustained attention for group 2

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Sphericity Assumed	76.000	4	19.000	2.317	.102
Error	Sphericity Assumed	131.200	16	8.200		

The results in table 4.16 show that, overall, the scores of sustained attention were not significantly affected by the treatment condition,  $F(4, 16) = 2.317, p > .05$ . The main effect size given in table A7.6 is small,  $\omega^2 = .02$ . This small main effect size may be due to the very small differences between the means of three consecutive measures (after eight weeks of SC, after eight weeks of MT, and after 16 weeks of MT) and the wide variances associated with these means. Table 4.17 presents the within-subjects contrasts for pairs of the five conditions/timepoints for group two.

Table 4.17: Within-subjects contrasts for group 2's sustained attention scores

Source	Timepoints	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size ( <i>r</i> )
Measurement timepoints	8 weeks of SC vs. BL	39.200	1	39.200	1.849	.245	.562
	8 weeks of MT vs. BL	51.200	1	51.200	3.879	.120	.702
	16 weeks of MT vs. BL	64.800	1	64.800	13.500	.021	.878
	8 weeks FU vs. BL	145.800	1	145.800	21.441	.010	.918
	8 weeks of SC vs. 8 weeks of MT	.800	1	.800	.091	.778	.149
	8 weeks of MT vs. 16 weeks of MT	.800	1	.800	.091	.778	.149
	16 weeks of MT vs. 8 weeks FU	16.200	1	16.200	1.328	.313	.499
Error	8 weeks of SC vs. BL	84.800	4	21.200			
	8 weeks of MT vs. BL	52.800	4	13.200			
	16 weeks of MT vs. BL	19.200	4	4.800			
	8 weeks FU vs. BL	27.200	4	6.800			
	8 weeks of SC vs. 8 weeks of MT	35.200	4	8.800			
	8 weeks of MT vs. 16 weeks of MT	35.200	4	8.800			
	16 weeks of MT vs. 8 weeks FU	48.800	4	12.200			

The significance values shown in table 4.17 show that statistical differences were present between baseline and 16 weeks of music therapy,  $p = .021$ , and between baseline and eight weeks follow-up,  $p = .010$ . The difference between eight weeks of standard care and baseline yielded a large effect size,  $r = .56$ . The difference between eight weeks of music therapy and baseline gave a large effect size,  $r = .70$ . The difference between 16 weeks of music therapy and baseline yielded a large effect size,  $r = .88$ . The difference between 8 weeks follow-up and baseline yielded a very large effect size,  $r = .92$ . Effect sizes were small for eight weeks of standard care compared with eight weeks of music therapy,  $r = .15$ ; and for eight weeks of music therapy compared with 16 weeks of music therapy,  $r = .15$ . The effect size for the difference between 16 weeks of music therapy compared with 8 weeks follow-up was medium-to-large,  $r = .50$ .

#### 4.3.4 Summary of attention data analysis

The main findings from the sustained attention data were as follows.

Table 4.18: Summary of results for sustained attention

Groups combined or separate	Source	Statistical significance	Effect size
Combined	Main effect	<i>ns</i> , $p > .05$	large, $\omega^2 = .11$
	8 weeks of SC vs. BL	<i>ns</i> , $p > .05$	large, $r = .54$
	8 weeks of MT vs. BL	$p < .05$	large, $r = .68$
	16 weeks of MT vs. BL	$p < .05$	large, $r = .80$
	8 weeks of SC vs. 8 weeks of MT	<i>ns</i> , $p > .05$	nil, $r = .03$
	8 weeks of MT vs. 16 weeks of MT	<i>ns</i> , $p > .05$	small, $r = .16$
Group 1	Main effect	<i>ns</i> , $p > .05$	nil, $\omega^2 = 0.0$
	8 weeks of MT vs. BL	<i>ns</i> , $p > .05$	large, $r = .64$
	16 weeks of MT vs. BL	<i>ns</i> , $p > .05$	large, $r = .73$
	8 weeks FU vs. BL	<i>ns</i> , $p > .05$	large, $r = .53$
	8 weeks of MT vs. 16 weeks of MT	<i>ns</i> , $p > .05$	small, $r = .18$
	16 weeks of MT vs. 8 weeks FU	<i>ns</i> , $p > .05$	nil, $r = .00$
Group 2	Main effect	<i>ns</i> , $p > .05$	small, $\omega^2 = .02$
	8 weeks of SC vs. BL	<i>ns</i> , $p > .05$	large, $r = .56$
	8 weeks of MT vs. BL	<i>ns</i> , $p > .05$	large, $r = .70$
	16 weeks of MT vs. BL	<i>ns</i> , $p > .05$	large, $r = .88$
	8 weeks FU vs. BL	<i>ns</i> , $p > .05$	large, $r = .92$
	8 weeks of SC vs. 8 weeks of MT	<i>ns</i> , $p > .05$	small, $r = .15$
	8 weeks of MT vs. 16 weeks of MT	<i>ns</i> , $p > .05$	small, $r = .15$
	16 weeks of MT vs. 8 weeks FU	<i>ns</i> , $p > .05$	large, $r = .50$

Analysis of variance computations of the main results for the combined groups and the individual groups showed no statistical significance. The main effect size for the combined groups was large, and those for groups one and two were nil and small, respectively.

Contrasts of individual differences between measurement timepoints for the combined groups showed that statistically significant differences were present between eight weeks of music therapy and baseline, and between 16 weeks of music therapy and baseline. These showed medium and large effect sizes, respectively. However, a statistically significant difference was not found between eight weeks of standard care and baseline.

Both group one and group two showed a continuing increase in mean scores for sustained attention over time during the course of the experiment.

The effect sizes of comparisons between conditions with BL for group two show larger effect sizes for both eight weeks of MT and 16 weeks of MT compared with eight weeks of SC. This is also reflected in the effect sizes of similar comparisons for the combined groups.

Effect sizes of comparisons of conditions with baseline increased over the course of treatment, i.e. effect size of the contrast between 16 weeks of music therapy and baseline was greater than the effect size of the contrast between eight weeks of music therapy and baseline.

Both group one and group two showed that their attention scores were maintained or improved eight weeks following the end of treatment.

Contrasts of individual differences between conditions for group one showed no statistically significant differences between conditions. The very small sample size ( $n = 3$ ) may have contributed to this lack of statistical significance. However, as for the combined groups, the difference between eight weeks of music therapy and baseline showed a medium effect size, and the difference between 16 weeks of music therapy and baseline showed a large effect size.

It was not possible to quantitatively analyse the effect of between-session practice on sustained attention due to insufficient data regarding the amount of self-led practice carried out between sessions.



## 4.4 Immediate memory recall

### 4.4.1 MT dosage compared with baseline and standard care

The raw data for outcome measurements of immediate memory recall are presented in Appendix 6. Table 4.19 and figure 4.4 show the mean scores for immediate memory recall of the combined scores for groups one and two.

Figure 4.4: Combined scores comparing measures of immediate memory recall taken at different timepoints

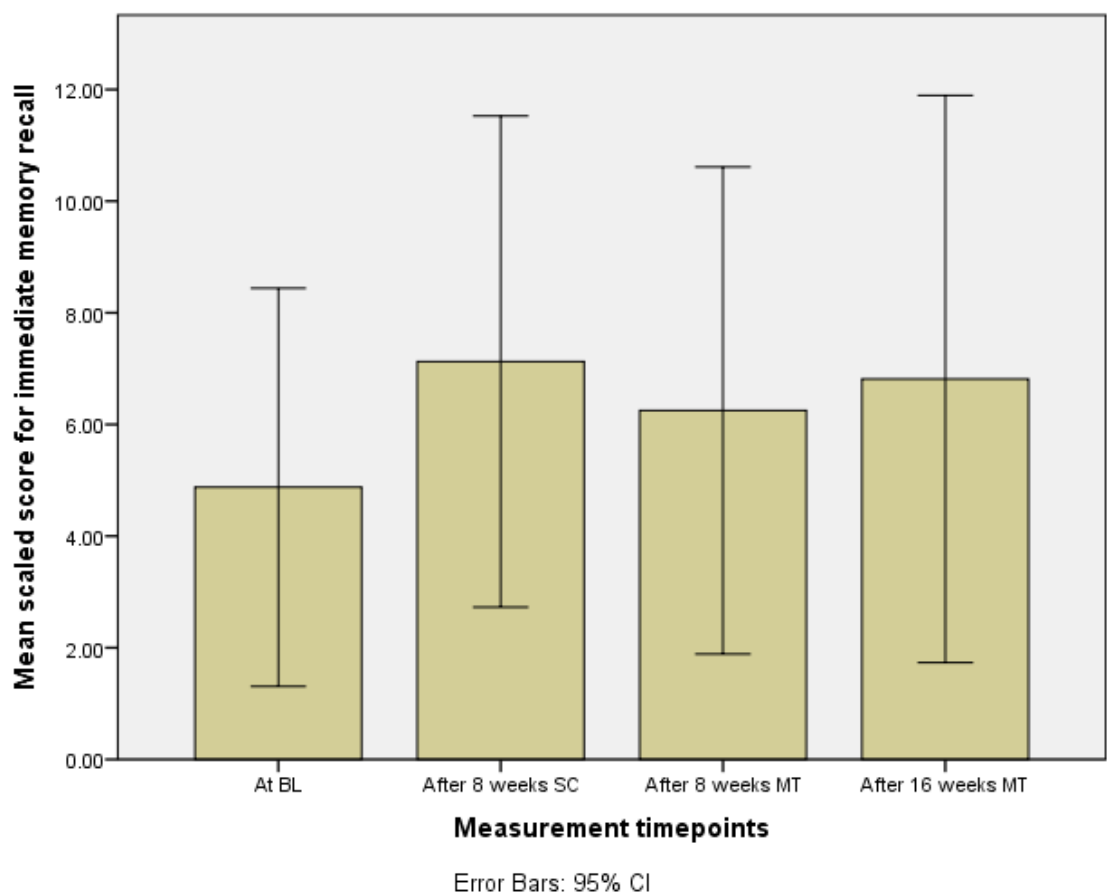


Table 4.19: Descriptive statistics for combined scores comparing measures of immediate memory recall taken at different timepoints

Measurement timepoints	Mean	Std. Deviation	N
At BL	4.875	4.266	8
After 8 weeks SC	7.125	5.263	8
After 8 weeks MT	6.250	5.217	8
After 16 weeks MT	6.813	6.077	8

Participants' scores for immediate memory recall improved with MT and SC compared with BL. 8 weeks of SC appears to show the greatest improvement compared with the mean score at BL. This improvement seems only slightly greater than 16 weeks of MT, which itself is slightly greater than the mean score for 8 weeks of MT. The improvement following 8 weeks of SC may be due to natural recovery of function. However, this is unlikely because the participants were all beyond the period of time generally accepted as the period of natural recovery. Anxiety effects may have decreased in the second timepoint as the participants became more familiar with the assessment process. Practice effects are unlikely due to the outcome measures having several versions to account for practice effects. Order effects may be confounding the data for group one due to improvements in immediate memory recall being retained following the music therapy treatment, thus producing a higher mean score after 8 weeks of SC. The data for SC in the combined groups scenario is composed of SC before treatment for group one and SC after treatment for group two. Order effects are discussed in sections 4.4.2 and 4.4.3. The error bars show the variation in the data and indicate that statistical significance may not be reached. Statistical analyses and differences between conditions are shown next.

Table 4.20: Mauchly's Test of Sphericity for combined scores comparing measures of immediate memory recall taken at different timepoints

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.174	10.021	5	.078	.562	.721	.333

From table 4.20 Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,  $\chi^2(5) = 10.021, p = .078$ . Therefore, sphericity was assumed in table 4.21.

Table 4.21: ANOVA of within-participant effects for combined scores comparing measures of immediate memory recall taken at different timepoints

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Sphericity Assumed	23.773	3	7.924	1.246	.318
Error	Sphericity Assumed	133.539	21	6.359		

The results in table 4.21 show that, overall, the scores of immediate memory recall were not significantly affected by the treatment condition (baseline, eight weeks of standard care, eight weeks of music therapy, or 16 weeks of music therapy),  $F(3, 21) = 1.246, p > .05$ . The  $p$ -value (.318) suggests that the results were not approaching statistical significance. The very small sample size may have reduced the power of the experiment to show statistical significance in the data. The main effect size given in table A7.8 in Appendix 7 was small,  $\omega^2 = .01$ .

Table 4.22: Tests of within-subjects contrasts for immediate memory recall for group 1 and group 2 combined

Source	Measurement timepoint	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size (r)
Measurement timepoints	8 weeks of SC vs. BL	40.500	1	40.500	3.082	.123	.553
	8 weeks of MT vs. BL	15.125	1	15.125	.561	.478	.272
	16 weeks of MT vs. BL	30.031	1	30.031	1.907	.210	.463
	8 weeks of SC vs. 8 weeks of MT	6.125	1	6.125	1.304	.291	.396
	8 weeks of MT vs. 16 weeks of MT	2.531	1	2.531	.227	.649	.177
Error	8 weeks of SC vs. BL	92.000	7	13.143			
	8 weeks of MT vs. BL	188.875	7	26.982			
	16 weeks of MT vs. BL	110.219	7	15.746			
	8 weeks of SC vs. 8 weeks of MT	32.875	7	4.696			
	8 weeks of MT vs. 16 weeks of MT	78.219	7	11.174			

Table 4.22 shows that none of the differences between pairs of measurement timepoints were statistically significant,  $p < .05$ . However, the table also presents the effect sizes for each of the pairs. The difference between eight weeks of SC and BL showed a large effect,  $r = .553$ , which was greater than either of the differences between BL and eight weeks of MT, and between BL and 16 weeks of MT. These differences showed small,  $r = .27$ , and medium,  $r = .46$ , effect sizes, respectively. The effect sizes for the differences between SC and 8 MT, or between 8 MT and 16 MT were medium,  $r = .396$ , and small,  $r = .18$ , respectively. As the main effect of treatment condition was not statistically significant, caution must be exercised in interpreting the data regarding individual differences between conditions. From the table the largest effect size is for the comparison between eight weeks of SC and BL. This unexpected result may be due to the order effects confounding the data. Participants from group one may have experienced improvements in immediate

memory recall that might have carried over into the period following treatment, which is eight weeks of SC for them. If improvements in memory functioning are retained, and functioning does not return to baseline level after treatment, then the data for 8 weeks of SC are confounded by the order effects. Group two's period of SC occurred before their treatment, so this is unlikely to affect them. Order effects are discussed in sections 4.4.2 and 4.4.3.

The participants were unable to provide evidence of practicing the between-session exercises. The reasons given were the same as those listed in section 4.3.1. The lack of evidence of between-session practice has resulted in failure to provide descriptive or statistical analyses of data about this independent variable and its effect on immediate memory recall.

#### **4.4.2 Order effects, carry-over effects, contrasts and effect sizes for immediate memory recall for group 1**

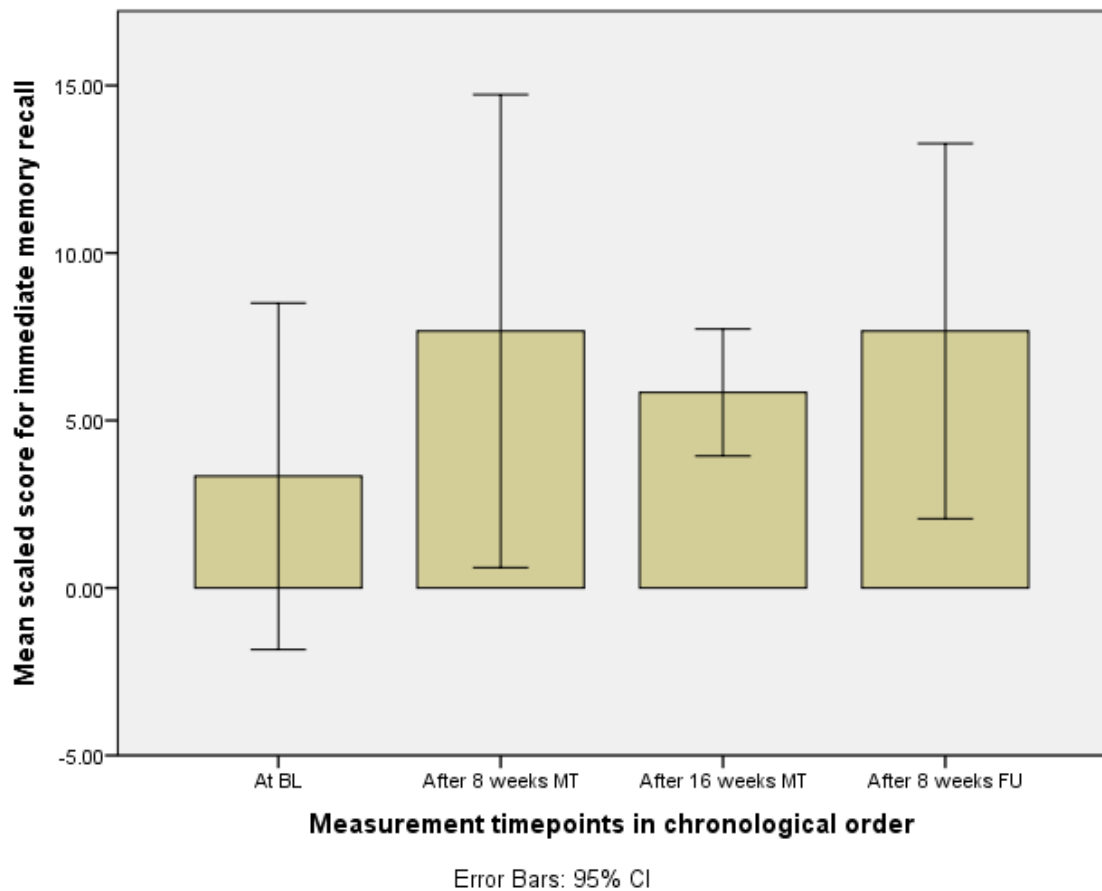
This section and section 4.4.3 present the immediate memory recall data for group one and group two separately. The order of the measurement timepoints is shown in chronological order to enable discussion of order effects. Data from the follow-up assessments are provided to determine any carry-over effects of music therapy treatment on immediate memory recall.

Figure 4.5 and table 4.23 show the descriptive statistics for group one's immediate memory recall results in chronological order.

Table 4.23: Descriptive statistics for group 1's immediate memory recall scores

Measurement timepoints	Mean	Std. Deviation	N
At BL	3.333	2.082	3
After 8 weeks MT	7.667	2.843	3
After 16 weeks MT	5.833	.764	3
After 8 weeks FU	7.667	2.255	3

Figure 4.5: Order effects for group 1 for immediate memory recall



The means show a large increase in immediate memory recall between BL and the timepoint after eight weeks of MT. The mean score decreases slightly from eight weeks of MT to 16 weeks of MT, and then returns to its highest level at the timepoint after eight weeks FU. The error bars in the bar chart show wide confidence intervals of the data for the first two and fourth timepoints. The error bars for the timepoint after 16 weeks of MT are narrower, indicating less variance in the data. The very small sample size may have contributed to wide confidence intervals. The rise in mean score for immediate memory recall from 16 weeks of MT to eight weeks FU may indicate a delayed improvement in memory functioning. The fact that the mean value after eight weeks FU does not return to the value at BL may indicate a carry over effect of treatment on memory recall.

Table 4.24: Mauchly's Test of Sphericity for group 1's immediate memory recall scores

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.000	.	5	.	.422	.817	.333

From table 4.24 Mauchly's sphericity test was not able to provide a figure for the statistical significance of the sphericity test. Therefore, it is necessary to refer directly to the Greenhouse-Geisser estimate, as advised by Field (2009). The estimate is less than 0.75 and is, therefore, the most suitable correction to be used.

Table 4.25: ANOVA of within-participant effects for mean scores of immediate memory recall for group 1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Greenhouse-Geisser	37.896	1.266	29.933	3.782	.168
Error	Greenhouse-Geisser	20.042	2.532	7.915		

Using the Greenhouse-Geisser correction, the results in table 4.25 show that, overall, the differences between the scores of immediate memory recall for group one at each timepoint were not statistically significant,  $F(1.27, 2.53) = 3.78, p > .05$ . Therefore, the scores for immediate memory recall were not affected significantly by treatment condition for group one.

The main effect size given in table A7.10 in Appendix 7 was large,  $\omega^2 = .34$ . This is notably different from the main effect size given for groups one and two combined ( $\omega^2 = .01$ ). This may suggest that the lower main effect size of the combined groups' scores is due to a very small main effect size for group two. This will be presented in section 4.4.3. The following table 4.26 shows the contrasts calculated for differences between pairs of timepoints. The statistical significance and degrees of freedom of the  $F$ -ratios for each

contrast are given. The data is used to determine the statistical significance of each contrast. Effect sizes for each contrast were calculated from the data in this table.

Table 4.26: Within-subjects contrasts for group 1's immediate memory recall scores

Source	Timepoints	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size ( <i>r</i> )
Measurement timepoints	8 weeks of MT vs. BL	56.333	1	56.333	4.477	.169	.831
	16 weeks of MT vs. BL	18.750	1	18.750	8.333	.102	.898
	8 weeks FU vs. BL	56.333	1	56.333	8.557	.100	.900
	8 weeks of MT vs. 16 weeks of MT	10.083	1	10.083	.910	.441	.559
	16 weeks of MT vs. 8 weeks FU	10.083	1	10.083	1.532	.341	.659
Error	8 weeks of MT vs. BL	25.167	2	12.583			
	16 weeks of MT vs. BL	4.500	2	2.250			
	8 weeks FU vs. BL	13.167	2	6.583			
	8 weeks of MT vs. 16 weeks of MT	22.167	2	11.083			
	16 weeks of MT vs. 8 weeks FU	13.167	2	6.583			

The significance values for the contrasts shown in table 4.26 show that the immediate memory recall scores for group one at each timepoint compared with BL were not statistically different. Despite the lack of statistical significance in this data set, the effect sizes were calculated to identify potential comparisons between conditions. The difference between eight weeks of MT compared with BL yielded a large effect size,  $r = .83$ . The difference between 16 weeks of MT compared with BL yielded a large effect size,  $r = .90$ . The difference between eight weeks FU compared with BL showed a large effect,  $r = .90$ . The significance values also show that none of the contrasts between consecutive timepoints were statistically different. Two of the three comparisons of consecutive timepoints yielded large effect sizes: for eight weeks of MT compared with 16 weeks of MT,  $r = .56$ ; and for 16 weeks of MT compared with eight weeks FU,  $r = .66$ .



#### 4.4.3 Order effects, carry-over effects, contrasts and effect sizes for immediate memory recall for group 2

Figure 4.6 and table 4.27 present the descriptive statistics for group two's results in chronological order of data collection.

Figure 4.6: Order effects for group 2 for immediate memory recall

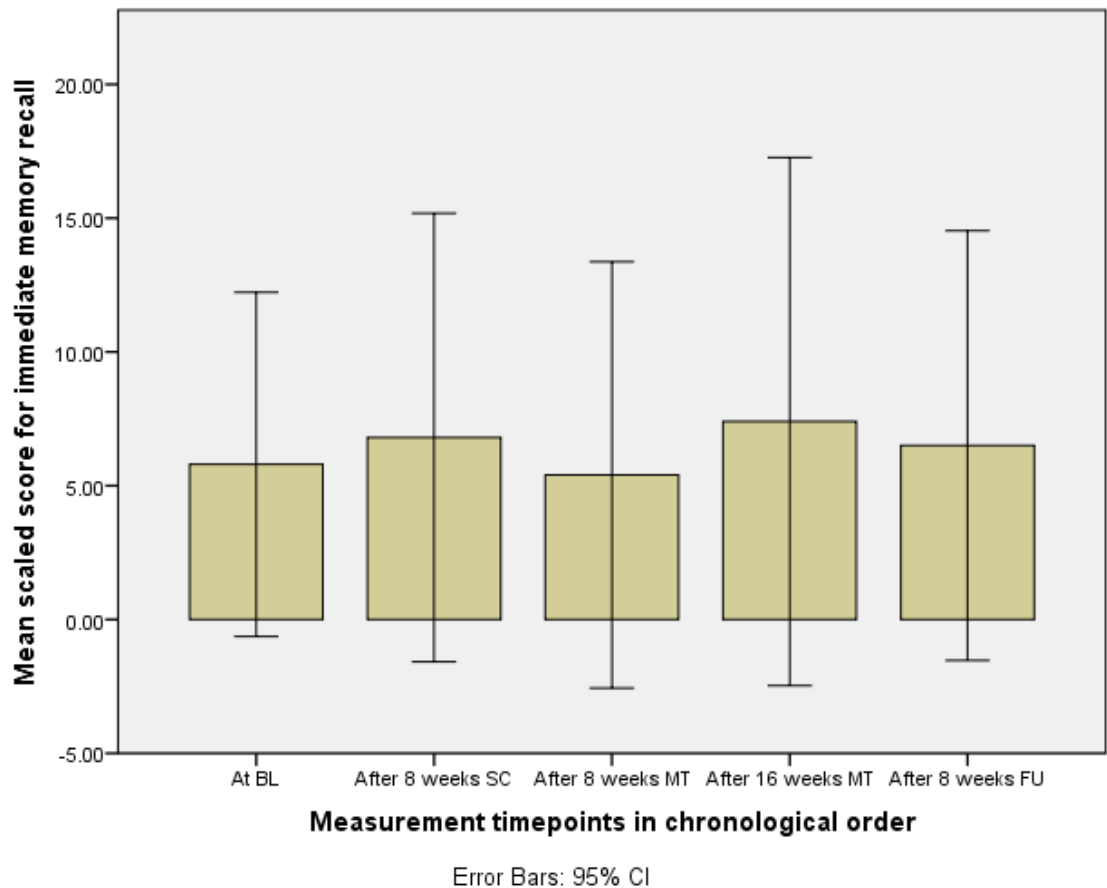


Table 4.27: Descriptive statistics for group 2's immediate memory recall scores

Measurement timepoints	Mean	Std. Deviation	N
At BL	5.800	5.179	5
After 8 weeks SC	6.800	6.751	5
After 8 weeks MT	5.400	6.417	5
After 16 weeks MT	7.400	7.948	5
After 8 weeks FU	6.500	6.471	5

Figure 4.6 and table 4.27 show the descriptive statistics for group one's immediate memory recall results in chronological order. The means show a small increase in

immediate memory recall between BL and the timepoint after eight weeks of SC. The mean score decreases slightly from eight weeks of SC to eight weeks of MT, and then increases to its highest level at the timepoint after 16 weeks of MT. This might suggest that eight weeks of MT is less effective than eight weeks of SC, whereas 16 weeks of MT is more effective than eight weeks of SC.

The mean score decreases from 16 weeks of MT to the timepoint after eight weeks of FU. The error bars in the bar chart show very wide confidence intervals of the data for all timepoints. The very small sample size may have contributed to wide confidence intervals. The mean score for immediate memory recall after eight weeks FU is slightly higher than that at BL. Overall, there seems to be very little difference in immediate memory recall scores between timepoints for group two.

Table 4.28: Mauchly's Test of Sphericity for group 2's immediate memory recall scores

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.002	14.696	9	.172	.376	.553	.250

From table 4.28 Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,  $\chi^2(9) = 14.696$ ,  $p = .172$ . Therefore, sphericity was assumed in table 4.29.

Table 4.29: ANOVA of within-participant effects for mean scores of immediate memory recall for group 2

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Sphericity Assumed	12.640	4	3.160	.563	.693
Error	Sphericity Assumed	89.760	16	5.610		

The results in table 4.28 show that, overall, the differences between the scores of immediate memory recall for group two at each timepoint were not statistically significant,  $F(4, 16) = .56, p > .05$ . Therefore, the scores for immediate memory recall were not affected significantly by treatment condition for group two.

The main effect size given in table A7.12 was very small,  $\omega^2 = .00$ . This is notably different from the main effect size given for group one ( $\omega^2 = .34$ ). This supports the earlier suggestion that the lower main effect size of the combined groups' scores ( $\omega^2 = .01$ ) is due to a very small main effect size for group two.

The following table 4.30 shows the contrasts calculated for differences between pairs of timepoints. The statistical significance and degrees of freedom of the  $F$ -ratios for each contrast are given. The data is used to determine the statistical significance of each contrast. Effect sizes for each contrast are also presented in this table.

Table 4.30: Within-subjects contrasts for group 2's immediate memory recall scores

Source	Timepoints	Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size ( <i>r</i> )
Measurement timepoints	8 weeks of SC vs. BL	5.000	1	5.000	.345	.589	.282
	8 weeks of MT vs. BL	.800	1	.800	.026	.879	.080
	16 weeks of MT vs. BL	12.800	1	12.800	.491	.522	.331
	8 weeks FU vs. BL	2.450	1	2.450	.161	.709	.197
	8 weeks of SC vs. 8 weeks of MT	9.800	1	9.800	1.441	.296	.515
	8 weeks of MT vs. 16 weeks of MT	20.000	1	20.000	2.807	.169	.642
	16 weeks of MT vs. 8 weeks FU	4.050	1	4.050	1.385	.305	.507
Error	8 weeks of SC vs. BL	58.000	4	14.500			
	8 weeks of MT vs. BL	121.700	4	30.425			
	16 weeks of MT vs. BL	104.200	4	26.050			
	8 weeks FU vs. BL	60.800	4	15.200			
	8 weeks of SC vs. 8 weeks of MT	27.200	4	6.800			
	8 weeks of MT vs. 16 weeks of MT	28.500	4	7.125			
	16 weeks of MT vs. 8 weeks FU	11.700	4	2.925			

The significance values for the contrasts shown in table 4.30 show that the immediate memory recall scores for group one for all comparisons were not statistically different. Despite the lack of statistical significance in this data set, the effect sizes were calculated to identify potential comparisons between conditions. The difference between eight weeks of SC compared with BL yielded a small effect size,  $r = .28$ . The difference between eight weeks of MT compared with BL yielded a very small effect size,  $r = .08$ . The difference between 16 weeks of MT compared with BL yielded a medium effect size,  $r = .33$ . The difference between eight weeks FU compared with BL showed a small effect,  $r = .20$ . Three comparisons of measurements taken at consecutive timepoints yielded large effect sizes: for eight weeks of SC compared with eight weeks of MT,  $r = .52$ ; for eight weeks of

MT compared with 16 weeks of MT,  $r = .64$ ; and for 16 weeks of MT compared with eight weeks FU,  $r = .51$ .

#### 4.4.4 Summary of immediate memory recall data analysis

Table 4.31: Summary of results for immediate memory recall

Groups combined or separate	Source	Statistical significance	Effect size
Combined	Main effect	$ns, p > .05$	small, $\omega^2 = .01$
	8 weeks of SC vs. BL	$ns, p > .05$	large, $r = .55$
	8 weeks of MT vs. BL	$ns, p > .05$	small, $r = .27$
	16 weeks of MT vs. BL	$ns, p > .05$	medium, $r = .46$
	8 weeks of SC vs. 8 weeks of MT	$ns, p > .05$	medium, $r = .40$
	8 weeks of MT vs. 16 weeks of MT	$ns, p > .05$	small, $r = .18$
Group 1	Main effect	$ns, p > .05$	large, $\omega^2 = .34$
	8 weeks of MT vs. BL	$ns, p > .05$	large, $r = .83$
	16 weeks of MT vs. BL	$ns, p > .05$	large, $r = .90$
	8 weeks FU vs. BL	$ns, p > .05$	large, $r = .90$
	8 weeks of MT vs. 16 weeks of MT	$ns, p > .05$	large, $r = .56$
	16 weeks of MT vs. 8 weeks FU	$ns, p > .05$	large, $r = .66$
Group 2	Main effect	$ns, p > .05$	very small, $\omega^2 = .00$
	8 weeks of SC vs. BL	$ns, p > .05$	small, $r = .28$
	8 weeks of MT vs. BL	$ns, p > .05$	nil, $r = .08$
	16 weeks of MT vs. BL	$ns, p > .05$	medium, $r = .33$
	8 weeks FU vs. BL	$ns, p > .05$	small, $r = .20$
	8 weeks of SC vs. 8 weeks of MT	$ns, p > .05$	large, $r = .52$
	8 weeks of MT vs. 16 weeks of MT	$ns, p > .05$	large, $r = .64$
	16 weeks of MT vs. 8 weeks FU	$ns, p > .05$	large, $r = .51$

The main findings from the immediate memory recall data were as follows. Analysis of variance computations of the main results for the combined groups and the individual groups showed no statistical significance. The main effect size for the combined groups was small. However, when the groups' data were analysed separately, the data from group one yielded a large effect size and the data from group two yielded a very small effect size. This difference in effect size between the results of the two groups suggests that the treatment affected immediate memory recall differently for each group.

Contrasts of individual differences between measurement timepoints for the combined groups and the individual groups showed no statistically significant differences between pairs of measurement timepoints. The very small sample sizes ( $n = 3$  for group one,  $n = 5$  for group two, and  $n = 8$  for the groups combined) contributed to this lack of statistical significance.

Both group one and group two showed an increase in mean scores for immediate memory recall from BL to the timepoint eight weeks after the end of treatment. This suggests that there may have been some benefit in immediate memory recall.

For the combined groups, the difference between eight weeks of music therapy and baseline showed a small effect size, and the difference between 16 weeks of music therapy and baseline showed a medium effect size.

When the groups' data were analysed separately, both groups showed increases in effect size with increasing length of treatment. This indicates that increasing the dosage of MT increased the effect of treatment.

The data did not show ceiling effects. However, potential order effects may have resulted from improvements in memory recall from the MT timepoints being carried over into the SC timepoints for group two.

Analysis of the comparisons between different conditions and BL for group two showed that 16 weeks of MT was more effective than eight weeks of SC, whereas eight weeks of MT was less effective. This might suggest a minimum dosage of 16 weeks of MT to perceive improvements in immediate memory recall.

It was not possible to analyse the effect of between-session practice on immediate memory recall due to insufficient data about the self-led practice.

## 4.5 Mood states

Sections 4.5.1 to 4.5.4 present the data analysis of the mood states data for the combined groups. The raw data for outcome measurements of mood states are presented in Appendix 6.

### 4.5.1 Agreeable-hostile

Figure 4.7 and table 4.32 show the descriptive statistics for agreeable-hostile mood state.

Figure 4.7: Combined scores comparing measures of agreeable-hostile mood state taken at different timepoints

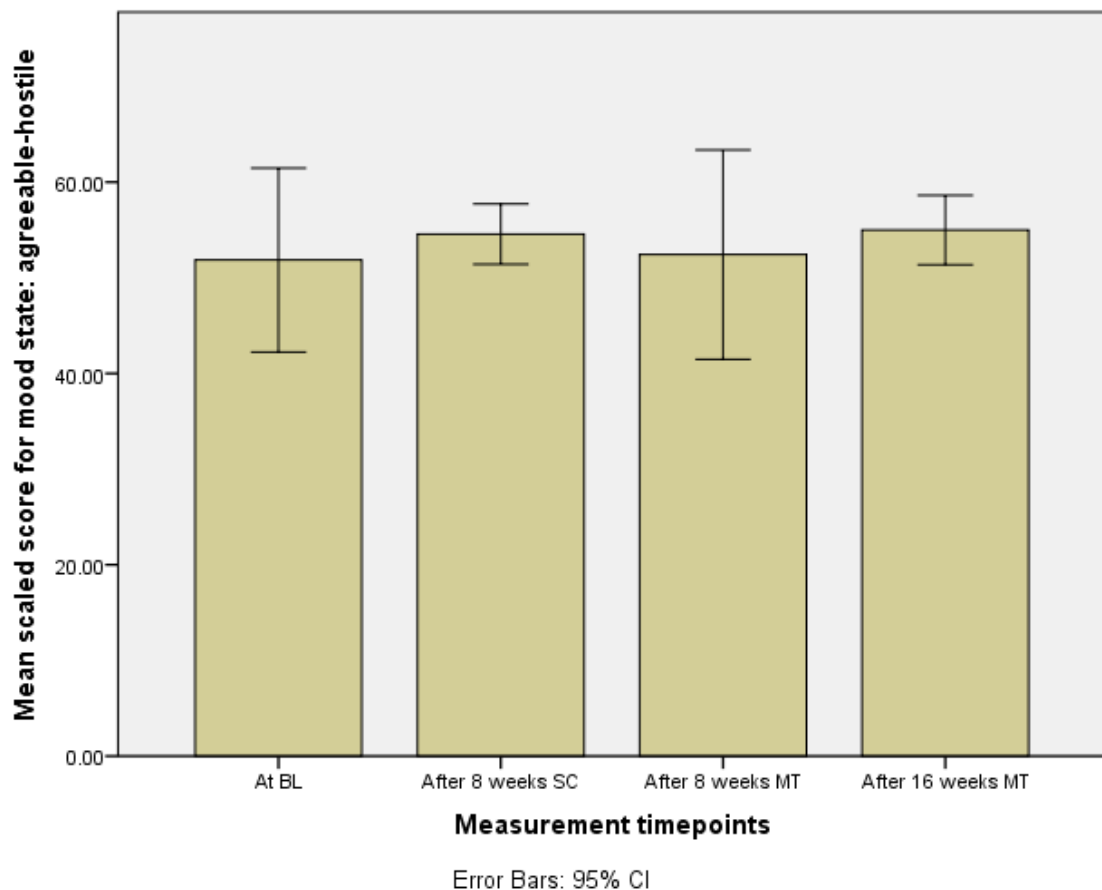


Figure 4.7 presents the mean scores for each timepoint with error bars representing the confidence limits. Values on the y-axis are interpreted as a low value representing a more hostile mood state and a higher value representing a more agreeable mood state.

Table 4.32: Descriptive statistics for combined scores comparing measures of agreeable-hostile mood state taken at different timepoints

Measurement timepoints	Mean	Std. Deviation	N
At BL	51.857	10.399	7
After 8 weeks SC	54.571	3.409	7
After 8 weeks MT	52.429	11.830	7
After 16 weeks MT	55.000	3.916	7

The above bar chart and table show that the mean scores at different timepoints vary only slightly. The mean values show a slight increase from BL to eight weeks of SC, followed by a small decrease from eight weeks of SC to eight weeks of MT, and a small increase from eight weeks of MT to 16 weeks of MT. The largest increase seems to be a small increase from BL to 16 weeks of MT. The mean score after 16 weeks of MT is only slightly higher than that after eight weeks of SC. The error bars indicate that the results of the analysis of variance may not reach statistical significance.

Table 4.33: Mauchly's Test of Sphericity for combined scores comparing measures of agreeable-hostile mood state taken at different timepoints

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.269	6.199	5	.296	.579	.794	.333

From table 4.33 Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,  $\chi^2(5) = 6.199, p = .296$ . Therefore, sphericity was assumed in table 4.34.



Table 4.34: ANOVA of within-participant effects for combined scores comparing measures of agreeable-hostile mood state taken at different timepoints

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Sphericity Assumed	50.679	3	16.893	.429	.735
Error	Sphericity Assumed	708.571	18	39.365		

The results in table 4.34 show that, overall, the differences between the scores of agreeable-hostile mood state at each timepoint were not statistically significant,  $F(3, 18) = .43, p > .05$ . Therefore, the scores for agreeable-hostile mood state were not affected significantly by treatment condition.

Order effects were not investigated for the data for mood state because the data for the combined groups did not suggest that mood state had been affected by the order of the various treatment conditions, i.e. there was not a notable increase from the mean score at BL to that after eight weeks of SC compared with increases from BL to eight weeks of MT or 16 weeks of MT.

#### 4.5.2 Composed-anxious

Figure 4.8 and table 4.35 show the descriptive statistics for composed-anxious mood state.

Table 4.35: Descriptive statistics for combined scores comparing measures of composed-anxious mood state taken at different timepoints

Measurement timepoints	Mean	Std. Deviation	N
At BL	52.857	7.647	7
After 8 weeks SC	53.714	6.075	7
After 8 weeks MT	51.429	9.108	7
After 16 weeks MT	54.143	6.890	7

Figure 4.8: Combined scores comparing measures of composed-anxious mood state taken at different timepoints

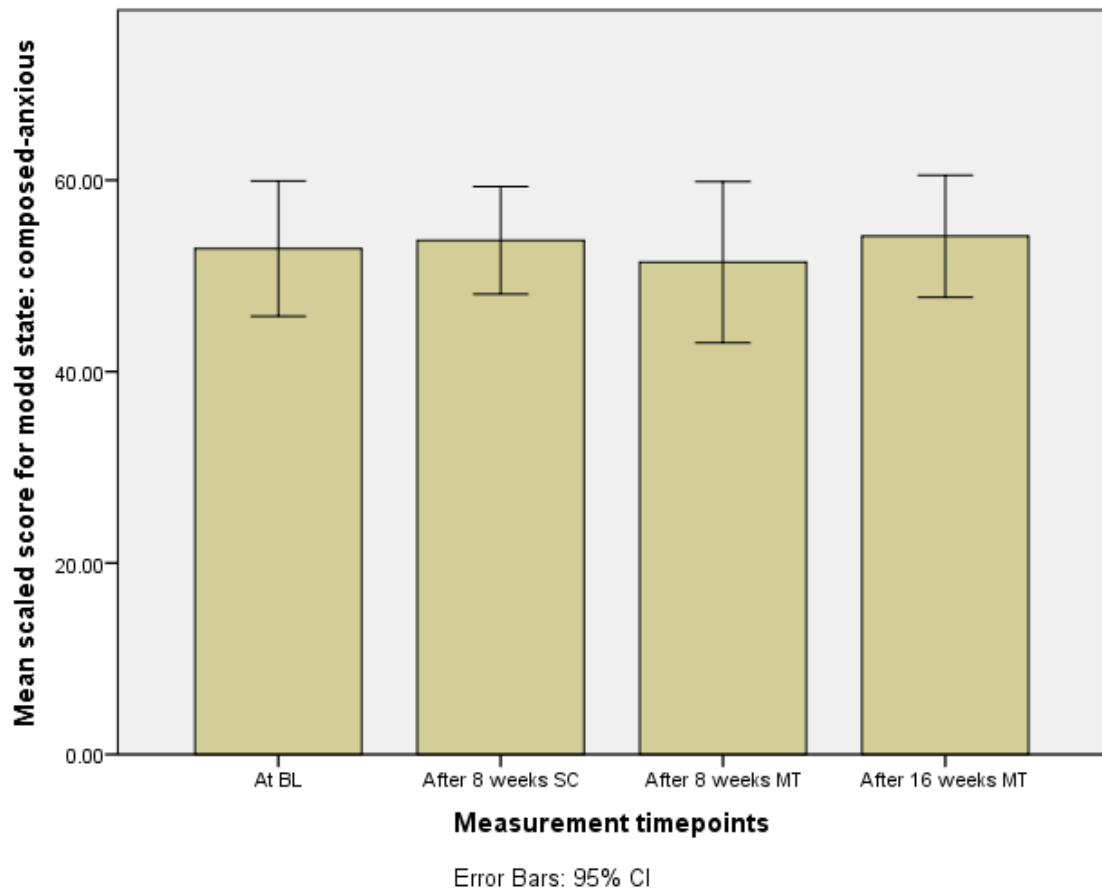


Figure 4.8 presents the mean scores for each timepoint with error bars representing the confidence limits. Values on the y-axis are interpreted as a low value representing a more anxious mood state and a higher value representing a more composed mood state.

Figure 4.8 and table 4.35 show that the mean scores at different timepoints vary only slightly. The mean values show a very slight increase from BL to eight weeks of SC, followed by a small decrease from eight weeks of SC to eight weeks of MT, and a small increase from eight weeks of MT to 16 weeks of MT. The highest mean value is shown at 16 weeks of MT. The error bars indicate that the results of the analysis of variance may not reach statistical significance.

Table 4.36: Mauchly's Test of Sphericity for combined scores comparing measures of composed-anxious mood state taken at different timepoints

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.069	12.652	5	.030	.421	.481	.333

From table 4.36 Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated,  $\chi^2(5) = 12.652, p = .03$ . Therefore, the Greenhouse-Geisser correction was used in table 4.37.

Table 4.37: ANOVA of within-participant effects for combined scores comparing measures of composed-anxious mood state taken at different timepoints

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Greenhouse-Geisser	30.107	1.263	23.845	.505	.541
Error	Greenhouse-Geisser	357.643	7.576	47.210		

Table 4.37 shows that the differences between the scores of composed-anxious mood state at each timepoint were not statistically significant,  $F(1.263, 7.576) = .505, p > .05$ .

Therefore, the scores for composed-anxious mood state were not affected significantly by treatment condition. Order effects were not investigated because they were not considered to be present, as explained in section 4.5.1.

### 4.5.3 Elated-depressed

Figure 4.9 and table 4.38 show the descriptive statistics for elated-depressed mood state.

Figure 4.9: Combined scores comparing measures of elated-depressed mood state taken at different timepoints

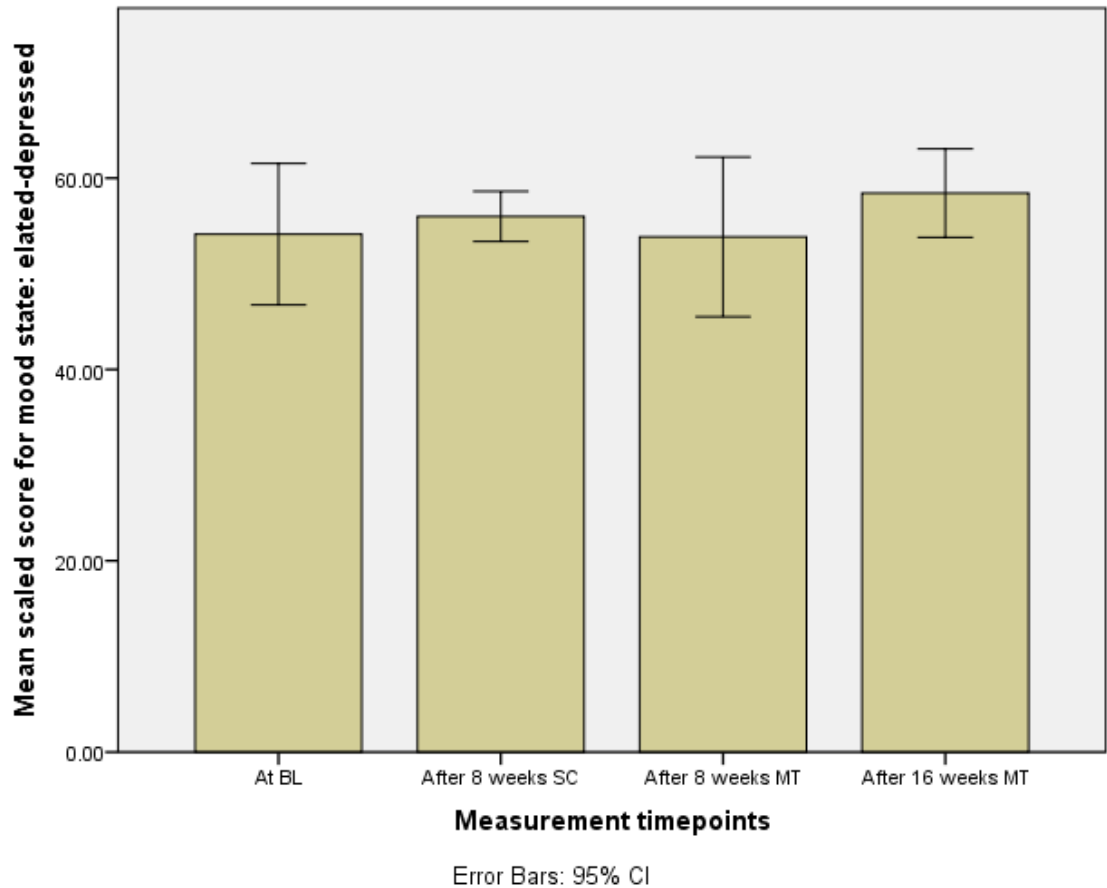


Figure 4.9 presents the mean scores for each timepoint with error bars representing the confidence limits. Values on the y-axis are interpreted as a low value representing a more depressed mood state and a higher value representing a more elated mood state.

Table 4.38: Descriptive statistics for combined scores comparing measures of elated-depressed mood state taken at different timepoints

Measurement timepoints	Mean	Std. Deviation	N
At BL	54.143	7.988	7
After 8 weeks SC	56.000	2.828	7
After 8 weeks MT	53.857	9.026	7
After 16 weeks MT	58.429	4.995	7

Figure 4.9 and table 4.38 show that the mean scores at different timepoints vary slightly.

The mean values show a very slight increase from BL to eight weeks of SC, followed by a

small decrease from eight weeks of SC to eight weeks of MT, and an increase from eight weeks of MT to 16 weeks of MT. The highest mean value is shown at 16 weeks of MT. The error bars indicate that the results of the analysis of variance may not reach statistical significance.

Table 4.39: Mauchly's Test of Sphericity for combined scores comparing measures of elated-depressed mood state taken at different timepoints

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.375	4.635	5	.470	.733	1.000	.333

From table 4.39 Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,  $\chi^2(5) = 4.635, p = .47$ . Therefore, sphericity was assumed in table 4.40.

Table 4.40: ANOVA of within-participant effects for combined scores comparing measures of elated-depressed mood state taken at different timepoints

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Sphericity Assumed	93.250	3	31.083	1.626	.218
Error(	Sphericity Assumed	344.000	18	19.111		

The results in table 4.40 show that, overall, the differences between the scores of elated-depressed mood state at each timepoint were not statistically significant,  $F(3, 18) = .43, p > .05$ . Therefore, the scores for elated-depressed mood state were not affected significantly by treatment condition. Order effects were not considered to be present, so no further analysis was conducted.

#### 4.5.4 Energetic-tired

Figure 4.10 and table 4.41 show the descriptive statistics for energetic-tired mood state.

Figure 4.10: Combined scores comparing measures of energetic-tired mood state taken at different timepoints

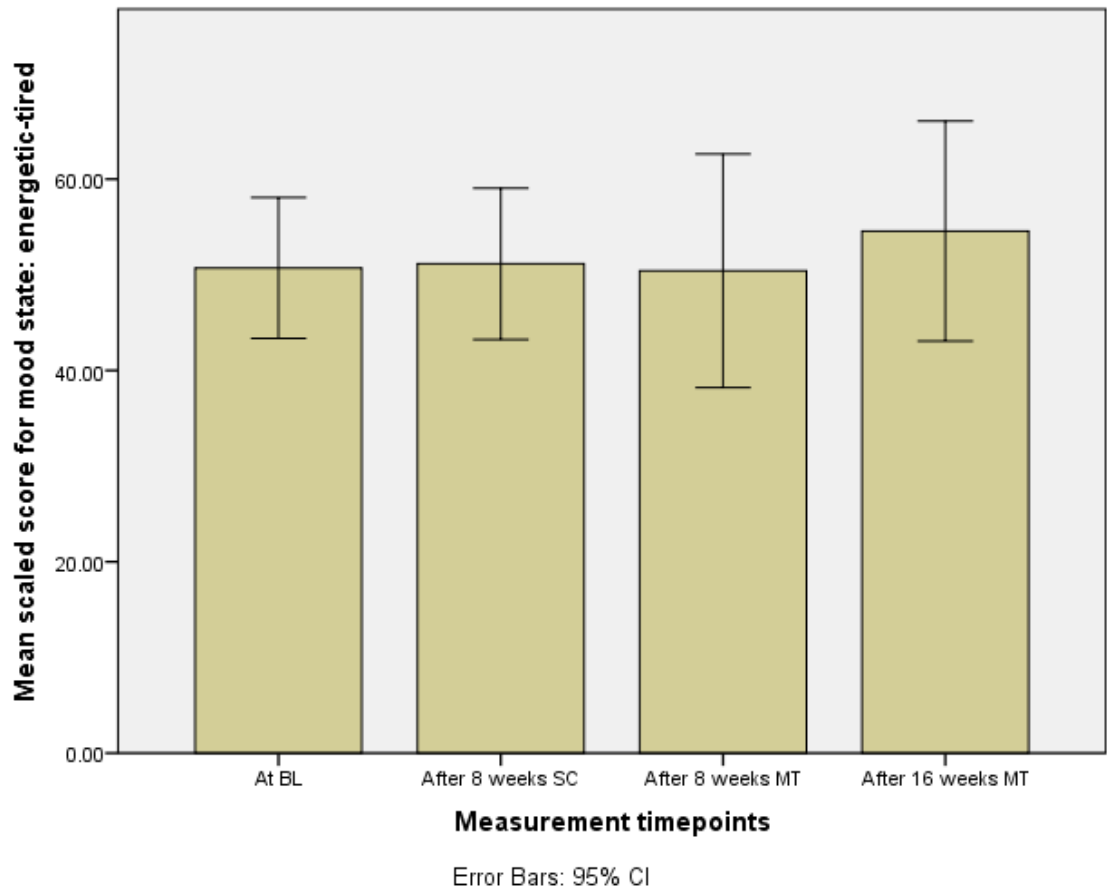


Figure 4.10 presents the mean scores for each timepoint with error bars representing the confidence limits. Values on the y-axis are interpreted as a low value representing a more tired mood state and a higher value representing a more energetic mood state.

Table 4.41: Descriptive statistics for combined scores comparing measures of energetic-tired mood state taken at different timepoints

Measurement timepoints	Mean	Std. Deviation	N
At BL	50.714	7.952	7
After 8 weeks SC	51.143	8.552	7
After 8 weeks MT	50.429	13.202	7
After 16 weeks MT	54.571	12.435	7

Figure 4.10 and table 4.41 show that the mean scores at different timepoints vary slightly. The mean values show a very slight increase from BL to eight weeks of SC, followed by a small decrease from eight weeks of SC to eight weeks of MT, and an increase from eight weeks of MT to 16 weeks of MT. The highest mean value is shown at 16 weeks of MT. The error bars indicate that the results of the analysis of variance may not reach statistical significance.

Table 4.42: Mauchly's Test of Sphericity for combined scores comparing measures of energetic-tired mood state taken at different timepoints

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Measurement timepoints	.472	3.547	5	.623	.766	1.000	.333

From table 4.42 Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,  $\chi^2(5) = 3.547, p = .623$ . Therefore, sphericity was assumed in table 4.43.

Table 4.43: ANOVA of within-participant effects for combined scores comparing measures of energetic-tired mood state taken at different timepoints

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Measurement timepoints	Sphericity Assumed	78.000	3	26.000	.759	.532
Error	Sphericity Assumed	617.000	18	34.278		

The results in table 4.43 show that, overall, the differences between the scores of energetic-tired mood state at each timepoint were not statistically significant,  $F(3, 18) = .759, p > .05$ . Therefore, the scores for energetic-tired mood state were not affected significantly by treatment condition. Order effects were not investigated because they were not considered to be present.

#### **4.5.5 Summary of mood states data analysis**

The main findings from the mood states data analysis were as follows. For each of the four mood states, the mean scores were highest at the end of treatment compared with those at BL and all other measurement timepoints. Thus, mean scores showed that the participants felt more agreeable, more composed, more elated, and more energetic after 16 weeks of MT compared to 8 weeks of SC, 8 weeks of MT, and BL. These differences were very small and were not statistically significant. The mean scores for each mood state showed the same pattern: a rise from BL to 8 weeks of SC followed by a fall after 8 weeks of MT followed by a rise after 16 weeks of MT. This may be linked to the therapeutic process in which participants increase self-awareness and gain insight. This pattern is also observed in the groups' combined scores for sustained attention (4.3.1) and immediate memory recall (4.4.1).



## 4.6 Emotional needs

The data analyses from the pre-post session measures of the six VASEN are presented in this section. The raw data are presented in Appendix 6. The six items of the VASEN are presented in sections 4.6.1-4.6.6. Although eight participants remained in the experiment until completion, the data from one participant (P9) was removed from the analysis. The exclusion of this participant's data was due to a pattern in the data suggesting that the participant was unable to use the VASEN due to impairments in cognition or a lack of capacity to self-evaluate. This was evident in P9 reporting extremely high values (between nine and ten) for all six domains of the VASEN both pre- and post-session for 13 of 16 sessions in the block of treatment. Figures 4.11 and 4.12 present the raw scores for the eight participants for the domain 'feeling part of a group'.

Figure 4.11: Comparison of pre-session raw scores for participants for 'feeling part of a group'

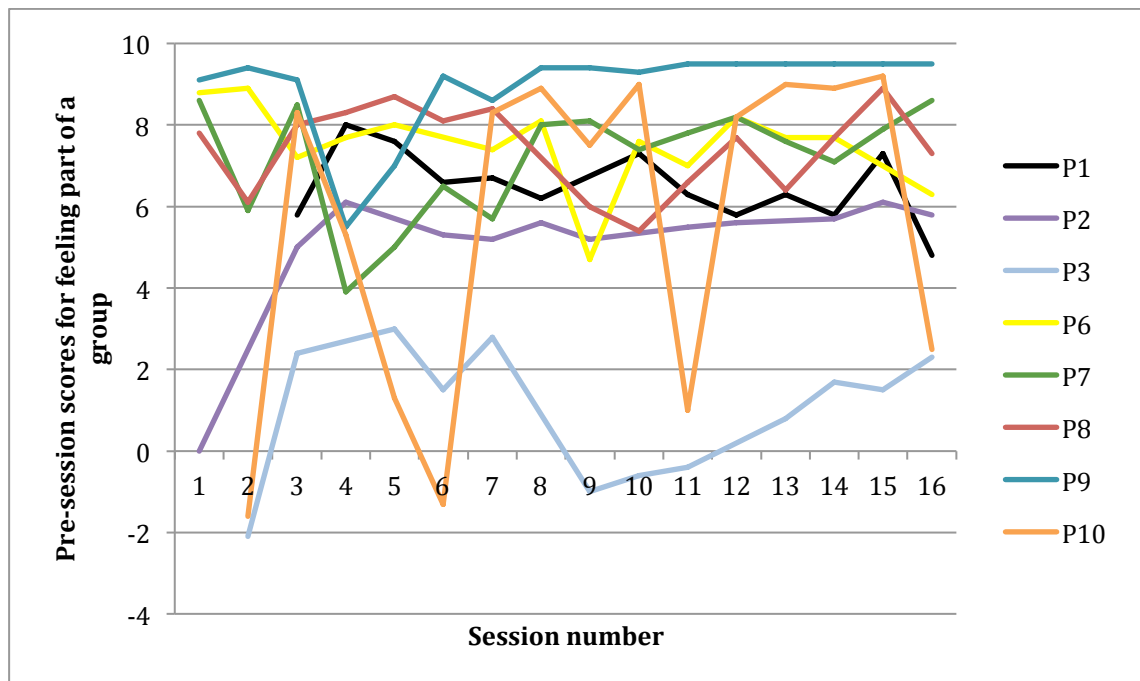


Figure 4.11 shows the pre-session scores for the eight participants. All other participants' scores showed fluctuations in the satisfaction of emotional needs, whereas P9's scores

remained high and fairly constant. P9's data showed decreases in sessions four and five. This is difficult to explain when the raw data from the other participants do not reflect this anomaly in P9's data. Figure 4.12 presents the post-session scores for all eight participants.

Figure 4.12: Comparison of post-session raw scores for participants for 'feeling part of a group'

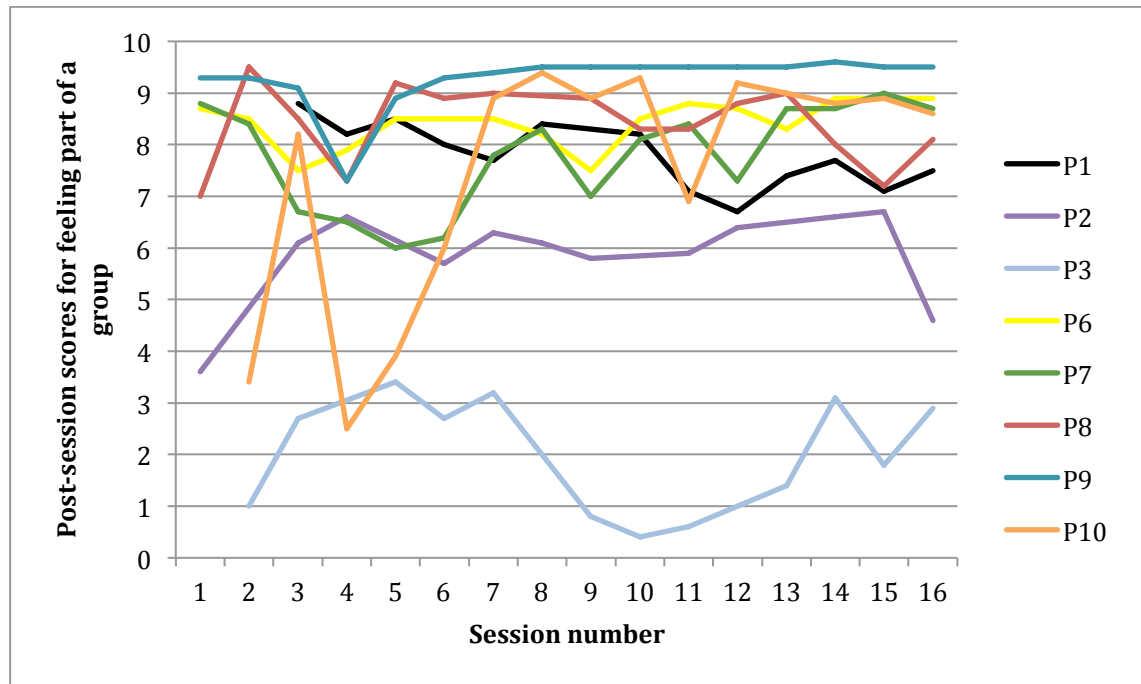
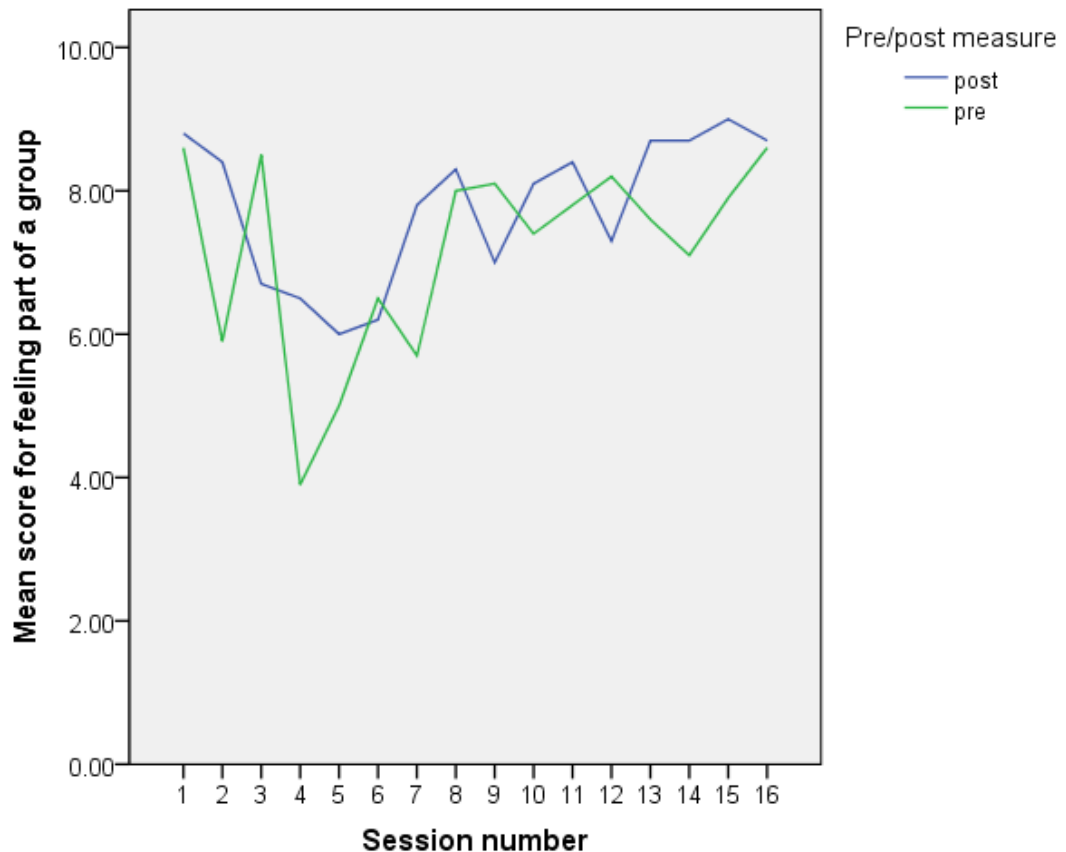


Figure 4.12 shows a similar pattern to the one presented in figure 4.11. P9's scores were extremely high and fairly constant between sessions. There is a small decrease in sessions four and five. However, this decrease is less than that observed for the pre-session data. This may suggest that P9 experienced a greater feeling of belonging immediately after sessions four and five compared to before them. The same pattern was observed in the other five domains. This analysis suggests that the Hawthorne effect may be confounding P9's raw scores. Therefore, P9's VASEN data was removed from further analysis in order to reduce the risk of confounding due to the Hawthorne effect.

### 4.6.1 Feeling part of a group

Figure 4.13 shows the mean values over the music therapy treatment period for pre-session and post-session outcomes in the domain ‘feeling part of a group’.

Figure 4.13: Comparison of pre-session and post-session mean scores for ‘feeling part of a group’



The figure above shows that post-session scores were generally higher than pre-session scores. This indicates that participants had a greater sense of belonging immediately after the music therapy sessions than immediately before them. The post-session scores generally seem to track, i.e. match the shape of, the pre-session scores. As the post-session scores were collected about one hour after the pre-session scores, and the pre-session scores were not available to the participants when reporting their post-session scores, it is reasonable to assume that the post-session scores are not confounded by knowledge about the pre-session scores. It is unlikely that the participants remembered their exact scores for

each of the domains of the VASEN because they all had memory impairments and it would require a high level of memory functioning to do this. This suggests a reasonable level of validity of the VASEN for use with this population for the purpose of self-reporting satisfaction of emotional needs. There are sharp fluctuations in pre-session scores in the first four sessions. The post-session scores do not fluctuate in the same way over this period of time, but show a fairly sharp decrease. This initial fluctuation and general decrease in scores may be due to the development of insight provoked in therapy. The fluctuations in scores become less dramatic from session seven onwards, and the pre- and post-session scores reach high values between sessions 14 and 16.

Table 4.44 presents the data for the delta values calculated from subtraction of the post-session values from the pre-session values. It also presents the numbers of participants reporting positive and negative changes in scores for ‘feeling part of a group’.

Table 4.44: Table of delta values for feeling part of a group

	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mean +ve	1.9	3.5	1.04	0.88	0.98	2.22	0.99	0.72	1.9	1.12	1.74	0.86	1.2	1.22	0.67	2.15
Mean -ve	-0.45	-0.4	-0.95	-1.9	0	-0.3	0	0	-1.1	0	0	-0.9	0	-0.1	-0.73	-1.2
Count +ve	2	4	5	4	6	5	7	5	5	6	7	5	5	6	3	6
Count -ve	2	1	2	2	0	1	0	0	1	0	0	1	0	1	3	1

The data from the table is presented in figures 4.14 and 4.15. Figure 4.14 shows the frequency distribution of positive and negative delta values for ‘feeling part of a group’. The frequency distribution plots the number of participants against the number of sessions. The delta values resulted from subtracting the post-session scores from the pre-session ones for each participant pre session. Then, the number of participants were counted and divided into two groups: those producing positive delta values, and those producing negative ones.

Figure 4.14: Frequency distribution of positive versus negative changes for ‘feeling part of a group’

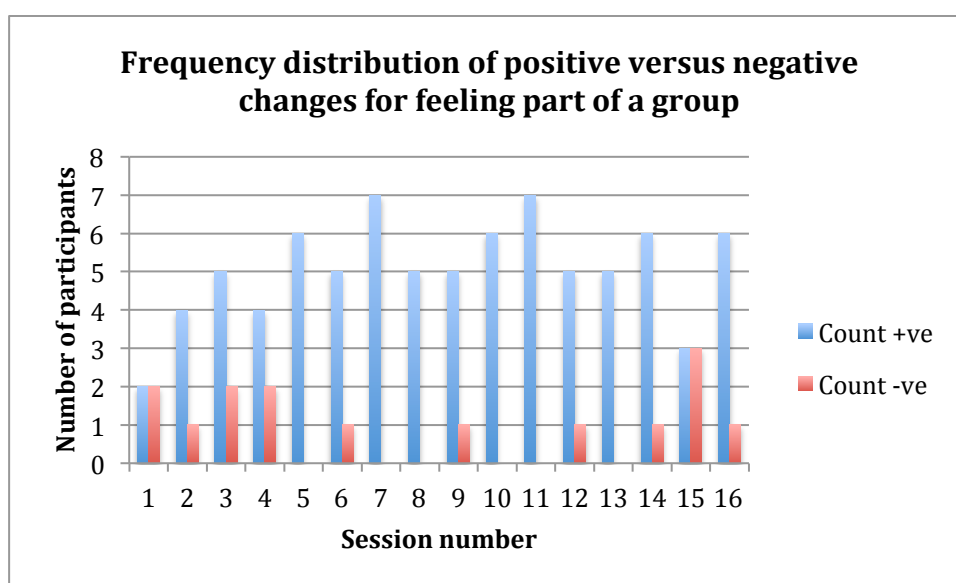
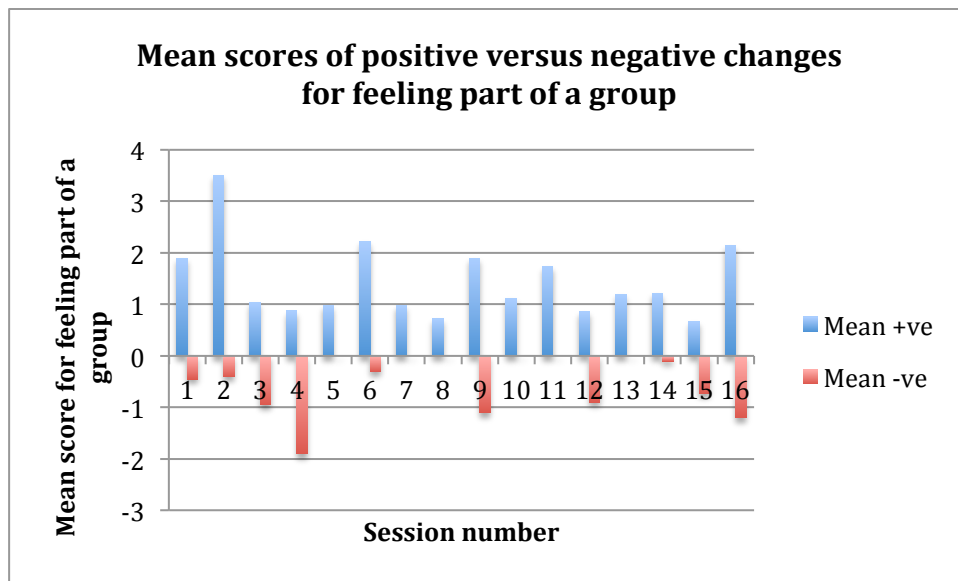


Figure 4.14 and table 4.44 show that for 14 of 16 sessions (87.5%) the majority of participants felt more part of a group (less socially isolated) following the music therapy sessions than they did before the sessions. In six sessions (37.5%) there were only positive changes in ‘feeling part of a group’. For the first and 15<sup>th</sup> sessions equal numbers of participants reported positive and negative changes in ‘feeling part of a group’. Figure 4.15 compares the mean scores for the positive and the negative changes for ‘feeling part of a group’, and plots them against the number of sessions.

Figure 4.15: Frequency distribution of mean scores of positive versus negative changes for ‘feeling part of a group’



The data in figure 4.15 and table 4.44 suggest that for 13 of 16 sessions (81.3%) the mean scores of positive changes were greater than the mean scores of the negative changes. This suggests that, overall, feelings of being part of a group increased post-session compared to pre-session. Table 4.45 presents the data comparing pre-session and post-session measurements for ‘feeling part of a group’ from the mixed models analysis.

Table 4.45: Descriptive statistics for immediate effects of music therapy on ‘feeling part of a group’

Measurement timepoint	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-session	6.412	.887	5.986	4.240	8.584
Post-session	7.103	.886	5.964	4.931	9.275

The above table presents the estimated marginal means and confidence intervals of pre-session and post-session measurements to determine the immediate effect of music therapy on ‘feeling part of a group’. It shows that the mean post-session score was higher than the mean pre-session score. The confidence intervals for the two means overlap and might suggest that the data will not show statistical significance. Table 4.46 presents the results

from the mixed models analysis carried out on the pre- and post-session data for ‘feeling part of a group’.

Table 4.46: Type III Tests of fixed effects for the immediate effects of music therapy on ‘feeling part of a group’

Source	Numerator df	Denominator df	F	Sig.
Pre_post	1	63.323	37.458	.000

The results from table 4.46 show that the immediate effects of music therapy on scores for ‘feeling part of a group’ were statistically significant  $F(1, 63.323) = 37.458, p < .05$ .

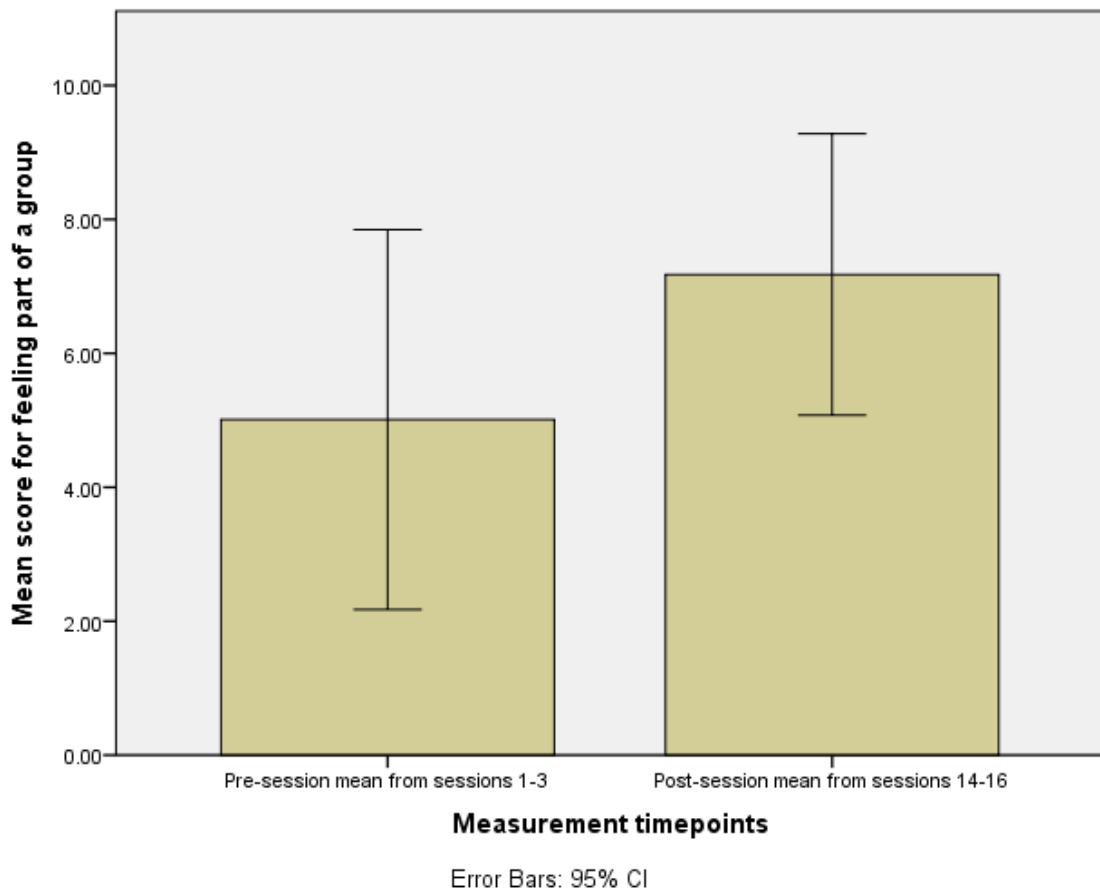
Table A7.13 in Appendix shows the values used in the effect size calculation for the immediate effects of treatment on ‘feeling part of a group’. The table shows a medium effect size,  $d = .74$ , for the immediate effect of treatment on ‘feeling part of a group’. Table 4.47 and figure 4.16 present the data from the post-hoc analysis of the data for ‘feeling part of a group’. The table and bar chart show the pre-analysis descriptive statistics for the data.

Table 4.47: Descriptive statistics for short-term effects of music therapy on ‘feeling part of a group’

Measurement timepoint	Mean	Std. Deviation	N
Pre-session	5.010	3.067	7
Post-session	7.177	2.272	7

The mean value for the end of treatment is higher than that for the beginning of treatment. This suggests that participants felt more part of a group at the end of treatment compared to the beginning of treatment.

Figure 4.16: Short-term effects of music therapy on ‘feeling part of a group’



The error bars in the bar chart indicate that statistical significance may not have been reached. However, an analysis of variance was conducted to determine the  $F$ -statistic and statistical significance. Sphericity tests were not included because only two conditions (measurement timepoints) were used: pre-session mean from sessions 1-3, and post-session mean from sessions 14-16.

Table 4.48: Tests of within-subjects effects for short-term effects of music therapy on ‘feeling part of a group’

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size $r$
Measurement timepoints	Sphericity Assumed	16.438	1	16.438	10.350	.018	.795
Error (Measurement timepoints)	Sphericity Assumed	9.529	6	1.588			



The results from table 4.48 show that the short-term effects of music therapy on scores for ‘feeling part of a group’ were statistically significant  $F(1, 6) = 10.35, p < .05, r = .80$ . So, the effect size calculated for the immediate effect of music therapy for ‘feeling part of a group’ is large.

#### 4.6.2 Feeling confident

Figure 4.17 shows the mean values over the music therapy treatment period for pre-session and post-session outcomes in the domain ‘feeling confident’.

Figure 4.17: Comparison of pre-session and post-session mean scores for ‘feeling confident’

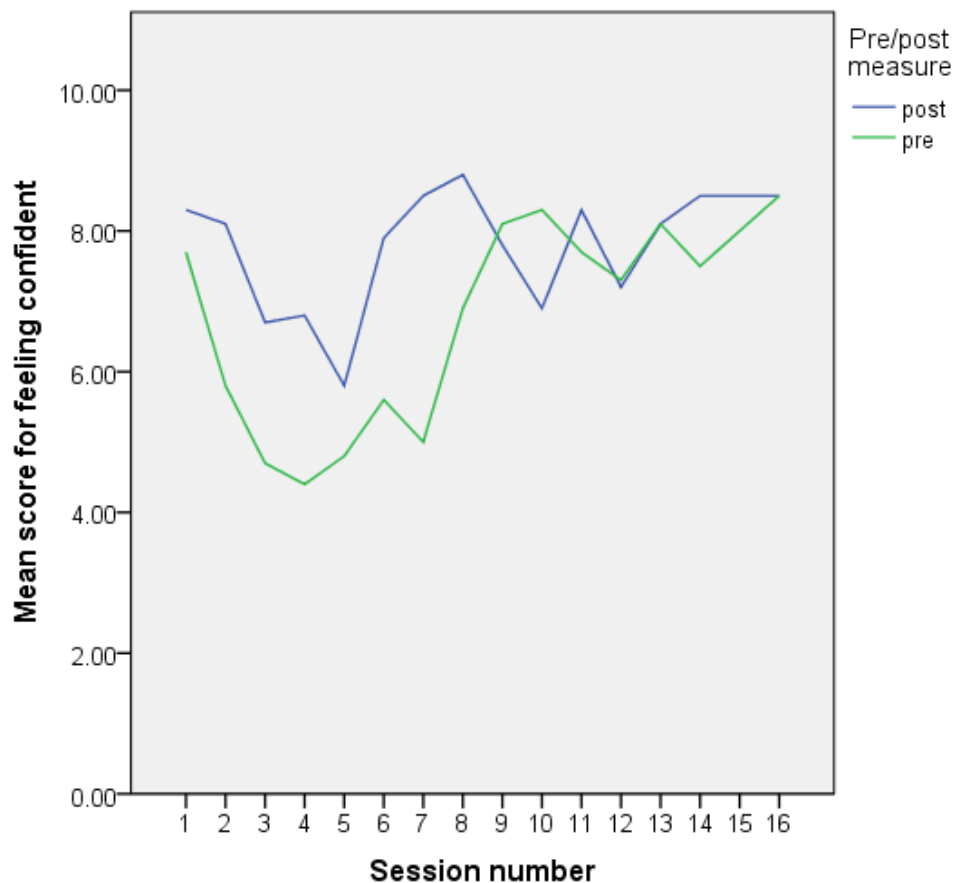


Figure 4.17 shows that the post-session scores were generally higher than pre-session scores. This indicates that participants felt more confident immediately after the music therapy sessions than immediately before them. As with the data for ‘feeling part of a

group', the post-session scores generally seem to track the pre-session scores. Therefore, this suggests a high level of validity of the VASEN for use with this population for the purpose of self-reporting satisfaction of emotional needs. There are sharp decreases in pre-session and post-session scores in the first three sessions. These initial decreases in scores may be linked to the development of insight provoked in therapy, as mentioned in section 4.6.1. The pre-session and post-session mean scores reached their lowest values in sessions four and five respectively. Then, both mean scores show rises in values reaching their peaks in session ten, for pre-session measures, and session eight, for post-session measures. The scores then show fluctuations that diminish in range towards session 16. Table 4.49 presents the data for the delta values for 'feeling confident'. It presents the numbers of participants reporting positive and negative changes in scores for 'feeling confident', and the mean values for positive and negative changes in this domain.

Table 4.49: Table of delta values for 'feeling confident'

	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mean +ve	2.67	2.13	3	3.95	2.42	1.97	1.31	1.85	3.14	1.375	1.56	1	0.96	1.69	1.58	1.97
Mean -ve	-3.5	0	-0.53	-0.45	-0.2	0	0	-9.9	-0.3	-2.25	-0.85	-0.1	0	0	0	-2.17
Count +ve	3	4	3	4	5	6	7	4	5	4	5	5	5	7	6	3
Count -ve	1	0	4	2	1	0	0	1	1	2	2	1	0	0	0	3

The data from the table is presented in figures 4.18 and 4.19. Figure 4.18 shows the frequency distribution of positive and negative delta values for 'feeling confident'. The frequency distribution plots the number of participants against the number of sessions. The delta values resulted from subtracting the post-session scores from the pre-session ones for each participant pre session. Then, the number of participants were counted and divided into two groups: those producing positive delta values, and those producing negative ones.

Figure 4.18: Frequency distribution of positive versus negative changes for ‘feeling confident’

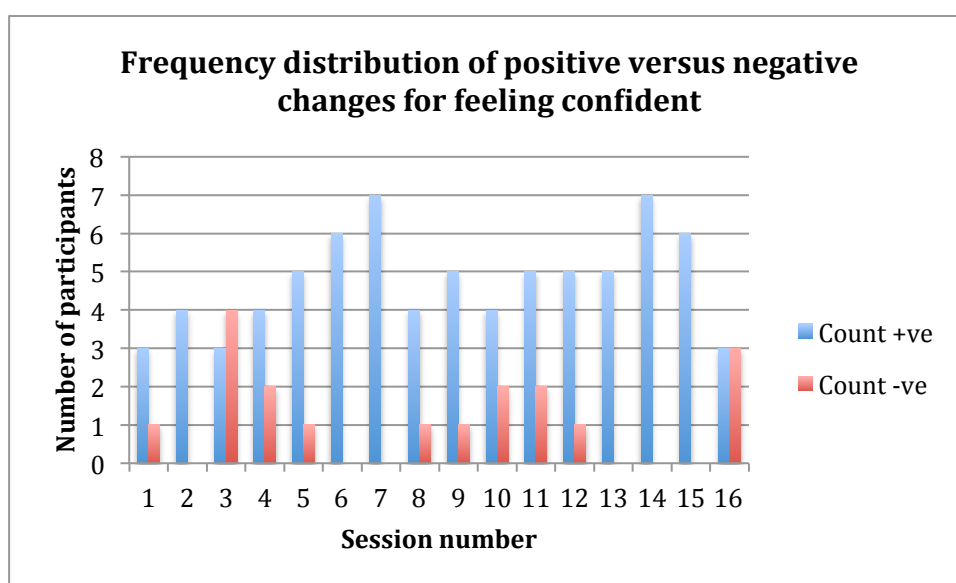
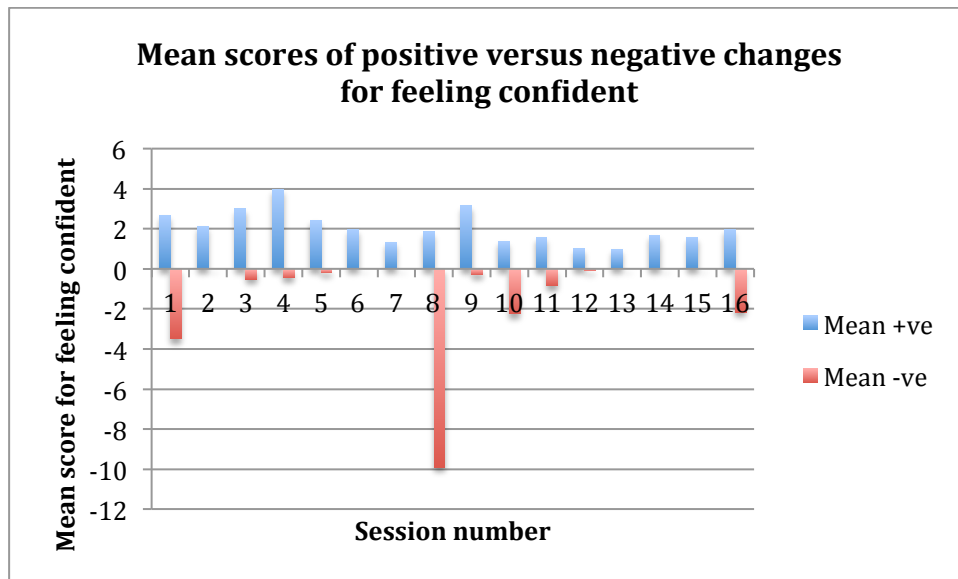


Figure 4.18 and table 4.49 show that for 14 of 16 sessions (87.5%) the majority of participants felt more confident following the music therapy sessions than they did before the sessions. In six sessions (37.5%) only positive changes were reported in ‘feeling confident’. For the 16<sup>th</sup> session equal numbers of participants reported positive and negative changes in ‘feeling confident’. In the third session more participants reported feeling less confident following the session compared to before the session.

Figure 4.19 compares the mean scores for the positive and the negative changes for ‘feeling confident’, and plots them against the number of sessions.

Figure 4.19: Frequency distribution of mean scores of positive versus negative changes for ‘feeling confident’



The data in figure 4.19 and table 4.49 suggest that for 12 of 16 sessions (75%) the mean scores of positive changes were greater than the mean scores of the negative changes. This suggests that, overall, feelings of confidence increased post-session compared to pre-session. In session eight the mean decrease in confidence was much greater than the mean increase. Session eight represents a halfway point in treatment and coincided with a seasonal break at Christmas for one of the groups. For both groups, assessments of attention, memory, and mood states were conducted the following week. Awareness of an approaching break from music therapy, imminent assessments, and thoughts about Christmastime may have contributed to increased anxiety and decreased confidence at the time of the eighth session. Table 4.50 presents the data comparing pre-session and post-session measurements for ‘feeling confident’ from the mixed models analysis of the data.

Table 4.50: Descriptive statistics for immediate effects of music therapy on ‘feeling confident’

Measurement timepoint	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-session	5.605	.827	6.138	3.592	7.617
Post-session	6.698	.822	5.994	4.686	8.710

The above table presents the estimated marginal means and confidence intervals of pre-session and post-session measurements to determine the immediate effect of music therapy on ‘feeling confident’. It shows that the mean post-session score was higher than the mean pre-session score. The confidence intervals for the two means overlap and might suggest that the data will not show statistical significance. Table 4.51 presents the results from the mixed models analysis carried out on the pre- and post-session data for ‘feeling confident’.

Table 4.51: Type III Tests of fixed effects for the immediate effects of music therapy on ‘feeling confident’

Source	Numerator df	Denominator df	F	Sig.
Pre_post	1	70.635	36.773	.000

The results from table 4.51 show that the immediate effects of music therapy on scores for ‘feeling confident’ were statistically significant  $F(1, 70.635) = 36.773, p < .05$ .

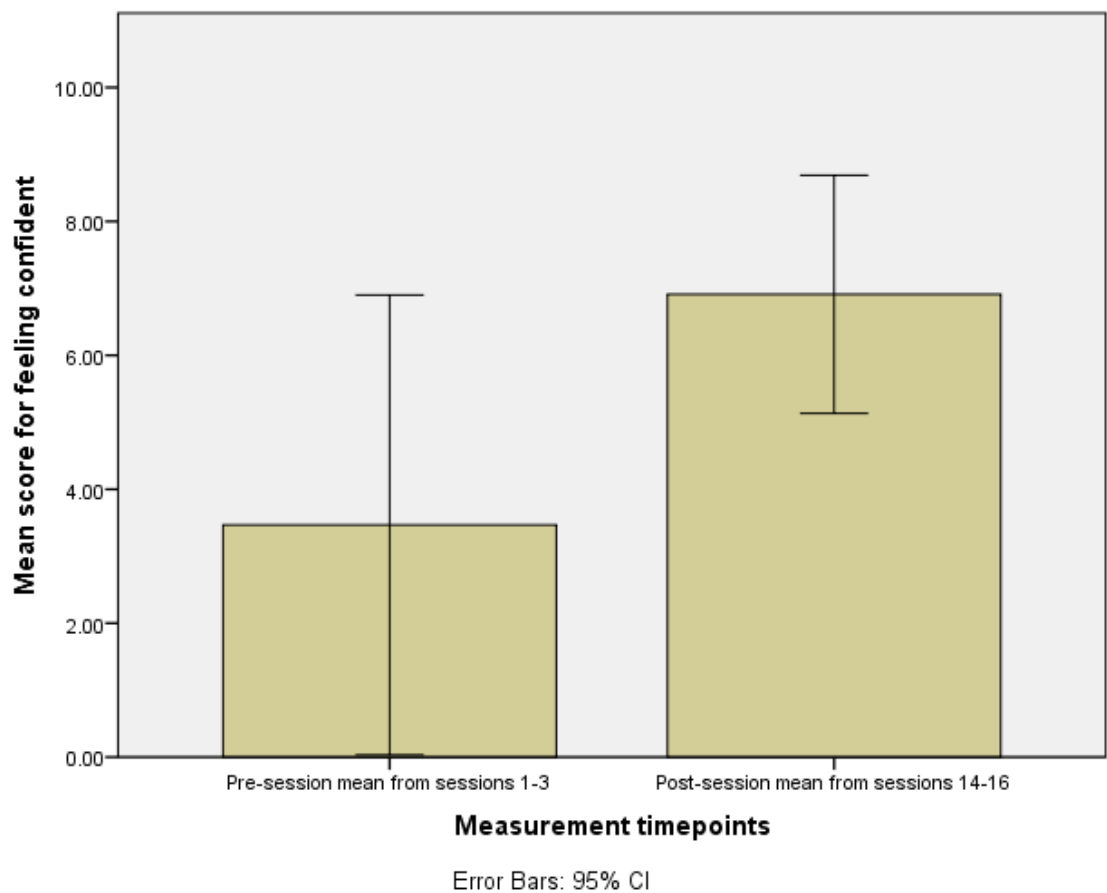
Table A7.14 in Appendix 7 shows the values used in the effect size calculation for the immediate effects of treatment on ‘feeling confident’. It shows a large effect size,  $d = .88$ , for the immediate effect of treatment on ‘feeling confident’. Table 4.52 and figure 4.20 present the data from the post-hoc analysis of the data for ‘feeling confident’. The table and bar chart show the pre-analysis descriptive statistics for the data.

Table 4.52: Descriptive statistics for short-term effects of music therapy on ‘feeling confident’

Measurement timepoint	Mean	Std. Deviation	N
Pre-session	3.467	3.715	7
Post-session	6.913	1.922	7

The mean value for the end of treatment is higher than that for the beginning of treatment. This suggests that participants felt more confident at the end of treatment compared to the beginning of treatment. The figure for the standard deviation of the data at the end of treatment is smaller than that for the beginning of treatment. This shows that there was less within-group variation in the scores towards the end of treatment than towards the beginning.

Figure 4.20: Short-term effects of music therapy on ‘feeling confident’



The error bars in the bar chart indicate wider variation in scores early in treatment compared with narrower variation in scores later in treatment. There is some overlap in the confidence intervals and this suggests that statistical significance may not have been reached. However, an analysis of variance was conducted to determine the *F*-statistic and statistical significance. Sphericity tests were not included, as for the analysis of variance of short-term effects in section 4.6.1.

Table 4.53: Tests of within-subjects effects for short-term effects of music therapy on ‘feeling confident’

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size <i>r</i>
Measurement timepoints	Sphericity Assumed	41.555	1	41.555	10.757	.017	.801
Error	Sphericity Assumed	23.179	6	3.863			

The results from table 4.53 show that the short-term effects of music therapy on scores for ‘feeling confident’ were statistically significant  $F(1, 6) = 10.76, p < .05, r = .80$ . So, the data showed a large effect size for the immediate effect of music therapy on ‘feeling confident’.

### **4.6.3 Feeling productive / useful**

Figure 4.21 shows the mean values over the music therapy treatment period for pre-session and post-session outcomes in the domain ‘feeling productive/useful’.

Figure 4.21: Comparison of pre-session and post-session mean scores for ‘feeling productive/useful’

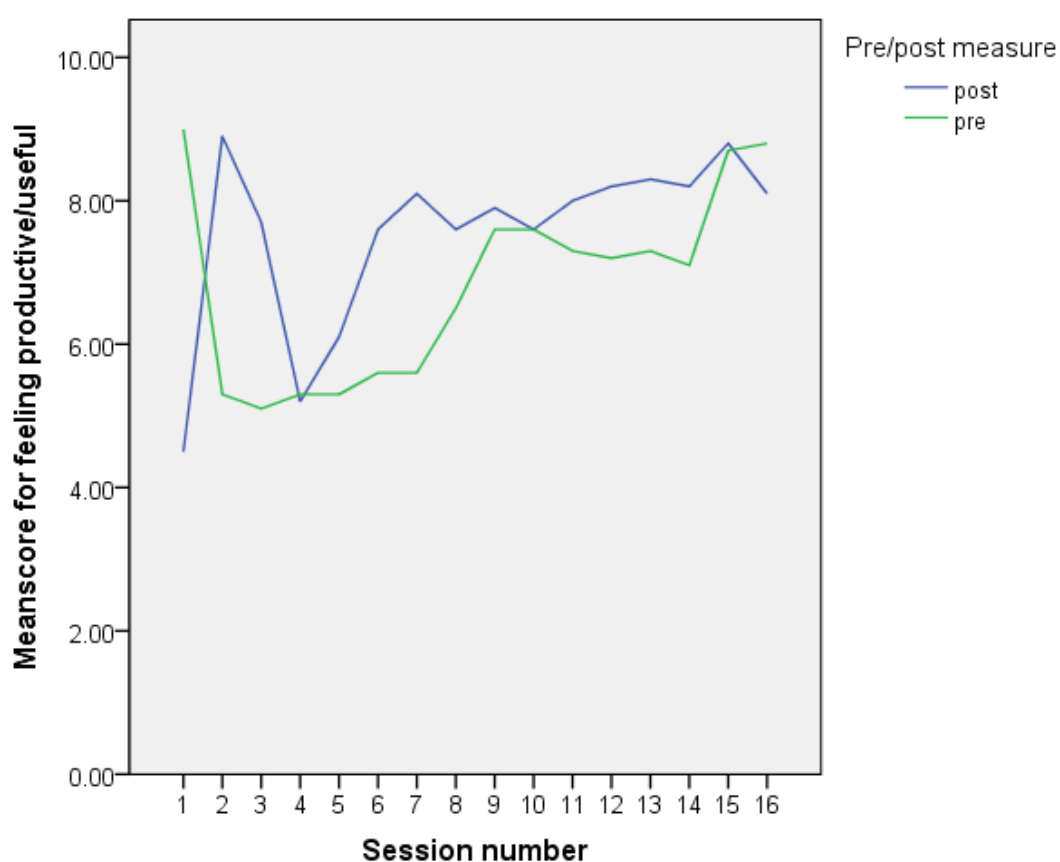


Figure 4.21 shows that the post-session scores were generally higher than pre-session scores. This indicates that participants generally felt more productive immediately after the music therapy sessions than immediately before them. The post-session scores do not seem to track the pre-session scores closely. This suggests that the post-session scores were not closely related to the pre-session scores. There is a sharp decrease in pre-session scores between the first and second sessions. This is accompanied by a sharp increase in the post-session scores between the same two sessions. These sharp fluctuations may be linked to the development of insight as participants become more aware of their ability to be productive. The pre-session mean score reached its lowest point in session three, and the post-session mean score reached their lowest value in session one. The highest values for



pre-session and post-session mean scores occurred in sessions one and two respectively. Both mean scores show rises in values from session four onwards with fluctuations that diminish in range towards as treatment progressed. Table 4.54 presents the data for the delta values for ‘feeling productive/useful’. It presents the numbers of participants reporting positive and negative changes, and the mean values for positive and negative changes in the domain.

Table 4.54: Table of delta values for ‘feeling productive/useful’

	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mean +ve	2.25	2.76	4.1	5.17	2.8	2.58	1.38	1.92	2.7	2.68	1.34	1.28	1.33	1.15	1.72	1.6
Mean -ve	-2.7	0	-1.97	-1.17	0	-0.3	-0.2	0	0	0	-4.6	0	0	-1.4	-0.5	-2.43
Count +ve	2	5	3	3	6	5	6	5	6	5	5	6	6	6	5	4
Count -ve	2	0	3	3	0	1	1	0	0	0	1	0	0	1	1	3

The data from the table is presented in figures 4.22 and 4.23. Figure 4.22 shows the frequency distribution of positive and negative delta values for ‘feeling productive/useful’. The frequency distribution plots the number of participants against the number of sessions. The delta values were calculated and grouped as in section 4.6.1.

Figure 4.22: Frequency distribution of positive versus negative changes for ‘feeling productive/useful’

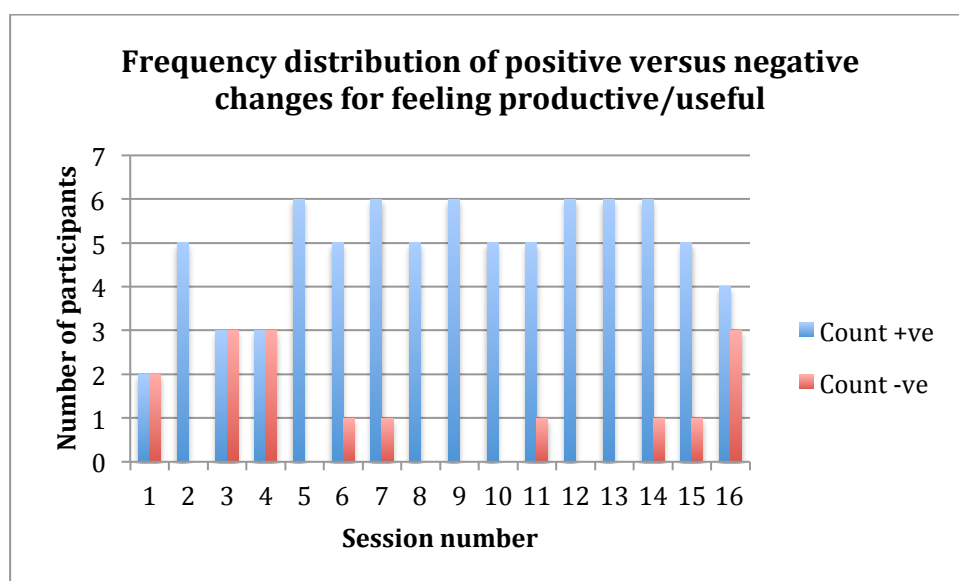
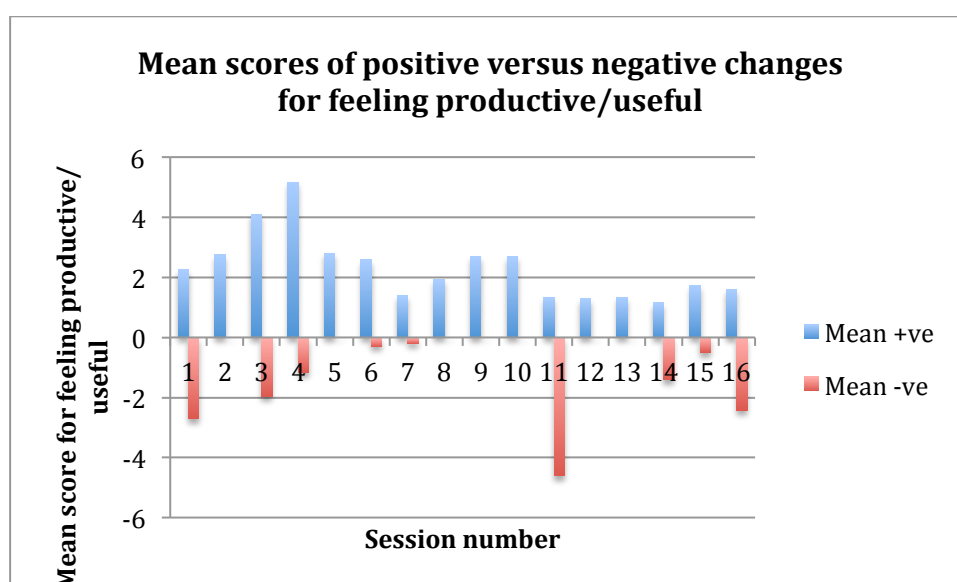


Figure 4.22 and table 4.54 show that for 13 of 16 sessions (81.3%) the majority of participants felt more productive following the music therapy sessions than they did before the sessions. In seven sessions (43.8%) only positive changes were reported for ‘feeling productive/useful’. For the first, third, and fourth sessions equal numbers of participants reported positive and negative changes for ‘feeling productive/useful’.

Figure 4.23 compares the mean scores for the positive and the negative changes for ‘feeling productive/useful’, and plots them against the number of sessions.

Figure 4.23: Frequency distribution of mean scores of positive versus negative changes for ‘feeling productive/useful’



The data in figure 4.23 and table 4.54 suggest that for 12 of 16 sessions (75%) the mean scores of positive changes were greater than the mean scores of the negative changes. This suggests that, overall, participants felt more productive post-session compared to pre-session. In session eleven the mean decrease in ‘feeling productive/useful’ was much greater than the mean increase. Table 4.55 presents the data comparing pre-session and post-session measurements for ‘feeling productive/useful’ from the mixed models analysis of the data.

Table 4.55: Descriptive statistics for immediate effects of music therapy on ‘feeling productive/useful’

Measurement timepoint	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-session	5.802	.842	6.216	3.760	7.844
Post-session	6.947	.833	5.978	4.905	8.988

The above table presents the estimated marginal means and confidence intervals of pre-session and post-session measurements to determine the immediate effect of music therapy on ‘feeling productive/useful’. It shows that the mean post-session score was higher than the mean pre-session score. The confidence intervals for the two means overlap and might suggest that the data will not show statistical significance. Table 4.56 presents the results from the mixed models analysis carried out on the pre- and post-session data for ‘feeling productive/useful’.

Table 4.56: Type III Tests of fixed effects for the immediate effects of music therapy on ‘feeling productive/useful’

Source	Numerator df	Denominator df	F	Sig.
Pre_post	1	53.692	45.539	.000

The results from table 4.56 show that the immediate effects of music therapy on scores for ‘feeling productive/useful’ were statistically significant  $F(1, 53.692) = 45.539, p < .05$ .

Table A7.15 in Appendix 7 shows the values used in the effect size calculation for the immediate effects of treatment on ‘feeling productive/useful’. It shows a large effect size,  $d = .90$ , for the immediate effect of treatment on ‘feeling productive/useful’.

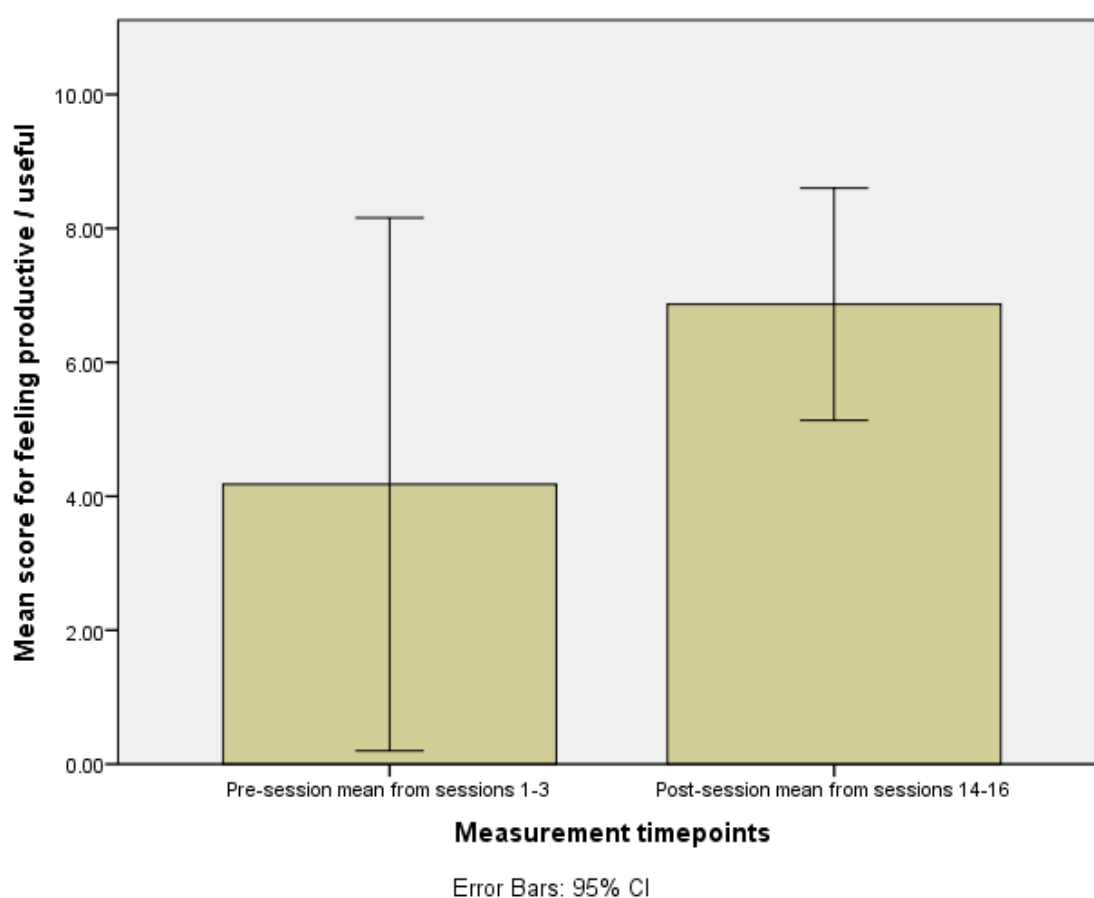
Table 4.57 and figure 4.24 present the data from the post-hoc analysis of the data for ‘feeling productive/useful’. The table and bar chart show the pre-analysis descriptive statistics for the data.

Table 4.57: Descriptive statistics for short-term effects of music therapy on ‘feeling productive/useful’

Measurement timepoint	Mean	Std. Deviation	N
Pre-session	4.179	4.302	7
Post-session	6.869	1.875	7

The mean value for the end of treatment is higher than that for the beginning of treatment. This suggests that participants felt more productive towards the end of treatment compared to the beginning of treatment. The figure for the standard deviation of the data at the end of treatment is smaller than that for the beginning of treatment. This shows that there was less within-group variation in the scores towards the end of treatment than towards the beginning.

Figure 4.24: Short-term effects of music therapy on ‘feeling productive/useful’



The error bars in the bar chart indicate wider variation in scores early in treatment compared with narrower variation in scores later in treatment. There is some overlap in the confidence intervals and this suggests that statistical significance may not have been reached. However, an analysis of variance was conducted to determine the  $F$ -statistic and statistical significance. Sphericity tests were not included, as for the analysis of variance of short-term effects in section 4.6.1.

Table 4.58: Tests of within-subjects effects for short-term effects of music therapy on ‘feeling productive/useful’

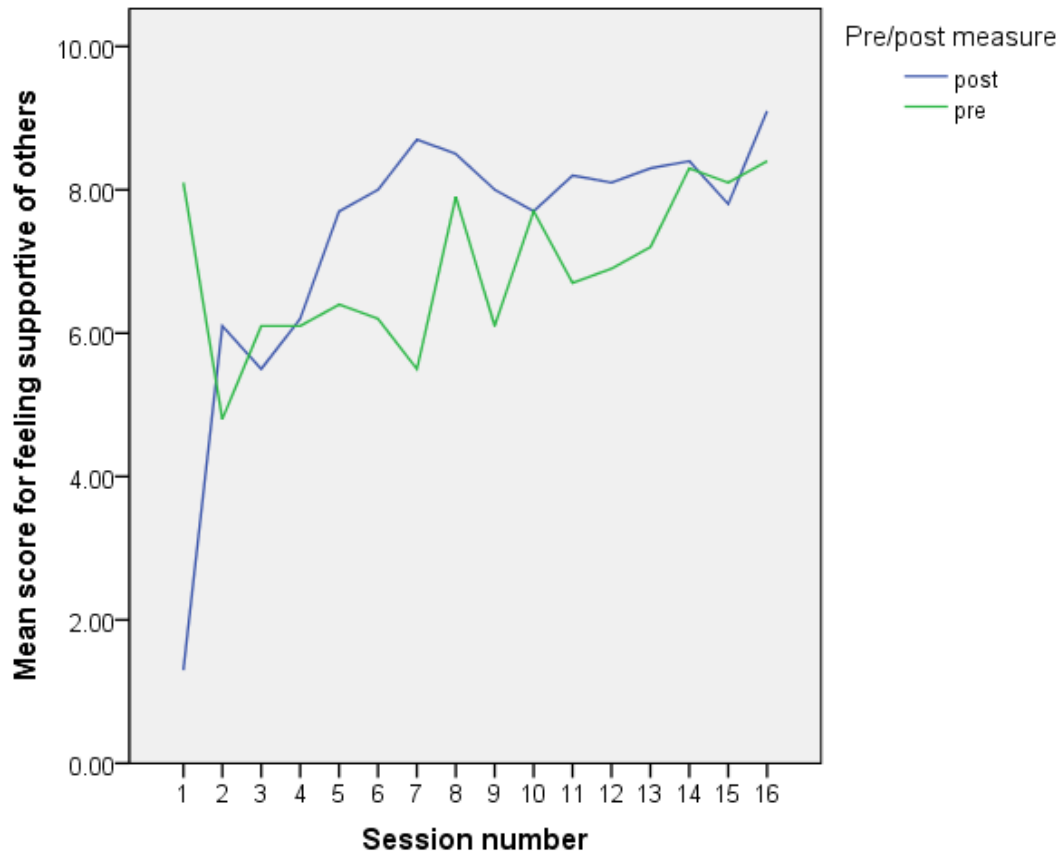
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size $r$
Measurement timepoints	Sphericity Assumed	25.326	1	25.326	4.544	.077	.656
Error	Sphericity Assumed	33.439	6	5.573			

The results from table 4.58 show that the short-term effects of music therapy on scores for ‘feeling productive/useful’ were not statistically significant  $F(1, 6) = 4.54$ ,  $p > .05$ , and showed a large effect size,  $r = .66$ .

#### **4.6.4 Feeling supportive**

Figure 4.25 shows the mean values over the music therapy treatment period for pre-session and post-session outcomes in the domain ‘feeling supportive’.

Figure 4.25: Comparison of pre-session and post-session mean scores for ‘feeling supportive’



The line graph above shows that the post-session scores were generally higher than pre-session scores. This indicates that participants generally felt more supportive immediately after the music therapy sessions than immediately before them. The post-session scores do not seem to track the pre-session scores closely, but both mean scores seem to follow an upward trend. There is a sharp decrease in pre-session scores between the first and second sessions. This is accompanied by a sharp increase in the post-session scores between the same two sessions. This matches a similar observation in section 4.6.3 where similar increases and decreases were shown for the same measures between sessions one and two. The pre-session mean score reached its lowest point in session two, and the post-session mean score reached its lowest value in session one. The highest values for pre-session and

post-session mean scores occurred in session 16. Both mean scores show a slight upward trend over the course of treatment with fluctuations that diminish in range towards the end of treatment. Table 4.59 presents the data for the delta values for ‘feeling supportive’. It presents the numbers of participants reporting positive and negative changes in scores, and the mean values for positive and negative changes in the domain.

Table 4.59: Table of delta values for ‘feeling supportive’

	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mean +ve	0.6	1.17	1.95	2.6	1.72	2.1	1.98	0.87	1.7	1.125	1.1	1.5	0.98	1.25	0.9	1.93
Mean -ve	-6.8	-0.85	-1.64	-1	-1.9	-0.6	-1.6	-0.95	0	-1	-2.2	-0.8	-2.95	0	-0.25	0
Count +ve	1	3	2	4	5	4	6	3	6	4	6	5	4	6	3	7
Count -ve	1	2	5	2	1	2	1	2	0	1	1	1	2	0	2	0

The data from the table is presented in figures 4.26 and 4.27. Figure 4.26 shows the frequency distribution of positive and negative delta values for ‘feeling supportive’. The frequency distribution plots the number of participants against the number of sessions. The delta values were calculated and grouped as discussed in section 4.6.1.

Figure 4.26: Frequency distribution of positive versus negative changes for ‘feeling supportive’

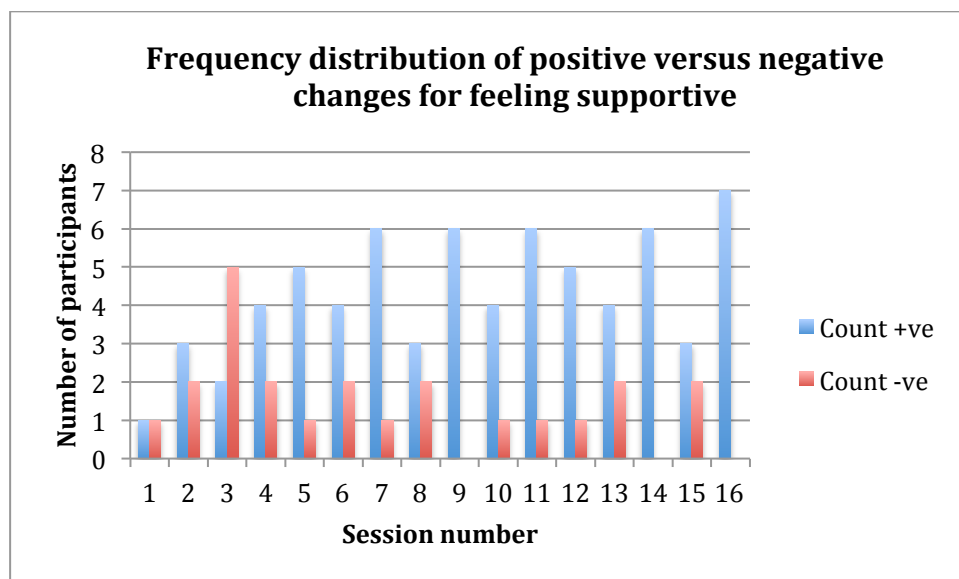
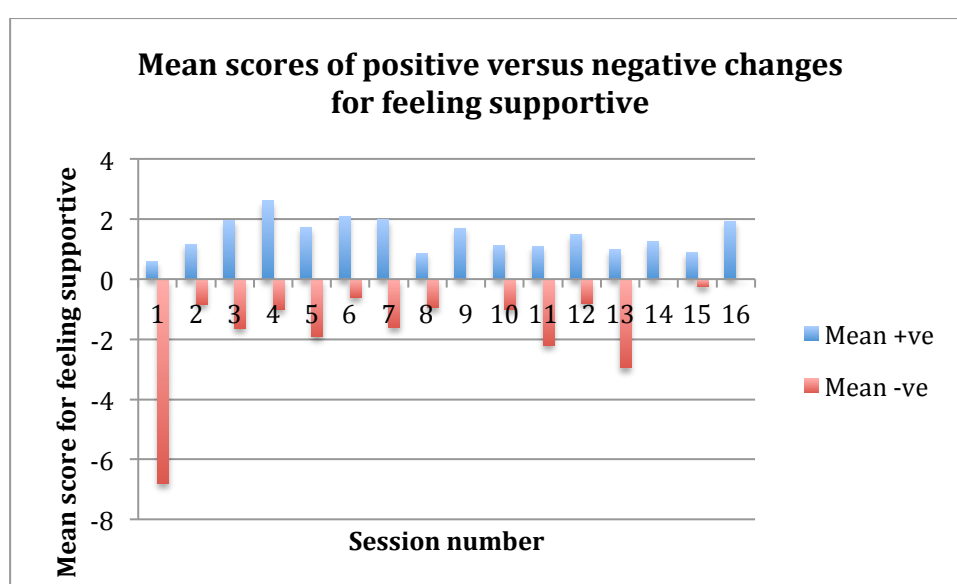


Figure 4.26 and table 4.59 show that for 14 of 16 sessions (87.5%) the majority of participants felt more supportive following the music therapy sessions than they did before

the sessions. In three sessions (18.8%) only positive changes were reported. For the first session equal numbers of participants reported positive and negative changes. For session three, five of seven participants (71%) reported negative changes in ‘feeling supportive’. Figure 4.27 compares the mean scores for the positive and the negative changes for ‘feeling supportive’, and plots them against the number of sessions.

Figure 4.27: Frequency distribution of mean scores of positive versus negative changes for ‘feeling supportive’



The data in figure 4.27 and table 4.59 suggest that for 11 of 16 sessions (68.8%) the mean scores of positive changes were greater than the mean scores of the negative changes. This suggests that, overall, participants felt more supportive post-session compared to pre-session. In session one the mean decrease in ‘feeling supportive’ was much greater than the mean increase. Table 4.60 presents the data comparing pre-session and post-session measurements for ‘feeling supportive’ from the mixed models analysis of the data.



Table 4.60: Descriptive statistics for immediate effects of music therapy on ‘feeling supportive’

Measurement timepoint	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
Post-session	6.768	.862	5.983	4.656	8.879
Pre-session	5.810	.865	6.061	3.699	7.921

The above table presents the estimated marginal means and confidence intervals of pre-session and post-session measurements to determine the immediate effect of music therapy on ‘feeling supportive’. It shows that the mean post-session score was higher than the mean pre-session score. The confidence intervals for the two means overlap and might suggest that the data will not show statistical significance. Table 4.61 presents the results from the mixed models analysis carried out on the pre- and post-session data for ‘feeling supportive’.

Table 4.61: Type III Tests of fixed effects for the immediate effects of music therapy on ‘feeling supportive’

Source	Numerator df	Denominator df	F	Sig.
Pre_post	1	49.132	51.075	.000

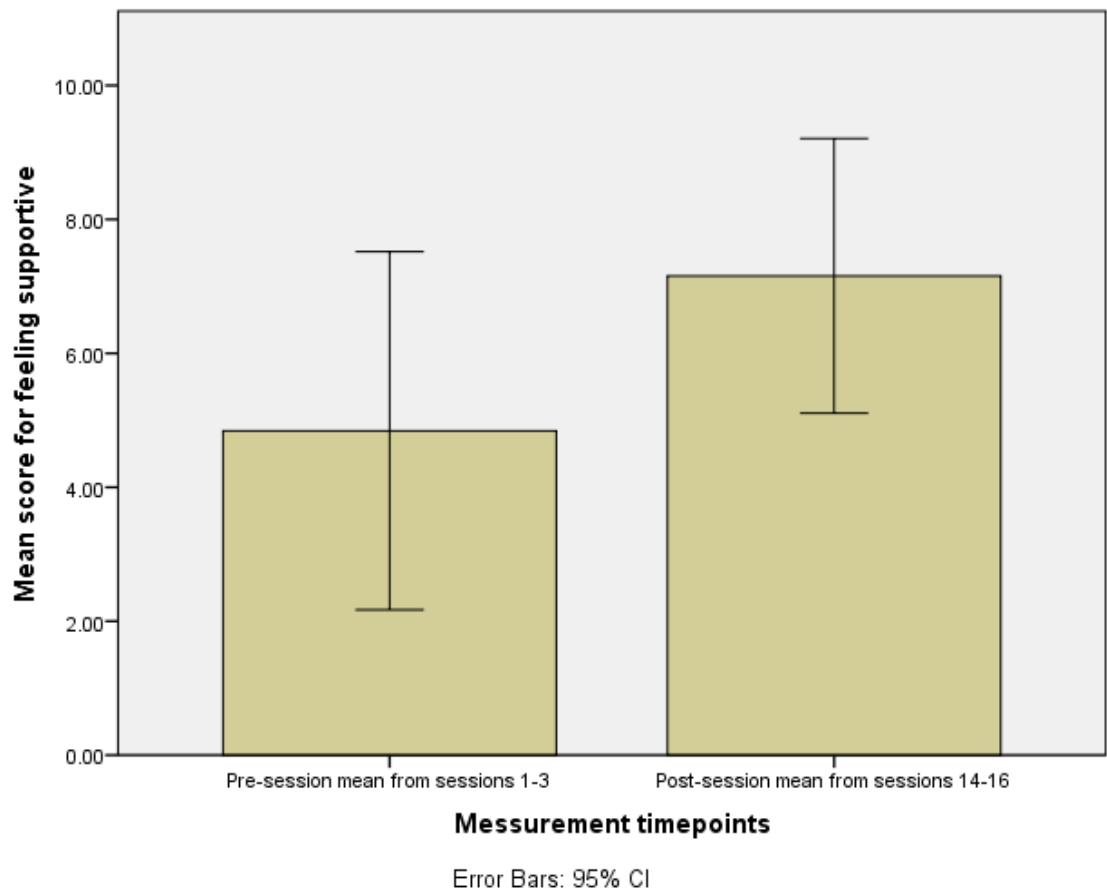
The results from table 4.61 show that the immediate effects of music therapy on scores for ‘feeling supportive’ were statistically significant  $F(1, 49.132) = 51.075, p < .05$ . Table A7.16 in Appendix 7 shows the values used in the effect size calculation for the immediate effects of treatment on ‘feeling supportive’. It shows a medium effect size,  $d = .75$ , for the immediate effect of treatment on ‘feeling supportive’. Table 4.62 and figure 4.28 present the data from the post-hoc analysis of the data for ‘feeling supportive’. The table and bar chart show the pre-analysis descriptive statistics for the data.

Table 4.62: Descriptive statistics for short-term effects of music therapy on ‘feeling supportive’

Measurement timepoint	Mean	Std. Deviation	N
Pre-session	4.843	2.892	7
Post-session	7.156	2.218	7

The mean value for the end of treatment is higher than that for the beginning of treatment. This suggests that participants felt more supportive towards the end of treatment compared to the beginning of treatment. The figures for the standard deviations of the data around the two means are similar.

Figure 4.28: Short-term effects of music therapy on ‘feeling supportive’



The error bars in the bar chart show some overlap in the confidence intervals and this suggests that statistical significance may not have been reached. However, an analysis of variance was conducted to determine the *F*-statistic and statistical significance. Sphericity

tests were not included, as for the analysis of variance of short-term effects in section 4.6.1.

Table 4.63: Tests of within-subjects effects for short-term effects of music therapy on ‘feeling supportive’

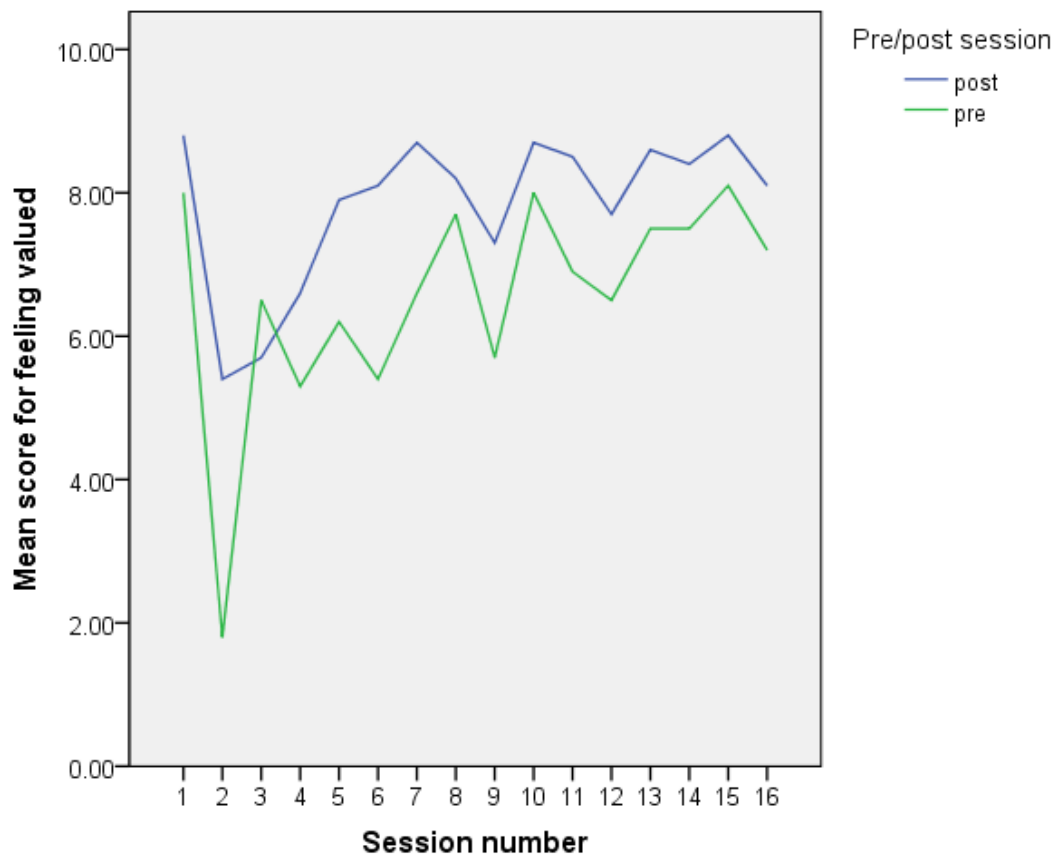
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size <i>r</i>
Measurement timepoints	Sphericity Assumed	18.723	1	18.723	5.624	.055	.696
Error	Sphericity Assumed	19.973	6	3.329			

The results from table 4.63 show that the short-term effects of music therapy on scores for ‘feeling supportive’ were not statistically significant  $F(1, 6) = 5.624, p > .05$ , and showed a large effect size,  $r = .70$ .

#### 4.6.5 Feeling valued

Figure 4.29 shows the mean values over the music therapy treatment period for pre-session and post-session outcomes in the domain ‘feeling valued’.

Figure 4.29: Comparison of pre-session and post-session mean scores for ‘feeling valued’



The line graph above shows that the post-session scores were generally higher than pre-session scores. This indicates that participants generally felt more valued immediately after the music therapy sessions than immediately before them. The post-session scores seem to track the pre-session scores closely, and both mean scores seem to follow an upward trend. There is a sharp decrease in pre-session and post-session scores between the first and second sessions. This may be due to the development of insight induced by therapy and may be linked to feelings of self-esteem. The pre-session and post-session mean scores reached their lowest values in session two. Both mean scores show a slight upward trend over the course of treatment with fluctuations in values becoming less pronounced towards the end of treatment. Table 4.64 presents the data for the delta values for ‘feeling valued’.

It presents the numbers of participants reporting positive and negative changes in scores, and the mean values for positive and negative changes in the domain.

Table 4.64: Table of delta values for ‘feeling valued’

	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mean +ve	0.8	1.7	2.76	1.8	1.6	2.92	1.44	2.73	1.7	1.2	1.24	1.12	1.2	0.92	0.75	1.53
Mean -ve	-3	-1.4	-1.5	-2.97	-1.55	-1.3	-1.1	-1.2	0	-1.4	-4.6	0	0	-0.2	0	-0.9
Count +ve	1	4	5	3	4	5	5	4	6	4	5	6	5	6	6	4
Count -ve	2	1	2	3	2	1	2	1	0	2	2	0	0	1	0	3

The data from the table is presented in figures 4.30 and 4.31. Figure 4.30 shows the frequency distribution of positive and negative delta values for ‘feeling valued’. The frequency distribution plots the number of participants against the number of sessions. The delta values were calculated and grouped as discussed in section 4.6.1.

Figure 4.30: Frequency distribution of positive versus negative changes for ‘feeling valued’

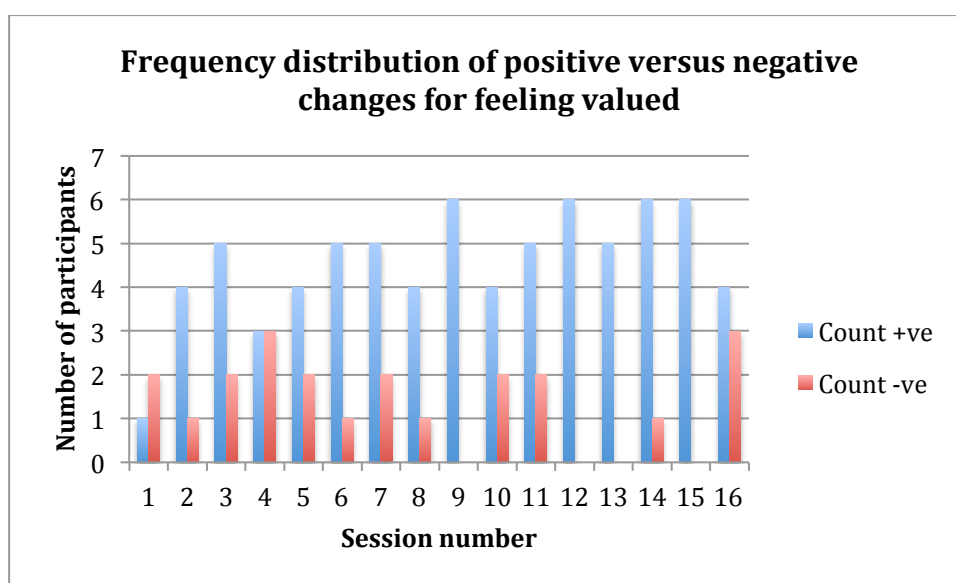
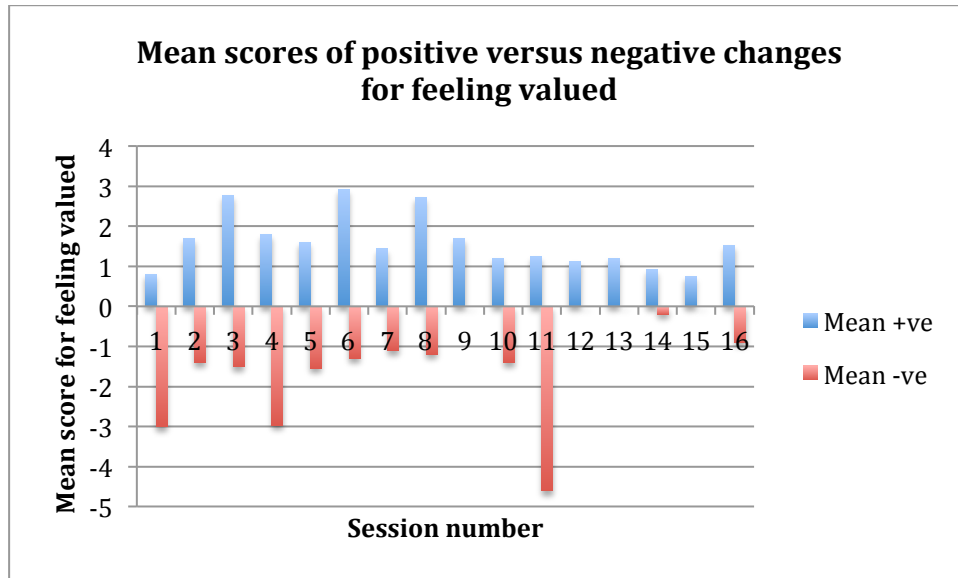


Figure 4.30 and table 4.64 show that for 14 of 16 sessions (87.5%) the majority of participants felt more valued following the music therapy sessions than they did before the sessions. In four sessions (25%) only positive changes were reported. In the fourth session equal numbers of participants reported positive and negative changes. For session one, two of three participants (66.7%) reported negative changes in ‘feeling valued’. Figure 4.31

compares the mean scores for the positive and the negative changes for ‘feeling valued’, and plots them against the number of sessions.

Figure 4.31: Frequency distribution of mean scores of positive versus negative changes for ‘feeling valued’



The data in figure 4.31 and table 4.64 suggest that for 12 of 16 sessions (75%) the mean scores of positive changes were greater than the mean scores of the negative changes. This suggests that, overall, participants felt more valued post-session compared to pre-session. In sessions one and 11, the mean decrease in ‘feeling valued’ was much greater than the mean increase. Table 4.65 presents the data comparing pre-session and post-session measurements for ‘feeling valued’ from the mixed models analysis of the data.

Table 4.65: Descriptive statistics for immediate effects of music therapy on ‘feeling valued’

Measurement timepoint	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-session	5.878	.843	6.080	3.821	7.936
Post-session	6.809	.840	5.967	4.752	8.866

The above table presents the estimated marginal means and confidence intervals of pre-session and post-session measurements to determine the immediate effect of music therapy

on ‘feeling valued’. It shows that the mean post-session score was higher than the mean pre-session score. The confidence intervals for the two means overlap and might suggest that the data will not show statistical significance. Table 4.66 presents the results from the mixed models analysis carried out on the pre- and post-session data for ‘feeling valued’.

Table 4.66: Type III Tests of fixed effects for the immediate effects of music therapy on ‘feeling valued’

Source	Numerator df	Denominator df	F	Sig.
Pre_post	1	60.029	53.363	.000

The results from table 4.66 show that the immediate effects of music therapy on scores for ‘feeling valued’ were statistically significant  $F(1, 60.029) = 53.363, p < .05$ .

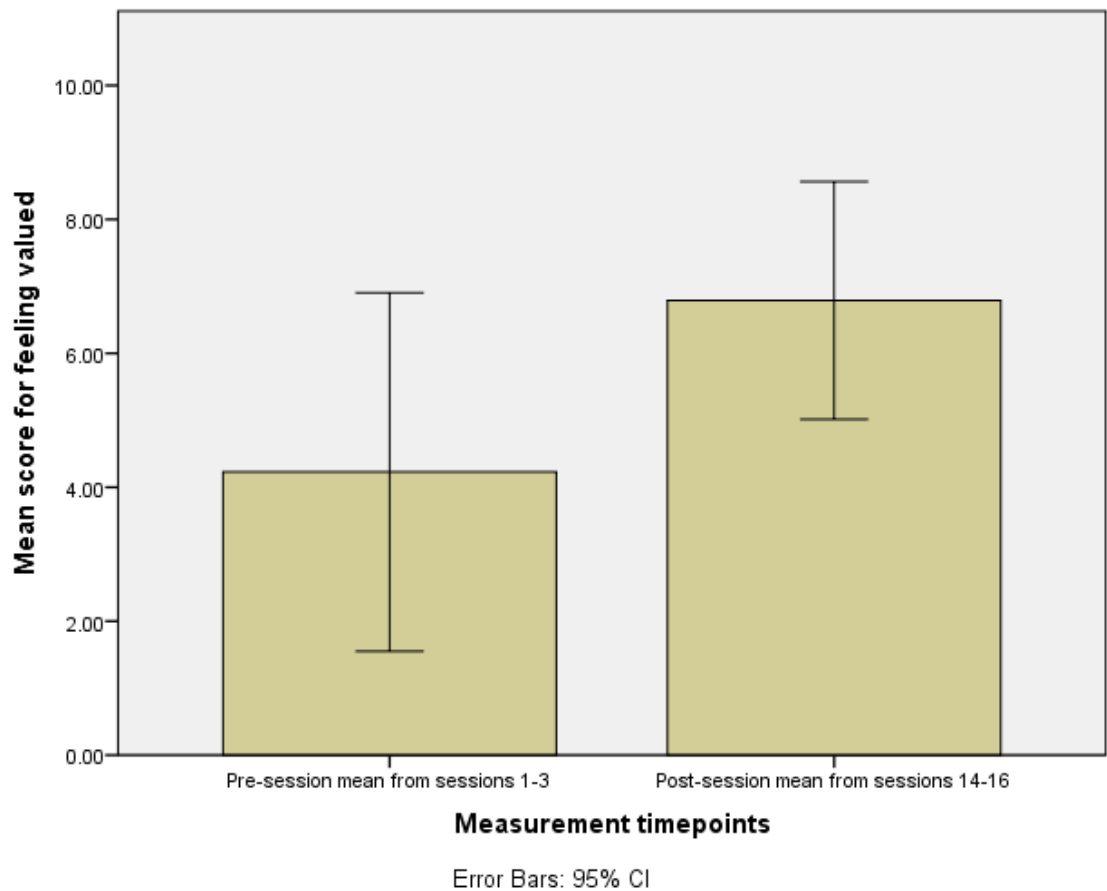
Table A7.17 in Appendix 7 shows the values used in the effect size calculation for the immediate effects of treatment on ‘enjoyment’. It shows a medium effect size,  $d = .74$ , for the immediate effect of treatment on ‘feeling valued’. Table 4.67 and figure 4.32 present the data from the post-hoc analysis of the data for ‘feeling valued’. The table and bar chart show the pre-analysis descriptive statistics for the data.

Table 4.67: Descriptive statistics for short-term effects of music therapy on ‘feeling valued’

Measurement timepoint	Mean	Std. Deviation	N
Pre-session	4.229	2.895	7
Post-session	6.790	1.920	7

The mean value for the end of treatment is higher than that for the beginning of treatment. This suggests that participants felt more valued towards the end of treatment compared to the beginning of treatment. The figures for the standard deviations of the data around the two means are dissimilar.

Figure 4.32: Short-term effects of music therapy on ‘feeling valued’



The error bars in the bar chart show some overlap in the confidence intervals and this suggests that statistical significance may not have been reached. However, an analysis of variance was conducted to determine the  $F$ -statistic and statistical significance. Sphericity tests were not included, as for the analysis of variance of short-term effects in section 4.6.1.

Table 4.68: Tests of within-subjects effects for short-term effects of music therapy on ‘feeling valued’

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size $r$
Measurement timepoints	Sphericity Assumed	22.963	1	22.963	18.925	.005	.871
Error	Sphericity Assumed	7.280	6	1.213			

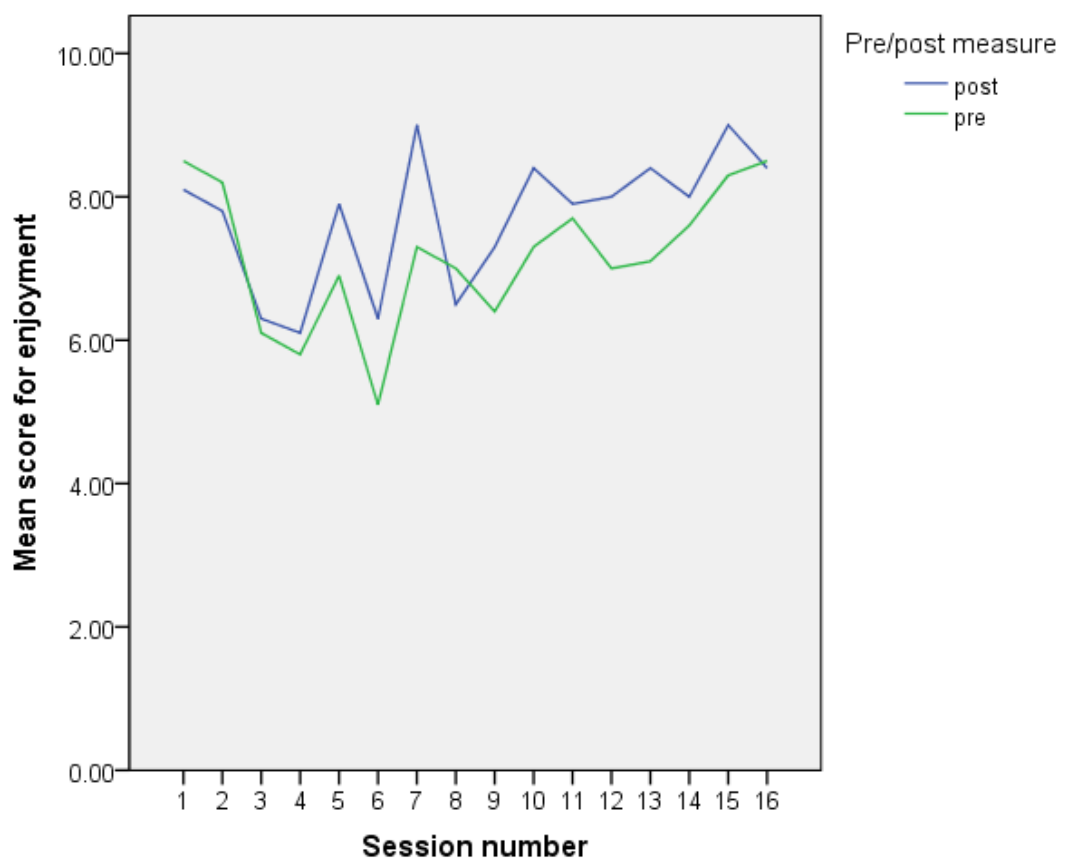


The results from table 4.68 show that the short-term effects of music therapy on scores for ‘feeling valued’ were statistically significant  $F(1, 6) = 18.925, p < .05$ , and showed a large effect size,  $r = .87$ .

#### 4.6.6 Enjoyment

Figure 4.33 shows the mean values over the music therapy treatment period for pre-session and post-session outcomes in the domain ‘enjoyment’.

Figure 4.33: Comparison of pre-session and post-session mean scores for ‘enjoyment’



The line graph above shows that the post-session scores were generally higher than pre-session scores. This indicates that participants generally felt that they were enjoying themselves more immediately after the music therapy sessions than immediately before them. The post-session scores seem to generally track the pre-session scores, and both mean scores seem to follow an upward trend following an initial sharp decrease. There is a

sharp decrease in pre-session and post-session scores between the second and third sessions. The pre-session and post-session mean scores reached their lowest values in sessions six and four respectively. Both mean scores show a slight upward trend over the course of treatment with wide fluctuations in values that narrow towards the end of treatment. Table 4.69 presents the data for the delta values for ‘enjoyment’. It presents the numbers of participants reporting positive and negative changes in scores, and the mean values for positive and negative changes in the domain.

Table 4.69: Table of delta values for ‘enjoyment’

	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mean +ve	0	1.57	1.42	0.83	4.53	1.58	1.43	1.4	2.12	1.13	1.16	0.8	1.18	0.6	0.68	1.1
Mean -ve	-0.58	-1.6	-0.2	-0.6	-0.6	-0.2	0	-0.83	0	-1.1	-1.2	-1.8	0	-6.1	-0.4	-0.6
Count +ve	0	3	5	3	4	5	7	1	6	4	5	4	6	6	4	4
Count -ve	4	2	2	3	1	1	0	4	0	2	1	1	0	1	2	3

The data from the table is presented in figures 4.34 and 4.35. Figure 4.34 shows the frequency distribution of positive and negative delta values for ‘enjoyment’. The frequency distribution plots the number of participants against the number of sessions. The delta values were calculated and grouped as discussed in section 4.6.1.

Figure 4.34: Frequency distribution of positive versus negative changes for ‘enjoyment’

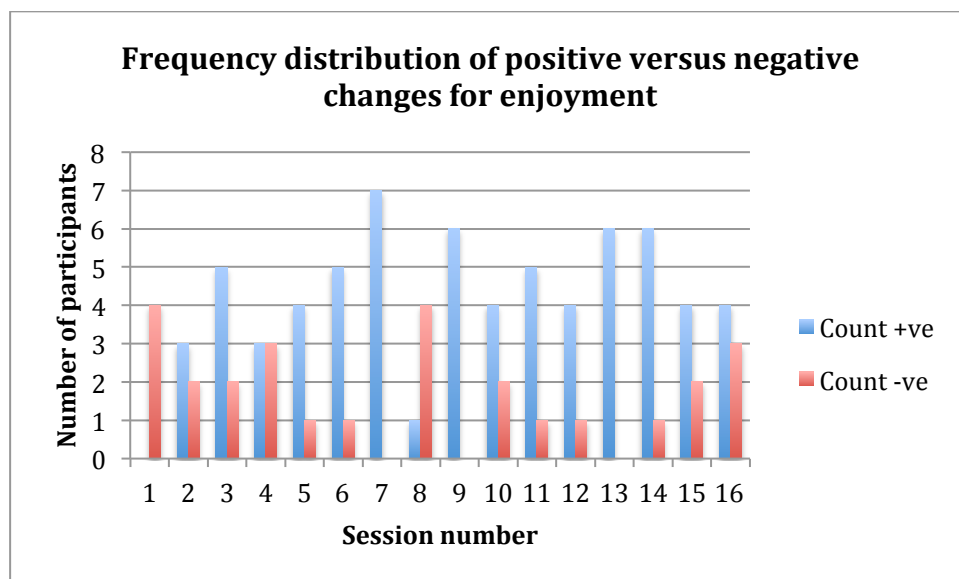
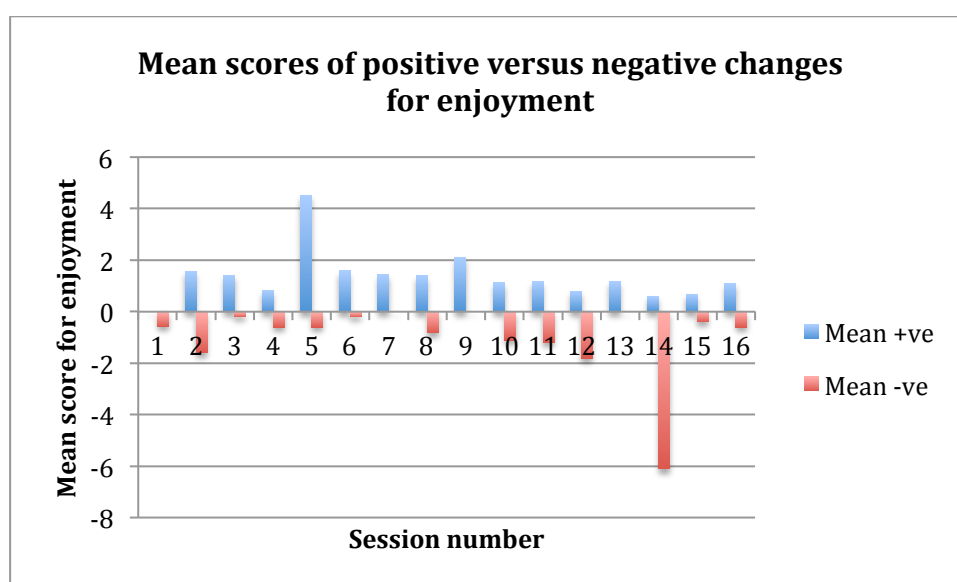


Figure 4.34 and table 4.69 show that for 13 of 16 sessions (81.3%) the majority of participants felt a greater sense of enjoyment following the music therapy sessions than they did before the sessions. In three sessions (18.8%) only positive changes were reported. In the fourth session equal numbers of participants reported positive and negative changes. For session one, the participants reported only negative changes in ‘enjoyment’. Figure 4.35 compares the mean scores for the positive and the negative changes for ‘enjoyment’, and plots them against the number of sessions.

Figure 4.35: Frequency distribution of mean scores of positive versus negative changes for ‘enjoyment’



The data in figure 4.35 and table 4.69 suggest that for 11 of 16 sessions (68.8%) the mean scores of positive changes were greater than the mean scores of the negative changes. This suggests that, overall, participants felt a greater sense of enjoyment post-session compared to pre-session. In session 14, the mean decrease in ‘enjoyment’ was much greater than the mean increase. Table 4.70 presents the data comparing pre-session and post-session measurements for ‘enjoyment’ from the mixed models analysis of the data.

Table 4.70: Descriptive statistics for immediate effects of music therapy on ‘enjoyment’

Measurement timepoint	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-session	6.601	.901	6.024	4.400	8.803
Post-session	7.058	.899	5.975	4.857	9.259

The above table presents the estimated marginal means and confidence intervals of pre-session and post-session measurements to determine the immediate effect of music therapy on ‘enjoyment’. It shows that the mean post-session score was higher than the mean pre-session score. The confidence intervals for the two means overlap and might suggest that the data will not show statistical significance. Table 4.71 presents the results from the mixed models analysis carried out on the pre- and post-session data for ‘enjoyment’.

Table 4.71: Type III Tests of fixed effects for the immediate effects of music therapy on ‘enjoyment’

Source	Numerator df	Denominator df	F	Sig.
Pre_post	1	53.079	12.451	.001

The results from table 4.71 show that the immediate effects of music therapy on scores for ‘enjoyment’ were statistically significant  $F(1, 53.079) = 12.451, p < .05$ .

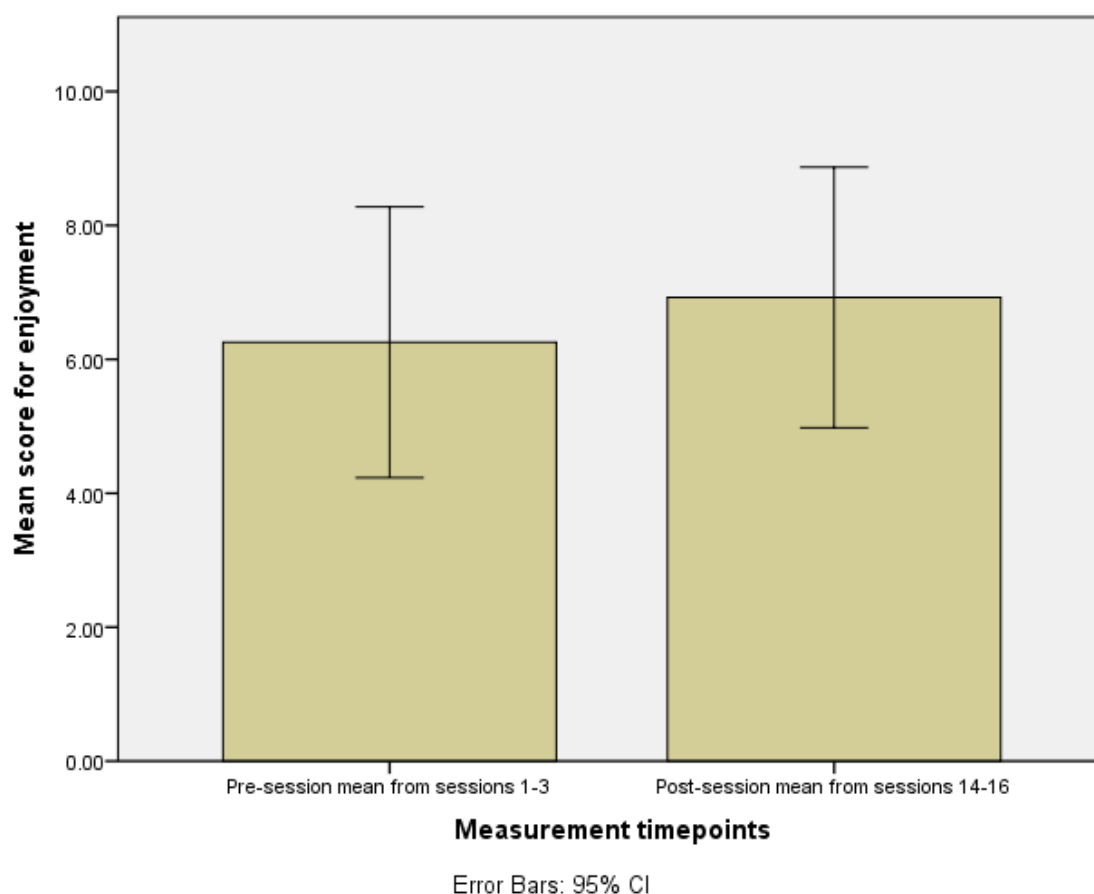
Table A7.18 in Appendix 7 shows the values used in the effect size calculation for the immediate effects of treatment on ‘enjoyment’. It shows a small effect size,  $d = .34$ , for the immediate effect of treatment on ‘enjoyment’. Table 4.72 and figure 4.36 present the data from the post-hoc analysis of the data for ‘enjoyment’. The table and bar chart show the pre-analysis descriptive statistics for the data.

Table 4.72: Descriptive statistics for short-term effects of music therapy on ‘enjoyment’

Measurement timepoint	Mean	Std. Deviation	N
Pre-session	6.254	2.186	7
Post-session	6.924	2.104	7

The mean value for the end of treatment is slightly higher than that for the beginning of treatment. This suggests that participant feelings of enjoyment increased slightly towards the end of treatment compared to the beginning of treatment. The figures for the standard deviations of the data around the two means are very similar.

Figure 4.36: Short-term effects of music therapy on ‘enjoyment’



The error bars in the bar chart show some overlap in the confidence intervals and this suggests that statistical significance may not have been reached. However, an analysis of variance was conducted to determine the *F*-statistic and statistical significance. Sphericity tests were not included, as for the analysis of variance of short-term effects in section 4.6.1.

Table 4.73: Tests of within-subjects effects for short-term effects of music therapy on ‘enjoyment’

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Effect size <i>r</i>
Measurement timepoints	Sphericity Assumed	1.571	1	1.571	1.466	.272	.443
Error	Sphericity Assumed	6.431	6	1.072			

The results from table 4.73 show that the short-term effects of music therapy on scores for ‘enjoyment’ were not statistically significant  $F(1, 6) = 1.466, p > .05$ , and showed a medium effect size,  $r = .44$ .

#### 4.6.7 Summary of VASEN data analysis

The main findings for the VASEN are summarised in table 4.74.

Table 4.74: Summary of emotional needs data analysis

Domain	Statistical significance of immediate effect of treatment ( <i>p</i> )	Effect size of immediate effect of treatment ( <i>d</i> )	Statistical significance of short-term effect of treatment ( <i>p</i> )	Effect size of short-term effect of treatment ( <i>r</i> )
Part of a group	$p < .05$	medium, $d = .74$	$p < .05$	large, $r = .80$
Confident	$p < .05$	large, $d = .88$	$p < .05$	large, $r = .80$
Productive	$p < .05$	large, $d = .90$	ns, $p > .05$	large, $r = .66$
Supportive	$p < .05$	medium, $d = .75$	ns, $p > .05$	large, $r = .70$
Valued	$p < .05$	medium, $d = .74$	$p < .05$	large, $r = .87$
Enjoyment	$p < .05$	small, $d = .34$	ns, $p > .05$	medium, $r = .44$

The majority of participants reported positive changes in the satisfaction of emotional needs between pre- and post-session measurements. This was observed in all six domains of the VASEN. The analysis of the immediate effects of treatment revealed statistically significant results in all six domains. The effect size calculations showed that the immediate effect of treatment produced:

- a medium effect size,  $d = .74$ , for ‘feeling part of a group’

- a large effect size,  $d = .88$ , for ‘feeling confident’
- a large effect size,  $d = .90$ , for ‘feeling productive/useful’
- a medium effect size,  $d = .75$ , for ‘feeling supportive’
- a medium effect size,  $d = .74$ , ‘feeling valued’
- a small effect size,  $d = .34$ , ‘enjoyment’

Over the course of the 16-session treatment fluctuations were shown in the pre- and post-session measurements. The longitudinal patterns of post-session measurements matched (to a reasonable degree) those of their pre-session counterparts in four domains: ‘feeling part of a group’, ‘feeling confident’, ‘feeling valued’, and ‘enjoyment’. There was a noticeable fall in measurements in the period from sessions two to five inclusively. This may be linked to changes in concept of self and the development of insight for the participants.

The analysis of the short-term effect (difference between pre-session scores at the beginning of treatment compared with post-session scores at the end of treatment) yielded statistically significant results in three domains: ‘feeling part of a group’, ‘feeling confident’, and ‘feeling valued’. The effect size calculations showed that the short-term effect of treatment produced:

- a large effect size,  $r = .80$ , for ‘feeling part of a group’
- a large effect size,  $r = .80$ , for ‘feeling confident’
- a large effect size,  $r = .66$ , for ‘feeling productive/useful’
- a large effect size,  $r = .70$ , for ‘feeling supportive’
- a large effect size,  $r = .87$ , for ‘feeling valued’
- a medium effect size,  $r = .44$ , for ‘enjoyment’

## **4.7 Summary of key findings from the quantitative results**

Analysis of the quantitative results revealed the following key findings.

Groups one and two showed improvements in sustained attention over time during the course of the experiment. 16 weeks of MT yielded greater improvements in sustained attention compared with scores at BL. Both eight weeks and 16 weeks of MT were more effective than eight weeks of SC in improving sustained attention. Thus, brief group music therapy was more effective than standard care alone for improving sustained attention of the participants. Attention scores were maintained or improved eight weeks following the end of treatment, implying potential long-term benefits

The participants' functional gains in memory recall varied widely in response to the music therapy intervention. However, both groups showed an increase in mean scores for immediate memory recall from BL to the timepoint eight weeks after the end of treatment, suggesting some longer-term benefit or delayed response to treatment. Memory scores increased between eight weeks of MT and 16 weeks of MT. 16 weeks of MT was more effective than eight weeks of SC, whereas eight weeks of MT was less effective. This might suggest a minimum dosage of 16 weeks of MT to perceive improvements in immediate memory recall.

Participants' difficulties in motivation and memory resulted in insufficient data to analyse the effect of the amount of self-led practice carried out between sessions on attention and memory functioning. This has cautionary implications for future studies involving self-led practice with ABI survivors.

Participants felt slightly more agreeable, more composed, more elated, and more energetic after 16 weeks of MT compared to 8 weeks of SC, 8 weeks of MT, and BL. The mean scores for each mood state showed the same pattern: a rise from BL to 8 weeks of SC followed by a fall after 8 weeks of MT followed by a rise after 16 weeks of MT. This may



be linked to the therapeutic process in which participants increase self-awareness and gain insight. The pattern of increases and decreases in mean scores of mood state is also reflected in the mean scores for sustained attention and immediate memory recall, implying a potential link between emotional state and cognitive functioning.

The participants showed improvements in all six domains of emotional need selected in this study. The brief group music therapy intervention satisfied emotional needs of the participants in the immediate and short-term. Similar longitudinal trends in scores in domains of emotional need suggest that the development of insight might be linked to changes in sense of self and emotional adjustment over the course of brief group music therapy.

## CHAPTER 5

### 5 RESULTS: QUALITATIVE DATA

This chapter presents the qualitative data gathered from the semi-structured interviews at the end of treatment and the lyrics from the songs written during treatment. The qualitative data provides subjective information about the needs, difficulties and experiences of people with ABI, and enables the researcher to reveal, from a within-participant perspective, how music therapy has addressed their needs and difficulties. The chapter is divided into two main sections. Section 5.1 presents the interpretative phenomenological analysis (IPA) of the semi-structured interviews. Section 5.2 presents the thematic analysis (TA) of the lyrics.

#### 5.1 Interpretative phenomenological analysis (IPA) of semi-structured interviews

This section presents the data from the IPA of the semi-structured interviews conducted with the participants who remained in the study until completion. Therefore, interviews were not conducted with the two participants who dropped out of the study due to problems with fatigue. The IPA addressed the following research sub-questions from the subjective point of view of the participants:

‘Does treatment have an effect on attention functioning?’

‘Does treatment have an effect on memory functioning?’

‘Does treatment have an effect on emotional needs?’

‘How does time-limitation affect treatment delivery?’

The interview transcripts and their analyses are given in Appendix 8. The IPA yielded a master table of themes for each interview question. They present the superordinate themes in bold, the themes in normal text, and the sub-themes in italics. Superordinate themes represent themes of high significance that meaningfully capture a general label around

which themes were clustered. Sub-themes were used for higher specificity and these clustered around individual themes. Identifiers for the extracts are shown in the columns for each participant. The extract identifiers contain two numbers separated by a decimal point: the first number refers to the page; the second number refers to the line. Generally, extracts of the participants' responses appear chronologically in the order in which questions were presented. In the master tables of themes this is shown as the extract identifiers increase in value going down the table. However, there are some instances where participants' responses relate to questions that were presented earlier in the interview. In these cases extract identifiers are presented out of chronological sequence but preserve their meaning in the context of the data. The master tables together with the interview transcripts can be found in Appendix 9. Selected results from the master tables of themes are presented because it is beyond the scope of this doctoral research to present the results from the IPA in their entirety. Selection of results was determined by the research questions and emergent patterns between the IPA results and other data sources in this study. The results are presented as narrative arguments with verbatim extracts to support and illustrate each argument.

### **5.1.1 Music therapy and the subjective needs of ABI survivors**

For question one of the semi-structured interviews the participants were asked the following:

- a) Since your brain injury what have been your greatest needs and difficulties?
- b) Has music therapy given you any benefits or difficulties with any of these needs?

You may feel that there has been no change at all, and it is OK to say so.

The table of themes generated in the IPA is shown in table 5.1.

Table 5.1: Summary of themes for responses to question 1

Superordinate themes, themes, and <i>sub-themes</i>	Superordinate themes, themes, and <i>sub-themes</i>
<p><b>Cognition</b></p> <p>Cognitive difficulties and needs</p> <ul style="list-style-type: none"> <li>- <i>Cognitive deficits</i></li> <li>- <i>Loss of memory</i></li> <li>- <i>Impact on orientation</i></li> <li>- <i>Impact on daily living</i></li> <li>- <i>Impact on creativity</i></li> <li>- <i>Impact on engagement</i></li> </ul> <p>Music therapy and cognitive rehabilitation</p> <ul style="list-style-type: none"> <li>- <i>Stimulating creative thinking</i></li> <li>- <i>Improved learning capacity</i></li> <li>- <i>Improved memory</i></li> </ul>	<p><b>Sense of self/self-evaluation</b></p> <p>Loss of sense of self/self-evaluation</p> <ul style="list-style-type: none"> <li>- <i>Loss of sense of self</i></li> <li>- <i>Loss of self-worth</i></li> <li>- <i>Need to recover former self</i></li> <li>- <i>Response to altered sense of self</i></li> <li>- <i>Self-evaluation difficulties</i></li> </ul> <p>Music therapy and sense of self/self evaluation</p> <ul style="list-style-type: none"> <li>- <i>Impact on self-awareness</i></li> <li>- <i>Self-evaluation during sessions</i></li> </ul>
<p><b>Communication</b></p> <p>Communication difficulties and needs</p> <ul style="list-style-type: none"> <li>- <i>Aphasia</i></li> <li>- <i>Dysarthria</i></li> <li>- <i>Dysphagia</i></li> <li>- <i>Difficulty with semantics</i></li> <li>- <i>A need for self-expression</i></li> </ul> <p>Music therapy and communication rehabilitation</p> <ul style="list-style-type: none"> <li>- <i>Satisfaction through non-verbal expression in music</i></li> <li>- <i>Reduced aphasia during musical tasks</i></li> </ul>	<p><b>Relationships</b></p> <p>Relationship problems and needs</p> <ul style="list-style-type: none"> <li>- <i>Social isolation</i></li> <li>- <i>Need for relationships</i></li> <li>- <i>Need for support from others</i></li> <li>- <i>Difficulty trusting others</i></li> </ul> <p>Relationships in music therapy</p> <ul style="list-style-type: none"> <li>- <i>Developing relationships</i></li> <li>- <i>Group support</i></li> <li>- <i>Shared experiences</i></li> <li>- <i>A therapeutic space for group discussion</i></li> <li>- <i>Group discussion was beneficial</i></li> </ul>
<p><b>Emotional needs</b></p> <p>Emotional problems and needs after ABI</p> <ul style="list-style-type: none"> <li>- <i>Anger</i></li> <li>- <i>Anxiety</i></li> <li>- <i>Depressed</i></li> <li>- <i>Confusion</i></li> <li>- <i>Loneliness</i></li> <li>- <i>Powerlessness</i></li> <li>- <i>Shame</i></li> </ul> <p>Music therapy and emotional problems and needs</p> <ul style="list-style-type: none"> <li>- <i>Impact on anxiety and stress</i></li> <li>- <i>Emotional adjustment</i></li> </ul>	<p><b>Independence and quality of life</b></p> <p>Loss of independence and quality of life</p> <ul style="list-style-type: none"> <li>- <i>Loss of independence</i></li> <li>- <i>A need to be independent</i></li> <li>- <i>A need to socialise independently</i></li> <li>- <i>A need for freedom</i></li> <li>- <i>Being dependent</i></li> </ul> <p>Independence and quality of life in music therapy</p> <ul style="list-style-type: none"> <li>- <i>Independence</i></li> </ul>

If participants showed difficulties in answering the questions the interview used verbal prompts and visual presentation of the questions to guide the participants to think about difficulties relating to functioning and daily life. All the participants related how their brain injury had affected their lives and described the difficulties they experienced as a result of their brain injuries. Table A9.1 in Appendix 9 presents the master table of themes for responses to question one. The participants' accounts clustered around six superordinate

themes: cognition, communication, emotional needs, sense of self/self-evaluation, relationships, and independence and quality of life.

#### **5.1.1.1 Cognitive difficulties and needs of participants**

Participants reported cognitive difficulties and needs due to brain injury. These included general cognitive deficits, loss of memory, impact on orientation, impact on daily living, impact on creativity, and impact on engagement. Participants identified general cognitive deficits as a significant difficulty following ABI. Their comments capture feelings of loss associated with these cognitive deficits. P1 expressed it in the following way:

*P1: So, since your brain injury, what have been your greatest needs? I just wish I had a better brain.*

P10 expressed the need to improve cognition in more detail and compared her post-injury cognitive abilities with her pre-injury cognitive abilities:

*Interviewer: So, the first question. We're going to just chat about the music therapy, how things have gone. So, be as honest as you like. Don't hold back. The first question is since your brain injury what have been your greatest needs?*

*P10: Oh. That is such a difficult question. My greatest needs. Right. Well, basically what I really want and maybe I don't know if it's my greatest need but it's what I really want or what I would like to get back what I aspire to is to get back to my normal self.*

*Interviewer: OK. And, in which areas do you feel are preventing you from doing that, are the most difficult.*

*P10: Area. I don't know what the question. It's a strange question.*

*Interviewer: So, getting back to your normal self. What would that mean?*

*P10: What does that mean? It's a good question. What is my normal self? I haven't got a clue. Well, I'm quite an intellectual sort of person. I've got a very good brain. I used to have a very good brain. Now, I haven't anymore.*

*Interviewer: OK.*

*P10: So, I miss it. So, getting back to my normal self would mean to be quick and with it, constantly able to make the right connections with a lot of things in my head. I see my head as a network of wires and they now don't seem to make any*

*electricity. They don't seem to have the ability to link up to each other anymore. So, that's being my greatest need would be to be that sort of person.*

These excerpts show a connection between cognitive functioning and the sense of self.

Cognitive functioning affects the sense of self of ABI survivors. It influences the experiential sense of self and, hence, the consciousness of the individual. Memory is an important element in the formation and stability of sense of self and consciousness.

Following ABI memory impairments are common. P9 provides an example of failure in episodic memory immediately after brain injury and emerging from a coma:

*Interviewer: That's been badly affected. And so, that's been as a result of your sort of physical side. Yeah? OK. Anything else? What else are you finding are your greatest needs? I'm just going to write these down, so I can remember.*

*P9: Oh. Egham. Egham.*

*Interviewer: Yeah.*

*P9: Well, that's a big place. Well, I can't remember going there, but I did. I was there for...what...ooh, I was there for...I don't know how long I was there for now. It's a place...Oh, blimey, how can I put it?*

*Interviewer: So, you can't remember being at Egham even though you were there for a long time?*

*P9: Yeah, yeah, yeah.*

*Interviewer: So, is that your memory? So, your greatest needs really since your brain injury you are saying....sort of...your memory.*

*P9: Mmm. Well, the funny thing is...even though it was quite a long time I can't even remember going there, but I did.*

Further on in the interview P9 explains that his memory loss seemed to affect his consciousness and his sense of reality:

*P9: I was in hospital. I was doing things but I didn't know I was doing them. If you know what I mean.*

*Interviewer: Right.*

*P9: Also, when I woke up...well, I didn't know I was awake. I had loss of memory.*

P10 links loss of memory with the loss of ability to think creatively. In the following excerpt P10 describes the importance of memory and how memory impairments affect creativity:

*P10: So, I miss it. So, getting back to my normal self would mean to be quick and with it, constantly able to make the right connections with a lot of things in my head. I see my head as a network of wires and they now don't seem to make any electricity. They don't seem to have the ability to link up to each other anymore. So, that's being my greatest need would be to be that sort of person.*

*Interviewer: To build those connections again.*

*P10: Working easily and almost without prompting. Just looking at something I expect my brain to think of things. I've also got quite a lot of imagination and I think I have lost out on that. I haven't got the imagination I used to have because imagination requires the ability to make lots of linkages and that seems to have got lost.*

*Interviewer: Sort of creative thinking. Yeah?*

*P10: Ooh. I'm getting hot.*

*Interviewer: Do you want me to open the window? Anything else at all? So, being able to think quicker and have those connections...*

*P10: And creatively.*

*Interviewer: Creatively. That you think are your greatest needs. Anything else at all?*

*P10: Um. I think so, yes. My memory is also the thing that...because memory is also important for those linkages. It seemed to have...I lost my memory in my brain injury and therefore because memory has such a great role to play with those flash of "Oh, yes. This reminds me of..." Well, it doesn't work anymore.*

*Interviewer: So, your memory really is a big part of...*

*P10: It's my big problem. It's a big part of my creativity as well because I don't believe that anyone is creative in absolute. I mean creativity doesn't exist from blank sheet of paper.*

*Interviewer: Yeah.*

*P10: Creativity starts from even a tiny dot on a piece of paper and from that dot you can sort of make linkages and see pictures and think in pictures...but I'm talking about pictures not because it's pictures necessarily that I'm missing. It's this ability to go from one thought to another and that's what I've lost with my brain injury.*

From P10's description creative thinking involves memory and processing speed, both of which are significantly impaired by brain injury.

Orientation, especially in time, and being organised enough to carry out Activities of Daily Living (ADL) can be difficult for people with ABI. Memory impairments are at the root of problems in these areas. For orientation, the individual requires knowledge of the past up to moments of the immediate past. This relies on retrospective memory recall. In order to be organised about activities of daily living, for example shopping for groceries or housekeeping duties, individuals require prospective memory. The following excerpt from P8's account captures difficulties with orientation and activities of daily living, and the use of a diary/notebook to overcome these difficulties:

*Interviewer: So, first of all. The first question. Since your brain injury what do you think have been your greatest needs?*

*P8: My greatest needs. Making sure I get things right.*

*Interviewer: Making sure that you get things right. Yeah?*

*P8: Yes.*

*Interviewer: OK. So, in what way?*

*P8: That's why I write out my shopping list. It's the simple, bare necessities.*

*Interviewer: OK.*

*P8: Yes.*

*Interviewer: I'm just going to jot this down to remind me in a bit. OK. So, making sure you get things right. That's good for you. You found that's important for you since your brain injury?*

*P8: Yes.*

*Interviewer: Why is that in particular?*

*P8: Now, I'm not overspending my money also.*

*Interviewer: OK.*



*P8: And, if there's something I want the next day and I don't usually get it, I know.*

*Interviewer: Right. OK. So, is it helping your memory?*

*P8: Yes. To do it like this.*

*Interviewer: OK. And any other areas? So, making sure you're organised and writing your lists, to help your memory, and....*

*P8: And also, when I go to bed, instead of taking the newspaper up with me I jot it down on a piece of paper what night it is.*

*Interviewer: OK.*

*P8: So I know what day it is when I wake up.*

*Interviewer: Oh. That's a good idea.*

*P8: Yes.*

*Interviewer: So, last thing at night, and that helps you first thing in the morning to get your head straight.*

*P8: I know I'm right, that it's that day.*

*Interviewer: So, what you've found since the brain injury is that you are needing to do these lists and keep yourself organised.*

*P8: The housework. Certain things on certain days.*

Memory and attention impairments that affect orientation, planning abilities, consciousness, and sense of self can significantly reduce engagement in rehabilitation interventions. Without memory of what has been experienced and achieved it is difficult for survivors to remain motivated to continue with the rehabilitation program. They are unable to judge for themselves whether or not they are improving and, hence, whether it is worth the effort to continue in the rehabilitation program. P9 demonstrates a failure to recall many of the episodic memories from attending the brief group music therapy:

*Interviewer: It won't come. I know that some of these things are really hard [participant 9] that I'm asking you to do, so...em.... These are the different things. I'm just going to show you this list and see if it helps you at all. These are the different things that you have done on the music therapy. See if anything sort of triggers anything with you. So, with Jonathan and [participant 10] and [participant 6] and [participant 7] and [participant 8] you've been playing just*

*once a week been playing music and singing songs, writing a song together...*

*P9: What...I've been doing that?*

P9 demonstrated significant memory problems in recalling information about the brief group music therapy. These severe memory impairments may have also inhibited his sense of self and his ability to self-evaluate. Memory is essential to an individual's phenomenological and experiential sense of self. P9's scores in the VASEN were excluded due to concerns that he was unable to use the tool meaningfully. This may have been due to his memory deficits that inhibited his ability to recall how he was feeling according to a scale.

According to the participants the brief group music therapy was able to address cognitive functional gains. Four participants reported improvements in cognition that they attributed to music therapy. The positive benefits were stimulating creative thinking, improved learning capacity, and improved memory. The following excerpt from P10's account shows how music therapy stimulated creative thinking and enabled her to perceive the linkages between thoughts that she had described as lost due to brain injury:

*P10: I think music therapy is definitely the way to go. I've enjoyed extremely very much and it has given me the opportunity to feel these connections again.*

Other participants acknowledged the effectiveness of music therapy to improve memory recall and learning capacity. P3 suggested that the musical exercises used in the treatment protocol enabled improvements in memory recall:

*Interviewer: OK. That's great. So, there were...practicalities. Has it given you any support with practicalities at all the music therapy? Anything that you can...any benefits or has it caused you any difficulties in relation to practicalities...practical things in life?*

*P3: I don't know really. Just to try and remember the sequence of things. You know...if it starts off and I think something is not right, and then all of a sudden it dawns on me I've done it the wrong way round. Then, I'll stop and do that, and I'll think "Why the hell did I start off that step, and not that step. Do you know what I mean? It's like "That's not right".*

*Interviewer: Are you finding you're relating that to music therapy to perhaps to something that*

*P3: Sort of, because of the beat. I don't know. Maybe it's because...like a rhythm sort of thing. You think: "Something's not right. Hold on. I've started at the wrong place again." Go back. Remember the sequence sort of thing. Yeah.*

*Interviewer: So, in some way your...the rhythm...the rhythms are helping your...have helped your...*

*P3: Jogging my memory. You think: "Something's not right." You know when you feel...at ease...wrong word...slightly off...that's not right...Oh, crap. I forgot the bloody...you know...and I think...tries to think backwards and think: "OK. I did that wrong." And then go forward a bit...better.*

P3's account suggests that error detection is integral to learning, and that the use of repeated patterns in musical rhythm activities can improve error detection and sequencing when carrying out tasks. P1 stated that music therapy had caused improvements in her capacity to learn. In the following excerpt P1 describes improvements in reading ability despite chronic aphasia:

*Interviewer: So, we were talking about reading and spelling and that you've had some difficulties since the brain injury.*

*P1: Yeah.*

*Interviewer: How...um...was music therapy...um...and relating it to your reading and spelling? Um...were there any benefits or any difficulties?*

*P1: I think I say that to Jon. As I said, he would write something on the board...oh, it wasn't just straight away...this has gone one week after the other week.*

*Interviewer: OK.*

*P1: When we started to do it I didn't know what it...he was just writing.*

*Interviewer: Right.*

*P1: Then bit by bit I used to go "I know what that says". I says "Oh". So that was quite...*

*Interviewer: OK.*

*P1: Quite nice. I says "You can learn me to read"*

So, cognitive deficits, particularly memory impairments, were common for the participants, and these affected them in the areas of orientation, daily living, engagement in therapy, sense of self, and reading and learning. Through music therapy participants were able to experience improvements in cognition. Improvements seemed to be related to rhythmic stimulation and the facilitation of error detection in working memory processes.

#### **5.1.1.2 Communication difficulties of participants**

ABI survivors often suffer communication difficulties, such as aphasia. These difficulties inhibit their ability to express themselves and can be a major source of frustration. Aphasia was the most common type of communication disorder reported by the participants. They experienced aphasic difficulties in verbal word-finding, verbal comprehension, and in completing application forms. The following excerpt from P1's account provides an example of word-finding difficulties and its effect on P1's behaviour and self-esteem:

*Interviewer: If there's anything you want me to help you with... how about...um...I mean...we talked about communication. Has that...talking about communication...what parts of the communication is it that your...that you find most difficult? What do you think is...is sort of...has been the most difficult about the communication side of things? Is it finding the words or...?*

*P1: Yeah. Sometimes it's in my brain...*

*Interviewer: Yeah.*

*P1: And something else comes out...*

*Interviewer: Yeah.*

*P1: When it shouldn't come out. And that's why sometimes I try and keep quiet.*

This excerpt shows that when survivors cannot be sure that what they want to say matches what is actually spoken, then they might respond by withdrawing from communication with others. This acts to lower self-esteem; frustrates the need to communicate one's thoughts, feelings, and needs; and reinforces social isolation.

Comprehension may be affected by speed of processing and ABI survivors with comprehension difficulties might be unable to keep up with the flow of conversation. The following excerpt captures the intense frustration when unable to process speech quickly enough to remain with the flow of conversation:

*P1: When anybody's talking...it's not going in my brain.*

*Interviewer: OK. So it's not... you thinking it's not...sort of...processing in there. It's not going in there?*

*P1: Yeah. It's sometimes when I go home I think it "oooh!" [frustrated tone]*

*Interviewer: So, is that mem...memory?*

*P1: Yeah. Sometimes I can go home thinking "I should have told her this or I should have said...I think "ohh"*

*Interviewer: OK. So, and has that been you think sort of memory has been a problem, yeah?*

*P1: Sometimes I can't write properly...can't read...read. I can read sometimes but I still don't know what it means.*

*Interviewer: OK. Yeah.*

*P1: Um.*

*Interviewer: And the writing...?*

*P1: It's like to...to spell...that's it spell.*

*Interviewer: Spelling.*

*P1: Terrible. Spelling. Even though they'll say "this is how you spell it, [participant 1]." But to me it doesn't. I can't spell it and sometimes it doesn't...I don't know what it means as well.*

*Interviewer: So, the comprehension.*

*P1: Yeah.*

The above excerpt also demonstrates difficulties with the written word, and understanding the meaning of words.

Aphasia inhibits the mechanisms for effective communication, and this frustrates the need for self-expression. Through playing musical instruments the participants were able to make use of non-verbal communication and feel the satisfaction resulting from this. P1 captures this in the following excerpt of her account:

*P1: OK. When I have the ...I can't think what it's called...the round thing and you bang it.*

*Interviewer: Yeah. The drum?*

*P1: That's quite good though. Sometimes when you...you come...you've just got things in your brain...*

*Interviewer: Yeah?*

*P1: You just want to...ooooooooohhhhhhhhhhh. I like that.*

In the above excerpt the participant conveys a sense of intense frustration due to ineffective verbal expression. She suggests that this frustration is relieved through playing the drum. Playing music can meet the need for self-expression in a non-verbal way that eliminates the difficulties resulting from aphasia. P1 also reported reduced aphasia during musical tasks:

*Interviewer: Yeah. I mean, what did you...so, communication...you were talking about getting your words out...um.... Do you think having the music therapy with Jonathan, has there been anything that...that the music therapy has maybe helped you get the words out or...?*

*P1: Um...I think sometimes I'm ...I must admit that when we were doing a CD, he was writing what we got onto...he used to write on the board.*

*Interviewer: Yeah.*

*P1: And then I could...*

*Interviewer: Could follow it.*

*P1: Yeah. And I could...I have these [holds up sheets of paper], and then I'd say "Oh, this is what it says. It says blah, blah, blah, blah, blah. And sometimes I wouldn't do that.*

*Interviewer: Yeah.*

*P1: Well, that was quite good. Um....*

In this excerpt P1 explains that during the music therapy sessions she perceived improvements in her comprehension and reading abilities. Positive experiences of overcoming difficulties in communication can build confidence and strengthen engagement in rehabilitation.

### **5.1.1.3 Emotional problems of participants**

Emotional problems following ABI include anger, anxiety, depression, confusion, loneliness, powerlessness, and shame. The sub-theme of ‘anger’ captures the survivors’ anger about acquiring disability and the consequent changes they experienced. Anger, as an emotional reaction to brain injury, may begin as a raw form of hate for the changes in the self and the effect of ABI on aspects of daily living. However, it may be transformed into determination and can, then, be used to drive survivors to maintain an exercise regime and be proactive in their rehabilitation. The following excerpt from P6’s account captures the use of anger to fuel determination:

*P6: Anyway, I don’t know if I mentioned this in music therapy but I look upon my haemorrhage as a thing to be beaten...you know...it’s an entity. I have to get the better of it. I always have done. You know...from the start I had this thing...I have to get the better of it. So...because I hate it so much...I’ve hated it from the start. So, if anything I have to...any of my goals that I try to achieve is to get the better of this thing...this thing that I hate so much. I have to do it...you know...to get one over it.*

Functioning in society can be a source of high anxiety for ABI survivors. Cognitive deficits, worries about appearing vulnerable, and fear of shame all contribute to the level of anxiety and stress associated with undertaking any social activity or task that involves interacting with people, or a virtual world (on the internet), that are unaware of the difficulties of the ABI survivor. The following excerpt from P3’s account expresses the high levels of stress she experienced when applying for financial assistance following ABI.

*P3: Yeah. Trying to sort it out because I was sort of in between things. I was trying to get rid of the house...uh...sort out benefits...you know...because people wouldn't give answers about things or...clear information.*

*Interviewer: Uh.uh.*

*P3: You know...everyone assumed you've got access online. It does your head in if you try and go online. Do you know, if you don't answer that question properly, you lose out on your benefits, and I'm thinking: "Well, what are they on about?" I seemed to be thinking of a different answer to what they're...*

*Interviewer: OK.*

*P3: You know...and it...sort of...I needed time to do that as well.*

The anxiety here is bound up in the fear that an incorrect response from P3 will result in a lack of financial support, which will affect her basic needs. Anxiety and stress can be caused by shame about inappropriate behavioural responses in public or the fear that others might judge the survivor or try to avoid contact. The following excerpt from P8's account captures her anxiety when shopping and her reaction when she finds it difficult to cope with the anxiety:

*P8: Also, if I go in the odd shop, they might recognise me and say 'Oh. It's her again.' And so, and so, and so, and so. So perhaps, I've just walked out then.*

*Interviewer: Right. OK. Do you find it quite stressful...the shopping experience?*

*P8: Sometimes. Bless you.*

In this account of a shopping experience P8's anxiety leads to withdrawal from interaction with others. This example might reveal shame and anxiety (and possibly paranoid thoughts) as factors inhibiting engagement in rehabilitation programs, as these are likely to involve interaction with other people – injured and uninjured. The following excerpt shows how shame about appearance and functioning can be a great source of anxiety even when in the company of other ABI survivors:

*P6: I'm so self-conscious. Even...I know it sounds silly...even at Headway, if we're walking from one end of the hall to the other I still feel self-conscious. Isn't that silly? You know...everybody here at Headway is in the same boat. Well, not everybody, but...and here am I feeling self-conscious about walking from one end*



*of the hall to the other...which is ridiculous but I'm just...everywhere, apart from when I'm at home, I feel self-conscious about...do I look silly? Am I straight when I am walking? Am I making a fool of myself? You know...is my knee bending when I walk? You know...it's just that sort of thing.*

The impact of ABI can cause depression and suicidal ideation. P1 briefly expressed a lack of feeling anything positive about herself after her brain injury:

*P1: I'm... I don't feel anything...anything good really.*

The next example from P2's account gives more detail about the kinds of thought processes that might lead to depression or even suicidal ideation. P2 suggests that ABI survivors may be more likely to contemplate suicide at a younger age rather than in later years of life:

*P2: I mean...I'm at the end of my life. I mean...I'm seventy-four...I mean...you know...they've got another whole of their life to go...and I can well imagine what they're feeling...and if I had to be like this for the next thirty or forty years I'd shoot myself. There's no doubt about...you know...because it is going to stay with you forever. It's never going to go. Although, when you have...they say it will get better but it doesn't. I think if anything it gets worse.*

The above excerpt captures the hopelessness and anger that are often associated with depression. Confusion and powerlessness might coexist as survivors have no control over how their needs are met during early phases of rehabilitation:

*P9: I left there before I should have done because...what I was doing...I didn't even know what I was doing there. It wasn't up to me.*

The above excerpt from P9's account captures the confusion and powerlessness of the traumatic experience of ABI. It presents an image of the survivor in a traumatised state, unable to comprehend what has happened, and a total loss of control of his life.

The emotional reactions to ABI are significant and must be addressed in rehabilitation in order to help survivors emotionally adjust, and to improve engagement in rehabilitation programs. The brief group music therapy addressed some of the emotional needs of the participants and facilitated emotional adjustment. Some participants reported more positive

mood states when engaged in the music therapy sessions, and also using music outside the sessions to improve mood:

*Interviewer: OK. Right. In respect of those things...so, I'll just make a note of them because we'll need to come back to them. So, in relation to those things has music therapy given you any benefits or any difficulties...in relation to those things. So...your fatigue...dealing with practicalities...*

*P3: Yeah. Umm.*

*Interviewer: It's OK to say if not. If there's been no change, then it's OK to say so.*

*P3: I think it has because I listen to music more and it sort of calms me...that's the wrong word.... It does calm me a bit, especially if I'm uptight. I just have to remember to put the music on to...chill out. Do you know what I mean? Just take that whatever's the problem away for a minute and then calm things down a bit.*

*Interviewer: And has that been since starting music therapy you've sort of increased listening to music...using music.*

*P3: Yeah. Because I've got more music given to me. Do you know what I mean? I'm better listening to the music than watching it on TV. Sometimes the flashing of the music...uh...*

*Interviewer: The over-stimulation.*

*P3: Yeah. It's like I can close my eyes and listen to that. That's a lot easier than watching it because sometimes it's like right in your face and you think "I don't need to know that." You know it's like over much, too much...wrong word...you know...like...I can hear it without pain, if you know what I mean, yeah?*

*Interviewer: Absolutely. So, really, a benefit has been to your...calming you down. So, perhaps where we've been talking about the ups...where you've been feeling up and down...*

*P3: It tries to level...*

So, music therapy has the effect of improving mood state and survivors are motivated to use music to improve their moods beyond the music therapy sessions. The music therapy treatment also addressed emotional adjustment by targeting awareness of loss. In the following excerpt P10 explains how music therapy has helped to acknowledge and cope with the loss experienced:

*P10: I think music therapy is definitely the way to go. I've enjoyed extremely very much and it has given me the opportunity to feel these connections again.*

*Interviewer: Really?*

*P10: Yes. And also given me, you know how when you taste something and you think: "Oh, yeah. That's exactly what it is that I am missing" and so it's frustrating in the sense that you realise how much you have missed and you are keep missing. So, it's like...did you understand what I meant?*

*Interviewer: Absolutely, yeah.*

*P10: If you are given to taste again something that you haven't tasted for a long time. You feel: "Oh, dear. Where is it all gone?"*

*Interviewer: If you didn't know something then you can't miss it. But if you....Yeah.*

*P10: But then, when you're reminded of what it is you're missing, then it suddenly really strikes you as being really such a painful experience.*

*Interviewer: So, in that way would you say that the music therapy is it a benefit having been reminded...?*

*P10: It is. Yeah, definitely.*

*Interviewer: or does it cause you more difficulties?*

*P10: No. No. No. No. Because I believe, and that's my personal belief, maybe I'm wrong. I believe that you cannot get...it's the same with any kind of ailment...you cannot get better unless you know exactly what's wrong.*

#### **5.1.1.4 Sense of self and self-evaluation of participants**

Music therapy is able to safely and effectively address ABI survivors' emotional needs relating to the collection of losses resulting from brain injury. One such loss is that of the sense of self. This is bound up with the identity of the individual and is also linked to the capacity for self-evaluation. For people with ABI there is a loss of their sense of self as aspects of their identity are lost or altered. Thus, there may be a desire to recover the former sense of self that existed pre-injury. P10's account of the impact of brain injury captures this loss of sense of self:

*Interviewer: So, the first question. We're going to just chat about the music therapy, how things have gone. So, be as honest as you like. Don't hold back. The first question is since your brain injury what have been your greatest needs?*

*P10: Oh. That is such a difficult question. My greatest needs. Right. Well, basically what I really want and maybe I don't know if it's my greatest need but it's what I really want or what I would like to get back what I aspire to is to get back to my normal self.*

*Interviewer: OK. And, in which areas do you feel are preventing you from doing that, are the most difficult.*

*P10: Area. I don't know what the question. It's a strange question.*

*Interviewer: So, getting back to your normal self. What would that mean?*

*P10: What does that mean? It's a good question. What is my normal self? I haven't got a clue.*

P6 also referred to returning to a pre-injury sense of self:

*P6: I suppose my greatest need right from the start was to get back to normal.*

The desire to return to a 'normal' pre-injury self is also related to the rejection of the disabled self that exists post-injury. Survivors might attempt to hide their disabilities and difficulties to guard against feelings of shame that attack self-esteem:

*P6: I still go out socially. And we live only four houses away from our local pub. So, we still go to our pub on Friday nights. But I won't walk in the pub with a stick. I feel I know I just can't...and I walk holding my husband's hand. I think it's safer to walk out of a pub holding his hand, if you see what I mean.*

P6 conveys the need to appear able. The last sentence suggests a fear of showing vulnerability and anxiety about how others might respond to her vulnerability. P8 expressed fear about being exploited due to appearing disabled:

*P8: Well, this is the shop assistants.*

*Interviewer: OK. Sort of...trusting others...that you feel sometimes you may be taken advantage of.*

*P8: They might see I'm wearing an SOS, and think I don't know what they're doing.*

*Interviewer: Right. OK.*

*P8: Yes. I might just pop this inside me when I'm in some shops or take it off.*

In this excerpt, P8 explains that she wears information that identifies her as having disabilities. She finds it difficult to appear vulnerable due to fears that others will exploit

her disabilities for their own gain. These fears lead to difficulties trusting others discussed later.

Impairments in physical and cognitive functioning often affect the survivors' abilities to carry out tasks in the home or at work. This might lead to the loss of roles that contributed to the survivors' sense of self-worth. In the following excerpt P1 states that the brain injury has impaired her abilities to manage the home environment independently:

*P1: I just don't seem to be able to do anything for myself.*

*Interviewer: ok – and what sort of impact has that had on your life do you think?*

*P1: I like everything clean.*

*Interviewer: you like everything clean?*

*P1: umm they do clean but it is not the way that I like it.*

In this excerpt it is clear that P1 took pride in the standard of cleanliness she maintained before her brain injury. The sense of dissatisfaction she expresses when evaluating the standard maintained by others may also reflect her feelings about the fact that she is not able to fulfil this role in the way she had done pre-injury. The loss of role in the family can have great impact on survivors' feeling of value and self-worth. Impairments might also lead to problems in carrying out tasks at work. P2 captures the impact of the loss of functioning on tasks that he found simple before his brain injury:

*P2: So, I've lost the use of this left side completely...well not completely. I can't even knock a nail in because I can't hold a nail to hit it with a hammer. Because I was always really constructive.*

P2 later mentions his achievements in his occupation and in owning his own business pre-injury:

*P2: Because I was a mechanic I used to strip engines and rebuild them. I could build chassis and build kit cars. I had a kit car company. I designed chassis body and made moulds and all things like that all my life. And then in the building trade I built about eight of my own houses and...sold them on.... It was a different thing in life...totally different.*

P2's sense of self was bound up in his ability to create and build, and in his success. The ABI had caused impairments that limited his abilities and, hence, affected his sense of self. The excerpt from P2's account captures an experience of life pre-injury that contained a high sense of self-worth and capability.

Brain injury can cause impairments in survivors' ability to perceive their own progress in rehabilitation and their fatigue levels. The following excerpt from P1's account captures her limitations in self-evaluation of improvements in her abilities:

*P1: People will always say to me "[participant 1], you've done really well." And I'll go "Don't be silly." And they've gone "But you've done really well." But I can't see it.*

*Interviewer: Yeah.*

*P1: That's the only trouble with me. It's like John would say to me : "You've done really well, [participant 1]." And I look at him (presents a facial expression)...*

*Interviewer: (laughs)*

*P1: "You really have." And I can't see it even at home. So, I don't know.*

Difficulties in self-evaluation can inhibit motivation in rehabilitation and contribute to the feeling of hopelessness. It also contributes towards dependency on others for evaluating progress and self-regulation:

*P3: I know my concentration goes because my speech slows down. Physical things...I will drop things or I'll think: "OK. Pick up your..." My foot will drop. So, I'll think: "OK. I've gone too far." I'll have to sit down and re...what's the word...re-ener...*

*Interviewer: Recharge?*

*P3: Yeah. Recharge. I know that if I get really...tired, my mum seems to know when I'm out. "You're getting tired, aren't you? We'll go for a cup of tea." Just that bit of a break because it's like it's overload sometimes and I just have to sit down and just stop for a minute.*

In the above excerpt P3 shows that she is able to detect a loss in concentration by noticing problems in speech production and physical functioning. She relates these problems to fatigue. P3 also states that when she is out of the home she relies on her mother to monitor

P3's fatigue. Environments outside the home might have a higher number of stimuli. The intensity of these stimuli might also vary widely. These factors can result in processing difficulties for ABI survivors and might increase fatigue levels. So, it may be more difficult to self-evaluate when in environments that are less familiar or that contain a greater quantity of sensory stimuli.

The participants commented that the music therapy treatment had altered their sense of self and self-awareness. The musical exercises and the song writing enabled a greater awareness by revealing to the participants their current level of ability in a meaningful way that the participants could tolerate:

*P10: So, I think the music therapy by opening up my awareness of what it is that I have lost has allowed me somehow to regain a little bit of that.*

P10 suggests that she has perceived benefits through becoming more aware of her loss of functioning. Her excerpt captures the positive aspects of acknowledging the loss of functioning. Other benefits of the increase in self-awareness include the development of compensatory strategies that survivors can use when they perceive lower levels of functioning in activities of daily living. In the following excerpt P3 explains how she uses observations made during the musical exercises to improve how she makes a cup of tea:

*Interviewer: OK. So, that's been a difficulty. Anything with regards to your sort of physical states? So, has music therapy had any benefits or any difficulties in relation to your sort of physical...you were saying about...*

*P3: I've noticed my left hand is much better at keeping time than my right. But then, that's because maybe I'm tired or it's the end of the day. It goes achy. You know...it won't respond the way I would like it to. But that hand is taking more...easier, sort of...re-routing...do you know what I mean...I'm trying to concentrate more on the left-hand side. So, yeah.*

*Interviewer: And, has that in your everyday life...*

*P3: I've noticed that I'm doing that more left-handed. Especially, the tea because I can't control the milk...pouring the milk...you know...especially at the end of the day I know I drop things, but I've noticed if I'm really tired I will do it left-handed...try and do it left-handed.*

P3 demonstrated that she identified unimpaired functioning in her left side through the musical exercises. The exercises enabled P3 to establish that her left limb functioned at a higher level than the right, and this caused her to consider using the non-dominant limb at times when P3 may experience the signs of fatigue, for example dropping objects.

Despite P1's difficulties in perceiving improvements in her functioning (quote on page 16), she was able to recognise improvements during the musical exercises. In the following excerpt P1 describes the group musical attention exercise and her experience of perceived improvements:

*P1: Yeah. We used to do...and I can't remember...in the afternoon, what we did the first...when we got there. He used to be the baddy....*

*Interviewer: Right.*

*P1: And he used to be the baddy and we had to do this banging, let's say, to make sure we don't do what he's doing.*

*Interviewer: So you don't do what he does.*

*P1: Yeah.*

*Interviewer: Oh. Right. OK. And if you end up doing what he does, then he's caught you.*

*P1: Yeah.*

*Interviewer: Yeah?*

*P1: Uhuh. So, first of all I thought "oooohhhhh!" And then sometimes I'm thinking "Oh God, yeah."*

So, the musical exercises provided immediate feedback to the participants about their levels of functioning. It also enabled them to explore their abilities through enjoyable activities. Sense of self and the capacity for self-evaluation are significantly affected by ABI. Impairments in these areas are manifested in several ways. Survivors might reject this altered identity and the vulnerability it reveals. They might also mourn for the loss of the normal, pre-injury sense of self. The survivors' identities are bound up with their roles in



their lives before ABI. The loss of these roles contributes to the sense of loss and loss of sense of self. Survivors' capacity for self-evaluation is reduced following a brain injury. This causes difficulties in successfully carrying out activities of daily living and also in self-regulation for maintaining health. Music therapy addresses the loss of sense of self and ability to self-evaluate by exploring the survivors' functioning and comparing pre-injury and post-injury identities and experiences. Through music therapy survivors become more self-aware and perceived benefits in and out of sessions.

#### **5.1.1.5 Relationship problems and needs of participants**

ABI can cause problems in survivors' relationships that result in feelings of social isolation. Functional impairments and behavioural changes affect survivors' personal relationships and their relationships with support services and the general public. The participants reported the loss of friendships following their brain injuries. The following excerpt from P1 captures this:

*P1: I've got one friend. The others have all... everything...well, nearly everything...They've all disappeared.*

*Interviewer: Right.*

*P1: When you think about it, I feel lonely, actually.*

The loss of friendships can lead to resentment and bitterness when reflecting on them. The following from P2's account captures the resentment he felt when thinking about the friendships that ended after his brain injury:

*P2: Not really. Only...all the people before I had the brain injury were always scrounging off of me. I had hundreds of people all around you, and they don't come now. Only some of them...you know.... It's surprising how many people disappear.*

ABI survivors might experience loss of friendships. There might also be a need for the love and companionship found in an intimate relationship with a spouse or partner. P7 expresses this need in the following excerpt:

*Interviewer: So, since your brain injury, what have been your greatest needs?*

*P7: I think my greatest need is a good woman.*

Finding a partner or maintaining the relationship may be difficult due to functional impairments, behavioural problems, or difficulties in being able to meet their mutual needs. ABI survivors experience the need for supportive relationships to help cope with the challenges presented by the brain injury. They may need help with making applications and negotiating the complex procedures involved in seeking financial and disability support. P3 describes her experience of seeking support following her brain injury:

*P3: You know...everyone assumed you've got access online. It does your head in if you try and go online. Do you know, if you don't answer that question properly, you lose out on your benefits, and I'm thinking: "Well, what are they on about?" I seemed to be thinking of a different answer to what they're...*

*Interviewer: OK.*

*P3: You know...and it...sort of...I needed time to do that as well.*

*Interviewer: So, really, and support services really needed to have been there for you through that.*

*P3: Because I had to go out and find...citizens advice bureau...you know...I had to find...wait a couple of weeks just to get an appointment to see someone. Do you see what I mean? And I needed help to do the form.*

The excerpt above captures P3's sense of frustration at trying to find support from service providers and advisors. So, the availability of supportive agencies is a significant issue for some people with ABI. The way in which ABI survivors relate to, and interact with, others in society also depend on whether they feel they can trust other people. Cognitive deficits, such as memory impairments, can seriously affect an ABI survivor's ability to trust others. The following excerpt from P8's account shows the difficulty in trusting others due to fears of being exploited:

*Interviewer: OK. And anything else at all, do you think since your brain injury that are your greatest needs?*

*P8: Also, I've noticed sometimes I've had to watch the shop assistants.*

*Interviewer: Right.*

*P8: They might try to short change me and what have you, or not give me what I've bought.*

*Interviewer: OK.*

*P8: Yes.*

*Interviewer: So, you're concerned sometimes that...you get quite worried that you're...*

*P8: They might notice that I'm wearing an SOS.*

*Interviewer: Right.*

*P8: And they go out of sight to wrap something. They have done. That's happened I know. And then, they've come back with it in a bag like, and they've said the price what have you.*

*Interviewer: Yeah.*

*P8: So, sometimes I haven't paid them straight away, looked in the bag and I haven't got it.*

*Interviewer: Right. OK.*

*P8: Especially with shoes. They've put an empty box in the bag.*

*Interviewer: So, being able to trust other people has been bit difficult.*

Relationships following brain injury are altered and lost. Survivors experience social isolation as a result of the lost friendships, difficulties finding a partner, and problems with the availability of supportive agencies. Trusting others can also be a problem for ABI survivors. Music therapy can address the need for supportive relationships by providing a therapeutic environment and group support to enable participants to share experiences and develop friendships. The following excerpt from P6's account suggests that the brief group music therapy helped the participants to develop the relationships and share experiences:

*Interviewer: So, has music therapy given you any benefits or difficulties with any of these needs? You may feel that there's been no change at all, it's made no difference, and that's OK to say so. It's just what your thoughts are.*

*P6: No. I've enjoyed the music therapy. I've enjoyed the sessions. I think it's brought us all closer together in a way.*

*-----Interruption (20 seconds)-----*

*P6: Yes. As I was saying, I think it's brought us all closer together. We've opened up to each other. Yes. I think especially writing 'Our Time'...you know...*

*Interviewer: Yes. 'Our Time.' Is that the...*

*P6: Song.*

The above excerpt suggests that group cohesiveness is connected to the openness with which the group members share their experiences, thoughts and feelings. The next excerpt is congruent with this suggestion and it also implies that the safety of the therapeutic space has facilitated this openness:

*Interviewer: Has the music therapy been any benefit sort of with regard to sort of independence and friendships and loneliness...um.... Any difficulties?*

*P1: It was with...you can talk to Jon. If I didn't feel...if I was a bit down...I didn't have to talk to him if I didn't want to. But then, I would say "Oh, this has happened to me today" or "This happened to me yesterday" you know. And then, even the other two with head...with the music...to me we could us three could talk to Jon.*

*Interviewer: Right.*

*P1: Of...you know...how they felt or....*

*Interviewer: And you felt that that's been a benefit?*

*P1: Yeah. It's been quite nice actually. So sometimes when you... it's not just me; there's others...you just want to talk to somebody and it's quite nice.*

*Interviewer: And did you talk just to Jonathan or did you talk with each other?*

*P1: Us. All of us.*

*Interviewer: All of you together.*

*P1: Yeah. That was nice.*

P1 suggests that the treatment was beneficial, as it provided an environment in which relationships could be developed and experiences shared. Through these relationships the participants found support and a sense of belonging.

### 5.1.1.6 Independence and quality of life issues for participants

The need for support in many areas of ABI survivors' lives leads to a loss of independence for them. This is clearly captured in the following excerpt from P1's account:

*P1: I just don't seem to be able to do anything for myself.*

The loss of independence is integral to the ABI survivor's sense of self and to the fulfilment of their emotional needs. It links to their sense of self-worth. The participants reported being dependent on their families following their brain injuries. They relied on them for support when going out for a walk, activities of daily living, shopping, and travelling beyond local boundaries. This dependency on others is connected to their need to remain safe. This is captured in the following excerpt from P6's account:

*P6: As yet, I still have to use a stick when I'm out of the house on the pavement, or when I go shopping with my helper or my daughter. I have to use a stick when I go into town...you know...but that's another aim...to be able to walk without a stick...you know...in town. As I say, out of the house I can, if I have somebody on my right hand side, so I know that if I stumble, there's somebody there to grab.*

In the above excerpt P6 describes the need for support when walking outside the home. This support is needed to account for hemiparesis, hemianopia, and spatial neglect. The loss of independence in basic areas of functioning can impact on survivors' freedom and ability to socialise independently:

*P1: I can't go out...I haven't been out on my own...*

*Interviewer: ok...*

*P1: and for four years I've not been on a bus.*

The above excerpt from P1's account briefly captures the need to socialise independently and the need for freedom. The following excerpt from P6's account provides a more detailed understanding of the loss of independence and its impact on her quality of life:

*P6: I can walk, but to just be able to get out of the car and just walk like I used to...you know...in town or on the pavement without even thinking about it...without it occurring to me that I'm walking...like I used to. That is one of my big aims. And, we live just across the road from fields and our dog, a golden retriever, and to be*

*able to walk across the road and to walk across the field, and just to do that is one of my aims. Just to be able to walk across the field like I used to be able to walk across the fields with him...you know.*

*Interviewer: That lovely freedom.*

*P6: Yeah. Just stride across the field like I used to.... Sorry, I'm waffling on again as I always do.*

*Interviewer: This is where you can, I wouldn't call it waffling, but this is where you can talk. Um...so, I would call that a physical need, but also an emotional need, for needing to have choices and freedom and these sorts of things.*

*P6: Mm.*

*Interviewer: OK. What about socially? Are you able to do things that you...?*

*P6: I still go out socially. And we live only four houses away from our local pub. So, we still go to our pub on Friday nights. But I won't walk in the pub with a stick. I feel I know I just can't...and I walk holding my husband's hand. I think it's safer to walk out of a pub holding his hand, if you see what I mean.*

*Interviewer: It might be safer for both of you, yes.*

*P6: Yeah. I know it's a cheat's way of doing it, but the...the other thing...I mean...the way I used to just...years ago I used stand at the bar for hours, just standing at the bar. But now, as soon as we get in the pub, we find a seat and sit down and don't sort of walk around and mingle like we used to. That's another social thing that I'd like to be able to do...independently, though. But, of course, there are old flagstones in the pub, which are sticking up and I'd trip over them if I tried to walk on my own. I could walk with [help], you know, but I want to be able to walk on my own. Silly things like that.*

The loss of freedom and the concurrent dependency on family can bring about resentment from some survivors:

*P7: I would like to get back driving again.*

*Interviewer: Driving.*

*P7: Mm. And just to be independent: without my parents sticking their oar in, if you like. You know what I mean?*

*Interviewer: Absolutely.*

*P7: Well. Yeah. Just independence more than anything.*

This resentment may be linked to feelings of being a burden to others, of a lack of privacy, of loss of agency as an adult. Rehabilitation can give ABI survivors back some of their independence. The brief group music therapy focused on the importance of providing a space in which the participants could feel more independent and have a sense of ownership. The following excerpt from P6's account captures the importance of the need for independence for ABI survivors. P6 explains that this is the reason for naming their song 'Our time':

*Interviewer: Good. Writing a song together. You've mentioned the song. What did you call it?*

*P6: Our Time.*

*Interviewer: Our time.*

*P6: Yes. Because I always think that when I come to Headway it's my time...you know.... I'm away from the home environment...not...you know...I love my home and my family. I mean, they've been absolutely brilliant, but it's my time. I'm away from my helper and everything. From the start I had my carers and I'm away from my carer...well, I don't have carers anymore...I have a helper...I'm away from all that. The reason I call it my time is because I'm away from all that sort of thing. It's my personal time...you know...it's where I do my own thing and I...if you see what I mean?*

*Interviewer: I do see what you mean.*

*P6: It's purely my time, so the song is called 'Our Time' because we're all together. We have our own time here. We do our thing.*

### **5.1.2 Aspects of treatment**

For question two, all participants were asked the following:

There were different aspects to the music therapy you had. Can you say which of these aspects of music therapy you found most useful, and which were least useful?

Please explain why you have chosen these aspects.

The participants were also presented with a printed list of the various aspects of the music therapy treatment to act as a prompt. Table A9.2 in Appendix 9 shows the master table of

themes for responses to these questions. However, a summary of the themes is given in table 5.2 for quick reference.

Table 5.2: Summary of themes for responses to question 2

<b>Superordinate themes, themes, and sub-themes</b>	<b>Superordinate themes, themes, and sub-themes</b>
<b>General evaluation</b> Effectiveness of music therapy Value of music therapy Therapist was helpful	<b>Group memory exercise</b> Group memory exercise was most useful Group memory exercise was useful Group memory exercise was enjoyable/fun Group memory exercise was challenging Impact on memory
<b>Homework exercises</b> Homework exercises were useful Homework exercises were least useful Difficulty remembering to practice Required self-motivation Interests and motivation Dependence on others for practice	<b>Group discussion</b> Group discussion was most useful Group discussion was useful A therapeutic space Shared experiences, thoughts and understanding Supporting each other
<b>Playing musical instruments</b> Playing music was most useful Playing music was useful Playing music was least useful Playing music was enjoyable/fun Self-expression through playing music Impact on memory Musical ability	<b>Singing the original song</b> Singing was useful Singing was essential Singing was least useful Singing was fun Singing was challenging Anxiety about singing
<b>Group attention exercise</b> Group attention exercise was useful Group attention exercise was least useful Group attention exercise was enjoyable/fun Group attention exercise was challenging	<b>Songwriting</b> Songwriting was most useful Songwriting was useful Songwriting was enjoyable/fun Self-expression and reflection Sequencing and planning Supporting and valuing each other Songwriting was challenging Impact on memory

The responses produced eight superordinate themes: general evaluation, homework exercises, playing musical instruments, group attention exercise, group memory exercise, group discussion, singing the original song, and song writing.

#### **5.1.2.1 General evaluation by participants of brief group music therapy**

Six participants made general comments about the effectiveness and subjective value of the intervention, and included comments about the therapist. The following excerpt from



P10's interview captures the effectiveness of the music therapy and provides some insight into why it was effective:

*Interviewer: OK. So, bearing all that in mind, and thank you for being so open. Has music therapy been any benefit in those areas or any difficulties?*

*P10: I think music therapy is definitely the way to go. I've enjoyed extremely very much and it has given me the opportunity to feel these connections again.*

*Interviewer: Really?*

*P10: Yes. And also given me, you know how when you taste something and you think: "Oh, yeah. That's exactly what it is that I am missing" and so it's frustrating in the sense that you realise how much you have missed and you are keep missing. So, it's like...did you understand what I meant?*

P10 considered the brief group music therapy to be effective in meeting her needs and difficulties. It increased her awareness of her loss of functioning and other losses due to ABI and provided her with the opportunity to regain some of these. This excerpt also shows that P10 was able to adjust emotionally to her brain injury. Music therapy simultaneously challenges and supports clients in rehabilitation. This is through enabling them to acknowledge the losses experienced and to find ways of addressing these losses through recovering lost functioning and coping with the lack of recovery. This may induce feelings of discomfort for the clients as they are challenged. However, the participants considered this a useful aspect of the treatment. The following excerpt from P1's interview conveys this clearly:

*P1: I think it was good, actually, instead of me just being sat there and not doing anything*

*Interviewer: Ok. So, things that maybe made you feel a bit uncomfortable but...*

*P1: It's good, yeah.*

*Interviewer: But it's good for you as well.*

*P1: Yeah.*

Music therapy may be unique in its ability to challenge and support ABI survivors through a client-centred approach. Flexibility is fundamental to this approach and the use of music in music therapy facilitates a highly flexible delivery of treatment. This allows music therapy to meet the diverse needs and range of functioning of the heterogeneous ABI population. The following excerpt from P3's interview captures the challenging nature of the work while also remaining flexible:

*Interviewer: OK. Anything else at all? Was there anything that was in the music therapy that you didn't want to be experiencing or...?*

*P3: Well. Most people. I don't know. I think that sometimes I was uncomfortable, but then because I've never been put in that position before. I think that most people would be uncomfortable. Do you know what I mean?*

*Interviewer: So, the uncomfortableness. Was that a negative or was it...?*

*P3: It's both and both. Do you know what I mean? It pushed you a bit because you are going to get that anyway from somewhere else but it's better...learn how to...not control it...wrong word...uh...accept it or work around it. You've got your own way of working around it.*

P3 suggested that music therapy is unique in enabling her to develop personalised compensatory strategies to work around her problems.

The effectiveness of the therapist emerged as a theme in the interview data. Some participants highlighted this aspect of the treatment and suggested that it was helpful to have someone to talk to when they needed it:

*Interviewer: Has the music therapy been any benefit sort of with regard to sort of independence and friendships and loneliness...um.... Any difficulties?*

*P1: It was with...you can talk to Jon. If I didn't feel...if I was a bit down...I didn't have to talk to him if I didn't want to. But then, I would say: "Oh, this has happened to me today" or "This happened to me yesterday" you know. And then, even the other two with head...with the music...to me we could us three could talk to Jon.*

So, it was important for the therapist to be available to listen but not coercive in delivering treatment.

### 5.1.2.2 Participant evaluation of homework exercises

The participants had mixed opinions regarding the between-session exercises (also called homework exercises). Some suggested that these were useful while others suggested that they were the least useful aspect of the intervention. Of those participants that found them useful P7 explained that the exercises were beneficial in terms of focusing and sustaining attention in a task:

*Interviewer: Yeah? And did you find them useful? Have you found them useful?*

*P7: Yes. In a way, because...holding your attention on things really.*

Participants who found it least useful identified factors that contributed to the difficulty in carrying out the exercises at home and maintaining an exercise regime: remembering to practice, self-motivation, personal interests, and dependence on others for practice. The following excerpt from P1's interview captures how her memory problems and dependence on others affected her use of the homework exercises:

*Interviewer: Anything the least useful?*

*P1: The homework exercises.*

*Interviewer: The homework exercises the least useful. Yeah?*

*P1: Yeah. Mainly that one.*

*Interviewer: Why was that?*

*P1: Because I forget. I forget and I don't remember when.... I try to remember and then...it's like the week goes so quick and you got to try and remember and then you forget...and you're thinking "ooh". So, mainly the homework...they're like when I went to school.*

*Interviewer: So, did you...did you do the homework or did you...?*

*P1: I think I did try.*

*Interviewer: OK.*

*P1: Yeah.*

*Interviewer: And even...sort of...with trying you still would say that was the least*

*useful of all the other things?*

*P1: Yeah. Cos' I always have to have somebody to help me anyway.*

So, motivation seems to be a key issue when considering exercises for rehabilitation with people with ABI. Motivation during the sessions was not highlighted as an issue for the participants. This may indicate that music therapy sessions provide sufficient motivation through facilitation by the therapist. It may also indicate that family involvement in rehabilitation is necessary to establish a regime that maximises potential for recovery and learning of compensatory strategies. Motivation to carry out exercises independently may be supported by adapting them to include the survivors' interests. The following excerpt from P3's interview describes how she used her interest to facilitate her motivation in the attention and memory exercises:

*P3: Yeah. Well. To be honest, I did do bits and pieces but I didn't write it down, and also, I didn't do the whole list if you know what I mean. There are different exercises. But some were easier...listening to the music, trying to get the music in your head, like the rhythm and the...not background, but...trying to get the songs along with the background...*

*Interviewer: OK.*

*P3: But, the...oh, actually the homework exercises like you're supposed to watch something and trying to remember what you watched.*

*Interviewer: Yeah?*

*P3: That I'm reasonably better at.*

*Interviewer: OK. Were you practicing that?*

*P3: Yeah. Especially the craft channel. Sorry, but if you remember how to do things, occasionally you thought "No. That wasn't like that. Oh, that was it." So, you fold it backwards and not forwards, and that sort of thing.*

*Interviewer: Does Jonathan know about the homework?*

*P3: No. Sorry.*

*Interviewer: It's OK. But, it might be quite good if he can get it on tape what you were doing.*

*P3: Some it was er...*

*Interviewer: He won't mind either. He'll be fine.*

*P3: To be honest, I've always done that – shirking the homework – until I'm actually told to do it, but yeah.*

*Interviewer: OK. So, the homework, but you were tending to watch things on the craft channel.*

*P3: Yeah. Trying to remember. Especially if I'm interested in a subject then, that can...you know...that will go straight over.*

*Interviewer: Uhuh.*

*P3: So, you have to be interested in the subject to...you know...*

P3 highlighted the need to be interested in the topic used in cognitive rehabilitation exercises. This may help survivors overcome some of the difficulties with motivation in these exercises.

### **5.1.2.3 Participant evaluation of playing musical instruments**

Participants' opinions about playing musical instruments during the music therapy sessions ranged from finding this to be the most useful to the least useful aspect of the treatment. The positive impact of playing musical instruments included the emotional satisfaction through non-verbal expression, the experience being memorable, and the enjoyment produced during the activity. The following excerpt from P1's interview explains how playing musical instruments was useful in enabling self-expression through music. This functioned as a way of satisfying the need to express an internal feeling state:

*Interviewer: So, which...any of them you can pick...I'm going to...I'm going to make you pick one out of all of them as your favourite...OK...as the most useful. I'm going to force you into a decision...bully you into it.*

*P1: Play music.*

*Interviewer: Playing music. Yeah?*

*P1: Yeah.*

*Interviewer: And, why did you pick that one over the others? I know it was a tough choice, but what did you find most useful about playing music?*

*P1: When playing music you can bang until your heart is contented.*

*Interviewer: Right. OK.*

*P1: Um. Yeah. Play the music and you can...I think that you can bang with...it's one of them thingibobs...you see I don't know...bang it.*

*Interviewer: Oh. Yeah. With the silver...yeah the tambourine*

*P1: Yeah. I like doing that.*

*Interviewer: Yeah.*

*P1: Yeah.*

*Interviewer: So you found playing music the most useful because it...you could bang the drums.*

*P1: Get rid of your...not the emotion.*

*Interviewer: Yeah? Get rid of what was inside and...*

*P1: That's it. Yeah.*

So, playing musical instruments allows the non-verbal expression of an internal feeling state, or something that is difficult to express verbally, to produce a feeling of relief or satisfaction. This suggests that P1 was able to meet her own emotional needs through the brief group music therapy. The experience of playing musical instruments also seemed to have a positive impact on memory recall. P9 had significant difficulties recalling most of the semantic details about the music therapy sessions. However, he was able to recall the experience of drumming:

*Interviewer: Just see if there's anything there that reminds you because it might be that something there triggers a.... Apparently, and I don't know this, but apparently you've all been banging drums and then somebody shouts out....*

*P9: Oh, yeah. Um. When we're drumming*

*Interviewer: That's it.*

*P9: We haven't got a group this week. That finished last week.*

P9 was able to recall drumming and also that the final session of the treatment had occurred the previous week. So, the experience had been stored in his memory and the semantic information about the end of treatment had also been attached to this memory. Playing musical instruments produces an enjoyable experience in rehabilitation. The following excerpt from P6's interview captures the enjoyment of using music in therapy:

*Interviewer: So, what did you think about playing music in music therapy?*

*P6: Playing music? Playing drums you mean?*

*Interviewer: It could have been. Yes.*

*P6: Oh. I enjoyed anything that we did involving the music part.*

This suggests that P6 was able to meet her need to have enjoyable experiences in rehabilitation, thus improving her quality of life. P10 identified the need to feel competent as a musician in order to benefit from playing musical instruments:

*P10: I think the talking was extremely valuable. Yeah. Playing music is nice but I'm not a musician so it wouldn't really do much for me and I'm not much of a singer either.*

This may suggest that music therapy techniques in rehabilitation should involve some training for brain injury survivors who are non-musicians in order for them to maximise their potential in using musical instruments as part of their rehabilitation.

#### **5.1.2.4 Participant evaluation of the group attention exercise**

The attention exercise was considered to be useful due to its challenging nature. The attention exercise placed demands on the various types of attention functioning of the group members. Each role in the group attention exercise focused on a specific level of attention functioning, for example sustained attention or divided attention. The following excerpt from P10's interview captures how P10 found this useful by relating it to everyday attention demands in family conversations:

*Interviewer: And the attention exercise. When someone was heckling.*

*P10: Oh. Yeah. That was very useful. It was very useful to be able to realise how in a situation where there is a lot going on and how to keep the thread in spite of all the breakages to manage to keep the thread that was I think very useful. Because in a family, for example, it's a constant thread which is constantly broken. So, being able to keep it in mind in your hand almost to keep the analogy of the thread. If you can keep it in hand, then you may be able to reach backwards and forwards following the same thread.*

Although, other participants found it difficult to identify any carry over effects of the attention exercise into their daily lives P1 was able to detect improvements in her attention functioning during the task itself:

*P1: So, you've got to try and think "I've got to bang what he's...heckle is doing I've got to do. And that is...you know...at first you're thinking "Oh, my God!"*

*Interviewer: Was it hard?*

*P1: It was at first, but then I think bit by bit...you know*

*Interviewer: It improved.*

*P1: Mmm.*

Humour emerged as an important aspect of the attention exercise. It was derived from the playfulness of the exercise owing to its game-like style in which the group members were instructed to resist the distraction posed by the heckler in order to succeed in their task. The following excerpt from P2's interview briefly captures the humorous aspect of the attention exercise:

*Interviewer: So, there was a group attention exercise where some of you followed a beat and someone heckled and tried to interrupt and disrupt...*

*P2: Oh, yeah. That was funny that was.*

Humour through playfulness may be a useful device in motivating brain injury survivors to remain engaged in challenging rehabilitation exercises. As a psychological defence mechanism or a moment of emotional respite from the negative feelings of loss, it may



also be useful in supporting emotional adjustment when part of the whole experience of rehabilitation.

#### **5.1.2.5 Participant evaluation of the group memory exercise**

The participants found the group memory exercise useful, challenging and enjoyable:

*Interviewer: And there was a group memory exercise where you repeated back short rhythmic phrases after a short pause.*

*P6: Yeah. Because that was testing our memory. I enjoyed doing that as well.*

The exercise allowed the participants to evaluate their memory functioning in this task and perceive any improvements themselves. The following excerpt from P7's interview captures the initial experience of being challenged by the demands of the exercise and his perceived improvements in memory during the task:

*P7: OK. The repeating one, I guess.*

*Interviewer: Which one?*

*P7: The repeating...*

*Interviewer: Oh, the group memory exercise. Repeating back short rhythmic phrases after a short pause.*

*P7: Yes.*

*Interviewer: You would say that was your most useful. Yeah?*

*P7: Yes.*

*Interviewer: And, why that one over the others?*

*P7: Because it got me to think about what Jonathan was playing to us and we had to repeat back what he had played, and I felt as though probably towards the end of the group it was getting better.*

### 5.1.2.6 Participant evaluation of group discussion

The group discussion facilitated by the song writing exercise was highlighted as a very useful aspect of the intervention. It provided a therapeutic space in which the group members could express feelings of pain and loss. In the following excerpt P10 describes the way that the brief group music therapy provided a unique therapeutic space in order to address an unmet need:

*P10: I think it's always very valuable to be able to talk. So, I very much appreciated the opportunity that was given to us because we do a lot of things in Headway but we don't seem to have this space where we can express ourselves or express what it is that is hurting us. But music therapy was also very valuable in it allowing me to notice what it is...the links that I have lost...the ability to make links.*

*Interviewer: And do you think that was through...was it mainly through talking that that was reached?*

*P10: Yes. Definitely. Yes.*

*Interviewer: So, you'd say that really the talking was the most...*

*P10: I think the talking was extremely valuable.*

The participants used the discussion to share experiences of brain injury and support participants who found it difficult to accurately verbalise what they were thinking:

*P7: Just the fact that I could communicate and I could say something that somebody else in the group was trying to say but couldn't. I could make sense of it and say to Jonathan what they were trying to say to him.*

The similarities in their experiences and difficulties enabled the group members to support each other and to feel valued during the sessions. The acknowledgement of shared feelings and experiences helped the participants reduce feelings of social isolation and depression:

*Interviewer: So, sometimes you feel you're not quite getting over what you're wanting to say. How about in sort of music therapy, when you've been in your music therapy sessions? Have you been talking in that, and...you know...how have you found that within the music therapy?*

*P3: Yeah. It's not too bad actually because the others have the same problem and I can generally see what way they were going and you think "Well, OK. I might be able to say the word they were after". And then sometimes you think "I know what*

*you mean". And...like...stuck...both of us...all three of us are thinking...you know...and it gets frustrating. So, I can understand that, yeah.*

The group discussion facilitated emotional adjustment by helping the participants recognise their losses and reflect on the past and the present. The following excerpt from P6's interview captures her ability to reflect on her brain injury. She acknowledges difficulties she experienced but also describes positive feelings of hope about having survived:

*P6: Well, they were just sort of...they were just reminders of what I call the dark days. But then on the other hand they made me feel positive because they were in the past and I've come through them and out the other side. So, I'm lucky to be here, really. And um...[knock]...I always touch wood. I'm real superstitious about touching wood. So, they're in the past and I've got through them and survived them.*

#### **5.1.2.7 Participant evaluation of group singing**

Singing in the group aroused feelings of enjoyment, shame, and anxiety for the participants. Several of the participants felt anxious about singing. One reason for the anxiety was lack of practice:

*P3: Singing. I wasn't really comfortable with the singing because I haven't sung for God knows how long, but yeah, I would say that was the least...*

Other reasons included feelings of embarrassment about the quality of sound of their voices:

*P2: Well, the singing was the most embarrassing.*

*Interviewer: The singing.*

*P2: Yeah because I sound awful at the best of times.*

*Interviewer: Did you not want to do it?*

*P2: No.*

*Interviewer: Would you rather it had not been in there or...*

*P2: Well, no. you couldn't do it without it, could you.*

In the above excerpt from P2's interview P2 states that, although he felt embarrassed about singing, he considered it to be an essential element in the music therapy treatment. P1 expressed her anxiety about singing, but also suggested that this anxiety was bearable when the whole group sang together:

*P1: As long as the others were singing...well, that was OK*

Participants also found singing enjoyable in the group:

*P10: Playing music is nice but I'm not a musician so it wouldn't really do much for me and I'm not much of a singer either. It's fun. I enjoy singing but it's fun for me.*

#### **5.1.2.8 Participant evaluation of song writing**

Song writing brought together many aspects of cognitive functioning and emotional adjustment simultaneously. The participants found that it facilitated self-reflection and expression of emotions. It helped them value each other while challenging and stimulating mental processes. The following excerpt from P2's interview demonstrates how song writing can be useful for brain injury survivors:

*P2: Writing a song together was the best part of it.*

*Interviewer: Yeah? So, would you say which was the least useful? You said writing a song was the best...and talking...so, would you say those were your top two?*

*P2: Yeah.*

*Interviewer: Which one over...which one...talking or writing a song? I'd like to make you choose.*

*P2: Writing the song was the best.*

*Interviewer: Writing the song was the best. Yeah? Why was that?*

*P2: It always made your brain think about what you had wrong with you...you know...*

*Interviewer: Right.*

*P2: It made you think a bit more about it.*

*Interviewer: Yeah.*

*P2: You got your own thoughts but then when other people were listening...you know...you could relate to what had...what...because since I've had this brain injury no one ever bothered with me. You know...I got thrown out of hospital within about a week and that was the end of it...no therapy of any description.*

P2 suggested that song writing enabled the survivors to reflect on their losses in the group and to know that other group members heard these reflections. P2 stated that this experience gave him a sense of being valued and cared for. The last sentence in this excerpt suggests that this was the first time P2 had experienced this form of therapy since his brain injury. The song writing task helped the participants put the experiences, thoughts, and feelings about their ABI in a sequence. This method helped to process aspects of ABI that had been felt as overwhelming. The following excerpt from P3's interview captures the value of the sequencing element in addressing emotional adjustment:

*P3: Um. I would say writing the song together was the most useful.*

*Interviewer: OK. And, why that one over the others?*

*P3: Um. Probably because it got thoughts down on paper...sort of logical...no, not logical...sequence again...you know...where to start, middle, the end...what to put words down as...do you know what I mean?*

The process of writing down what happened and how it was experienced prompted insight for some of the participants:

*P7: Yeah. It was good. It made you think about your feelings of what we put down and made you think: "Oh Yeah. Maybe that was me."*

From the above excerpt from P7's interview it seems that by looking at other participants' experiences and feelings P7 was able to recognise similar ones from his own experience of ABI. This may have functioned to allow him to tolerate his own pain and loss. The song writing process enabled the participants to express feelings about brain injury:

*P6: We did some talking when we were...sort of...starting to do the song and...um...yes...that brought out some emotions. Um...*

Thus, the brief group music therapy provided a therapeutic space to hold the difficult feelings the survivors had about ABI. The emotional content of the songs written seemed to have an effect on memory recall for the more severely memory impaired participants. P9, despite having significant memory deficits, was able to recall a specific conversation in which he contributed to the song writing:

*Interviewer: Can you remember writing the song with Jonathan and you talked about different words to be put into the song about you had been feeling?*

*P9: Yeah. What...I did say to him: "That third line, Jonathan" I said. "Could we have it second because I've got a third line to put in?" Something like that.*

*Interviewer: Yeah? And did you get a third line put in?*

*P9: I did. I did. Yeah. Yeah.*

*Interviewer: Well done. Good work there, [participant 9]. And did you find that enjoyable?*

*P9: Yeah. Quite enjoyable, quite enjoyable.*

Some memories of the song writing task seemed to have been retained. This may be due to emotional arousal during the song writing process: the memories being encoded emotionally and episodically. The participants found the song writing process challenging from a lyric-writing perspective. Some participants were concerned with the skill needed to write lyrics, and this inhibited their freedom to express themselves through the lyric writing. The following excerpt from P10's interview shows how she found the task of lyric-writing challenging:

*Interviewer: And, how about the writing of the song?*

*P10: Oh. That was fun. But, I'm not a writer and for me it's very difficult for me to sort of open up in a group and come up with fascinating...because I have very high standards, I find it difficult to just throw a couple of words here and there and think "Yeah. Here you are. I've done my bit." No. I need time to come up with the right sort of...well, maybe not John Lennon. I certainly will never be a John Lennon. I have never been given the opportunity to actually.... And I think somebody did write something and that was good. She obviously had the chance to think through it so in the class it was great to do it together with...but I don't think my contribution was any particularly brilliant or anything because I need time. So, I*

*don't know what else to say about it. It was lovely in any case. I think I very much enjoyed it.*

The above excerpt shows that P10 needed time by herself to compose lyrics. She also suggested that, although, she was not satisfied with her own contributions to the song, she enjoyed the process. The excerpt from P10's interview has useful implications for treatment as it suggests that ABI survivors may need the opportunity to write lyrics in their own time outside the sessions in order for them to feel satisfied with their contributions. Writing lyrics during the group sessions may place very high demands on attention and thought processing and result in higher anxiety levels than when composing lyrics in situations with fewer environmental stimuli.

### 5.1.3 Length of treatment

For question three the participants were presented with the following question:

You have had 16 sessions of music therapy over about 4 months. What do you think about the number of sessions you received?

Table A9.3 in Appendix 9 presents the master table of themes for responses to these questions. A summary of the themes from the IPA is shown in table 5.3.

Table 5.3: Summary of themes for responses to question 3

<b>Superordinate themes, themes, and <i>sub-themes</i></b>
<b>Satisfaction of length of treatment</b> Satisfied More needed Minimum length 6 months
<b>Factors influencing length of treatment</b> Timing and fatigue Need for a break Familiarity with treatment Relationships Anxiety Absence

Their responses clustered around two superordinate themes: satisfaction of length of treatment, and factors influencing length of treatment. In cases where a prompt was needed, the interviewer asked whether they felt that the treatment period was long enough, too long, or too short.

#### **5.1.3.1 Satisfaction of the length of treatment**

Five of the eight participants reported that they were satisfied with the length of treatment. P6's response captured this sense of satisfaction and commented on the frequency of the sessions:

*Interviewer: So, you've had sixteen sessions of music therapy over about four months. What do you think about the number of sessions? So, that is 'is sixteen a nice kind of number'? Are you ready to end it now or would you have liked some more or would you have liked them more frequently or more spaced out?*

*P6: No. I think they are just right as they are. One a week is just fine. It's just good.*

P2 suggested that the length of treatment was the minimum length that could be effective:

*P2: If it had been less than that it wouldn't have worked I don't think.*

Two participants said that more sessions were needed. The reasons they gave were very similar and both suggested that there is minimum amount of time needed to become familiar with the techniques and protocol. P10 captured this very clearly:

*P10: I think it would have been nice to have a few more because by the time we got the hang of it, it was almost already finished.*

#### **5.1.3.2 Factors influencing the length of treatment**

In reflecting on the length of treatment, participants revealed six factors that were important in considering the length of treatment: timing and fatigue, the need for a break, familiarity with treatment, relationships, anxiety, and absence. P3's response captures several of these factors in her argument for a longer period of therapy:

*Interviewer: What do you think about the number of sessions you received? Do you think you would have liked more, fewer or you were satisfied with how it went?*



*P3: I think it could have been more because by the time you got into the stride of it, you're...sort of...more comfortable with what you're supposed to do.*

*Interviewer: Yeah.*

*P3: And that probably would have done more...do you know what I mean...so, it took about a month or so just to get to what you were supposed to do and you felt uncomfortable...you know...like being put somewhere where you...*

*Interviewer: A bit embarrassed?*

*P3: Yeah. That sort of thing. Until you are more comfortable with what you were doing, then...yeah...I think a little bit longer, probably. Because I missed a few...you know...some people have as well. Yeah.*

*Interviewer: So, a few more...*

*P3: A few more, probably. Yeah.*

*Interviewer: How many more?*

*P3: I would say six months maybe.*

P3's response shows that familiarity with treatment, anxiety, and absence are important factors that affect length of treatment. P2's response captures some overlapping factors but also suggests the need to develop relationships as a factor in determining the length of treatment in group music therapy:

*Interviewer: So, you have had sixteen sessions of music therapy over about four months. What do you think about the number of sessions that you received?*

*P2: They were alright, but I missed most of them. I missed a load of them.*

*Interviewer: Did you?*

*P2: Because we were away, but yeah, it was quite a long session but it was enough to get into it...you know.*

*Interviewer: OK. Do you think you would have liked more?*

*P2: Well, no. If I hadn't have missed so many it would have been about right I think.*

*Interviewer: Right. OK. So, more, fewer or are you satisfied?*

*P2: Well, yeah. It was enough.*

*Interviewer: Just enough. Yeah? OK. And...sort of...why do you...any reasons why you think it was about right.*

*P2: It gave you a chance to get into it...to get to know Jonathan...and to get to know the group...and stop being embarrassed at trying to sing when you can't sing.*

*Interviewer: OK.*

*P2: If it had been less than that it wouldn't have worked I don't think.*

*Interviewer: Right.*

*P2: You have to get comfortable with each other.*

*Interviewer: Yeah.*

*P2: And you can't do anything in five minutes...I mean...in my day an apprenticeship was five years and then you had another twenty-five years learning it.*

*Interviewer: Yeah.*

*P2: And now everybody thinks you can learn it in five minutes. Well, you can't...you know. You need time for it to settle in and I think that was about enough.*

The responses from P3 and P2 suggest that a longer treatment period would allow the participants to become more familiar with the routine and therapeutic techniques, develop relationships, reduce anxiety about the treatment, and allow for absence due to illness, appointments, or holidays. Two additional factors were revealed in P1's discussion about the length of treatment. P1 identified the need for a timely end to treatment to avoid the risk of boredom, and the need to time the sessions to account for problems with fatigue.

This is illustrated in the following excerpt:

*Interviewer: Do you think you would have liked more sessions, fewer, or was it about right?*

*P1: That I don't know. Just wish it wasn't...tight. We used to come half-past three?*

*Interviewer: Yeah.*

*P1: And I wish he would have come about one.*

*Interviewer: OK.*

*P1: So...because round about...we used to come tired*

*Interviewer: OK.*

*P1: but...*

*Interviewer: So, would you like to have more music therapy? Jonathan won't mind you saying whatever you want to say. Don't worry. Em...so, would you want more, less, or is it about right?*

*P1: No. Good. 16. Yeah.*

*Interviewer: About right.*

*P1: Yeah. Yeah.*

*Interviewer: Is there a reason why you...sort of...didn't want it maybe to have more or...*

*P1: Because sometimes it's nice to have a break, don't you.*

*Interviewer: So, maybe relating what you were saying about the half-past three start and being tired.*

*P1: Yeah.*

*Interviewer: Yeah?*

*P1: Yeah. But it's like anything. If you do the same thing over and over and over again, you get bored then, don't you. So, if you have enough...*

*Interviewer: Yeah?*

*P1: And then...now...*

*Interviewer: Enough, but not too much.*

*P1: Yeah.*

*Interviewer: Yeah? So, just the right amount that you don't get bored...*

*P1: Yeah. That's it.*

One participant (P9) showed significant impairments in memory and had great difficulty in recalling semantic information about the treatment. This interview was terminated when

the interviewer felt that P9 was not able to answer any further questions. As a consequence, questions three and four were not presented to participant P9.

#### 5.1.4 Improving treatment

The final question presented to the participants was:

How could the music therapy be improved?

Seven of the eight participants were able to respond to the question. P9 was not able to comment due to severe difficulties in recalling semantic details about the treatment. If the participants found it difficult to answer the question, the interviewer presented them with a printed list of the various aspects of the treatment as a prompt. Table A9.4 in Appendix 9 presents the master table of themes for responses to these questions. For quick reference, a summary of the themes produced is given in table 5.4.

Table 5.4: Summary of themes for responses to question 4

<b>Superordinate themes, themes, and <i>sub-themes</i></b>
<p><b>General Comments</b></p> <p>Could not be improved</p> <p>Excellent overall</p>
<p><b>Support</b></p> <p>Visual support</p> <ul style="list-style-type: none"> <li>- <i>Visual aids as prompts</i></li> <li>- <i>Visual aids for orientation</i></li> <li>- <i>Different learning styles</i></li> </ul> <p>Guidance with tasks</p> <ul style="list-style-type: none"> <li>- <i>Explanations</i></li> <li>- <i>Consolidation and planning</i></li> <li>- <i>Chunking when rehearsing lyrics</i></li> </ul>
<p><b>Personal preferences</b></p> <p>Flexibility</p> <p>Variety of instruments</p> <p>Familiar songs</p> <p>Individual music preferences</p> <p>Music listening to escape</p>

The responses from the participants clustered around three superordinate themes: general comments, support, and personal preferences.

#### **5.1.4.1 General comments by participants about improving the treatment**

Under the superordinate theme of general comments three participants said that the treatment could not be improved and a fourth participant, P10, said that it was excellent overall.

#### **5.1.4.2 Improving the supportive element of the treatment**

P10's response captures this sense of satisfaction with the treatment and also identifies important considerations for practice regarding how people with ABI might be supported more effectively:

*Interviewer: OK. And then the final question is how could the music therapy have been improved? Is there something that you would have wanted more of, something that you would have liked less?*

*P10: Yes. I think it would have been nice to have more of it and maybe have a more visible structure to it so that one can...because I'm made like that. That's probably nothing to do with music therapy itself. I think because I'm made in this manner I like to have structure and I like to know the structure. So, maybe a little more time spent explaining the structure would have for me only made a difference. That doesn't mean the way it was done wasn't good. It was actually excellent. I enjoyed it thoroughly.*

*Interviewer: But for you.*

*P10: I am just a pain. I always like structure. I mean in the morning, for example, every morning now I have a white board on which I explain what my day is going to be about. So, I know exactly one minute to the next but that's maybe a professional...*

*Interviewer: Throwback.*

*P10: Throwback. Yeah. And I like to know where I am going, what I am doing and why I am doing it. So, that's what I am saying. It's not a criticism at all.*

*Interviewer: Was there anything that you would have liked less of?*

*P10: No. No. Everything was perfect. As I say maybe I would have liked more of, more structure.*

P10 expresses the need for visual support and explanations giving more detail about the treatment protocol. This type of support would incorporate P10's visual learning style and enable P10 to remain orientated within the therapeutic process. The use of deeper explanations would meaningfully relate the therapeutic exercises to P10's needs. This might, in turn, support engagement in music therapy.

Visual support and guidance with tasks were also highlighted by P3, who suggested visual aids to be useful as prompts. P3 also emphasised the need to reduce information to be learnt into manageable chunks, and to incorporate consolidation (of what has occurred) and planning (of what will happen next) into each session. Chunking, consolidation and planning identify memory impairments as salient issues influencing engagement in, and effectiveness of, rehabilitation therapies for people with ABI. The following excerpt from P3's interview illustrates the above points:

*Interviewer: OK. Then, the final question is how could the music therapy be improved? So, was there anything that you liked more than another, or less than something else, or was there something missing, something that you didn't want to participate in?*

*P3: I'm not sure. Um. Improved.*

*Interviewer: So, was there anything that in the music therapy sessions...anything that might...that you thought...you know...maybe you had a small something that you'd rather have had more of it, or anything that you had too much of that you didn't find particularly useful and...you know...you'd rather not do that...or something...you know...a completely different idea. Anything that was missing. Anything that you were expecting that you didn't get or...*

*P3: I'm trying to think actually. Um. Probably more structured...um...maybe the reminders at the end of the session like you're supposed to do something or get something back for the next session.*

*Interviewer: Yeah.*

*P3: Maybe that's a reminder like a...reinforcement of what you've done in the last one to carry on in the next one.*

*Interviewer: OK.*

*P3: Maybe. I don't know.*

*Interviewer: That's fine. Jonathan won't mind you saying anything. Don't worry.*

*P3: Yeah. I know. I'm just trying to think because sometimes it was better if it sort of carried on.*

*Interviewer: What.... So, things that you were to be carrying on in the following week.*

*P3: Yeah. Sort of...carrying on and then...you know...it's like "OK. In half an hour we'll try and do this. I know you...it doesn't always work with us time-wise because we've got no sense of time in some respects because it might take longer to do one thing in one session than do in the next one...you know what I mean? You can't allot half an hour to do that, that and that. It won't always work. So, that might need to be more fluid or...either way sort of thing.*

*Interviewer: Yeah. So, a bit more flexibility maybe, but also...*

*P3: Like it's not going to work today and that sort of thing.*

*Interviewer: And you also said about being more structured in...*

*P3: Sort of...the problem we had with the song would be...um...OK, it was good writing it, but...how can I put it? When you had to put the words to the music...like the beats in between...like you had to have a...distance...wrong word...no...gap.*

*Interviewer: Yeah.*

*P3: And then, say...song...you know...the next part of the song. Maybe explain why...tempo.*

*Interviewer: Yeah.*

*P3: Do you know what I mean? Like different tempos. And you think "One, two, three..." Uh...come on...visual...like...*

*Interviewer: To have some visual...*

*P3: You know...like...it had to be "One, two, three..." Then, the...you know...like...broken down more. And maybe...chunks. Break it down.*

*Interviewer: So, the way that Jonathan could have...sort of...conveyed some of the bars...the music in the bars or the four beats or...*

*P3: Yeah. If you had to put that in two sentences...two lines. Do that, but also do if there was...like...a beat in between "One, two, three..." then you start the next one...do you know what I mean?*

*Interviewer: Yeah.*

*P3: Do you know...like a reminder because sometimes I had to remind...like...do a bar there saying that's the next you know there was a gap or two beats before the next one like "One, two..." then the next one started like a reminder.*

*Interviewer: So, you could've done with maybe developing how you can remember the song and manage the words with the music.*

*P3: Yeah. Because some people are better at reading...you know...like..."dot, dot" then, but I'm better listening "one, two, three" then...you know...visual as well as...*

*Interviewer: Auditory.*

*P3: Yeah. That's it. Different versions.*

P3's excerpt also suggests the need for therapy to be flexible and responsive to the changing needs, energy levels, and abilities of ABI survivors.

#### **5.1.4.3 Personal preferences of participants**

Personal preferences emerged as a superordinate theme with five themes clustering around it: flexibility, variety of instruments, familiar songs, individual music preferences, and music listening to escape. P6 suggested that the use of familiar songs would increase the enjoyment of the intervention. These songs might have personal meanings for the ABI survivors or be associated with special memories:

*Interviewer: The last question is just here. How could the music therapy be improved?*

*P6: That's a bit hard for me to say. The only thing I would maybe suggest is maybe we could sing songs together would be nice. But that's purely in my opinion because I enjoy singing. Not that I've got any voice, but...*

*Interviewer: Singing is wonderful.*

*P6: I just enjoy singing as a group.*

*Interviewer: What sort of songs would you like to sing if you were singing? What would you like if you could choose.*

*P6: Oh, dear. What. You want specific titles or...well, we do singing on a Thursday afternoon, anyway with Ben.*

*Interviewer: Do you?*



*P6: Yes. He comes in on Thursday afternoons. We sing songs all across the board, and I really enjoy singing...our singing sessions. We do all manner of different songs. A lot of seventies songs, and even before then...sixties.*

*Interviewer: That's good.*

*P6: And my favourite one is...I say this because it's mine and my son's song, I call it...it is 'Stand By Me' by Ben E King.*

The personal relevance of certain pieces of music, musical preferences, and the variety of ways that individuals differ in their use of music all point to the need for music therapy to remain flexible if it is to effectively engage individuals and address their individual needs. P2's excerpt illustrates this point and suggests that having a variety of instruments and acknowledging individual musical preferences might improve the intervention:

*Interviewer: Good. That's nice to hear. OK. The last question then. How could the music therapy be improved?*

*P2: Some decent things to play with instead of them blooming old drums all the time.*

*Interviewer: Right. OK. Any suggestions? What would you have fancied?*

*P2: Well, there must be other instruments we could have had.*

*Interviewer: Right.*

*P2: They were all clonk, clonk, clonk...you know.*

*Interviewer: Yeah.*

*P2: That's not music to me. What little bit of music I like is mellow.*

*Interviewer: Right.*

*P2: Subtle...you know.*

*Interviewer: OK.*

*P2: Romantic, putting it mildly.*

*Interviewer: Yeah.*

*P2: That's me. That's the only music I like. I don't like head-banging stuff.*

P2 also suggested incorporating music listening into the treatment:

*P2: Perhaps, if we had listened to a bit of music from time to time.*

*Interviewer: OK.*

*P2: We didn't. It was just us...you know...I thought music therapy you'd have a bit of music or something apart from him on his old fiddle...you know*

*Interviewer: Right.*

*P2: I think if there had been a bit of background music or something. But then, I like...like in a restaurant when you got a very subtle background music...to me that's music. That's nice.*

*Interviewer: OK.*

*P2: In other words, that's romantic...you know.*

*Interviewer: So, maybe having some time to listen to music and...*

*P2: Yeah. It would have been nice to go into dream...you know.*

This excerpt reveals that P2 perceives music as a subtle background stimulus used to provide pleasant moods, but also as a tool to help the individual escape into a dreamlike state. Beneath these perceptions are the notions that music is supportive and mood altering, while also being able to reduce pain, provide comfort, and facilitate intimacy.

### **5.1.5 Summary of interpretative phenomenological analysis**

The IPA of the semi-structured interviews revealed that the participants experienced significant difficulties and accentuated needs following ABI. These needs and difficulties were reported in areas of cognition, communication, emotional needs, sense of self/self-evaluation, relationships, and independence and quality of life. Participants reported that the brief group music therapy intervention addressed these areas of need through various aspects of the treatment. Individual participants found the different aspects of the treatment useful differentially. However, song writing and its associated discussion emerged as the most popular aspect, and the between-session exercises were considered the least useful.

Self-motivation to practice between sessions was highlighted as a significant limitation in carrying out the between-session exercises.

Participants reported perceived improvements in cognition, communication, mood state, emotional adjustment, self-awareness, and quality of life. They reported that the length of treatment was satisfying, but it was at the minimum amount required to produce benefits. Participants suggested the importance of visual aids and personal preferences in designing treatment methods.

## **5.2 Thematic analysis (TA) of lyrics**

This section presents the data from the TA of the lyrics of two songs composed, performed, and recorded by the two groups involved in this study. Transcripts of the two songs are given in Appendix 10. Audio recordings of the songs can be found in the accompanying compact disc. The thematic analysis addressed the following question:

‘Does treatment have an effect on emotional needs?’

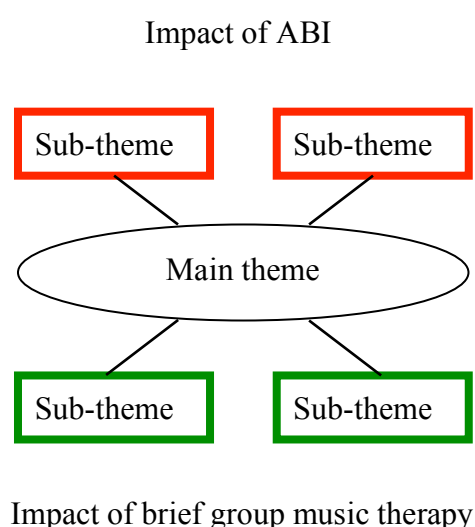
The analysis extended this question to ask how music therapy addresses emotional needs and adjustment in community rehabilitation for ABI survivors. The thematic analysis of the two songs is shown in Appendix 11. These were used to produce the thematic maps that are presented in sections 5.2.3-5.2.8. They show how themes and sub-themes are connected and conceptualised. These maps are accompanied by detailed accounts of how ABI and music therapy impact on the participants with reference to these themes.

### **5.2.1 Presentation of the thematic maps**

The TA of the lyrics produced six main themes: challenges due to ABI, emotions, communication, identity, belonging, and support. Sub-themes linked with each of these were categorised into two main groups: impact of ABI, and impact of the music therapy group. So, each thematic map presents the main theme in the centre, with sub-themes in a

polar arrangement according to the two main group categories. Figure 5.1 shows the basic structure of each thematic map. The main theme is shown in the centre as an ellipse, with the sub-themes shown as rectangles. The red rectangles represent sub-themes that were coded for impact of ABI, and green rectangles represent those that were coded for impact of the music therapy group.

Figure 5.1: Example of the thematic maps produced from the lyric analysis in this study



The TA of the lyrics produced six thematic maps: one map for each theme. These are presented in sections 5.2.3-5.2.8. Section 5.2.2 discusses the titles and musical characteristics of the two songs.

## **5.2.2 Titles and musical characteristics of the songs**

The two music therapy groups chose titles for their songs that encapsulated important and overarching themes. The titles chosen were ‘Life in our shoes’ and ‘Our time’. Both titles capture a sense of ownership and present this through the use of the possessive determiner ‘our’. The use of this word also suggests the personal nature of the songs’ contents and identifies the songs as descriptions of the subjective experiences of the participants. ‘Life in our shoes’ implies that the song is a message to the listener about the experiences of

ABI survivors. It suggests that life is different for those with ABI and that the uninjured population are largely unaware of this. The use of the noun 'shoes' captures a need for the listener to empathise with the songwriters. It also connects the listener with the idea that the song will be about a journey.

The title 'Our time' has a strong sense of ownership and privacy. It evokes a need to be independent and suggests that there was a need to have some time away from the participants' everyday lives as ABI survivors: a time to be more independent. So, the song title focuses the song content on the participants' experiences of Headway and of the music therapy group.

The participants in both groups one and two chose musical accompaniments that reflected positive and negative mood states. This allowed for a range of emotional expression in each song that matched the lyrical content: the challenges and difficulties due to ABI, and the support and achievements experienced through finding support.

The structure of each song is dissimilar. 'Life in our shoes' follows an ABABABABA form, where A represents the chorus and B represents the verse. The chorus provides a message combining the difficulties and losses of ABI with a positive comment on the value of group support to manage them. Each verse describes the process of coping with the challenges of ABI in a chronological sequence consisting of the experience of acquiring brain injury (verse one), looking for support (verse two), finding support (verse three), and achieving emotional adjustment through relationships (verse four).

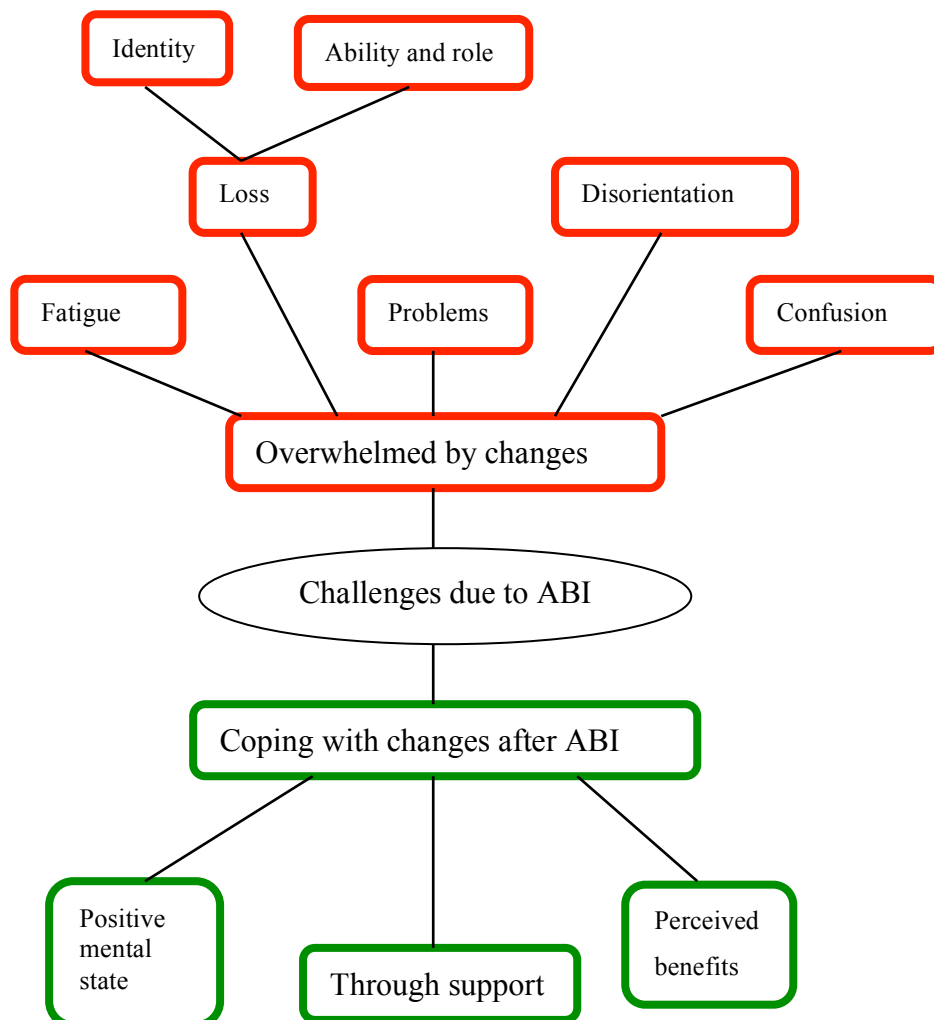
'Our time' follows a binary form, AB. Part A represents experiences and feelings of being disconnected and socially isolated. Part B represents those of being connected and having a sense of belonging. The theme 'disconnected' refers to the participants' feelings of social isolation, and losses of sense of self and agency. 'Connected' refers to feelings of

belonging, and gaining senses of self and agency. The participants used these two themes to describe two alternating feeling states that they moved between following ABI.

### 5.2.3 Challenges due to ABI

Figure 5.2 shows the thematic map of the main theme ‘challenges due to ABI’ with two themes linked directly to it: ‘overwhelmed by changes’ and ‘coping with changes after ABI’. Sub-themes cluster around these two.

Figure 5.2: Thematic map of main theme ‘challenges due to ABI’



The overarching theme ‘challenges due to ABI’ captures a general sense of the impact of ABI on the survivor, who often initially feels overwhelmed by these challenges. Fatigue,

loss, disorientation, confusion, and the large number of problems being presented simultaneously all contribute to this feeling of being overwhelmed. Fatigue was a prevalent theme in 'life in our shoes'. It was connected to a state of continuous unrest and occupies a significant section of verse one. The verse begins with:

*Brain never stops  
Liquid won't settle  
Machine in your head  
Constantly running*

Then, a few lines later the lyrics express the fatigue that the participants associated with this continuous state of unrest:

*...We were weary...*

Loss emerged as a significant sub-theme for both groups one and two. Group one expressed a general sense of loss:

*There are so many  
kinds of pain*

This gives the impression that loss affects ABI survivors in multiple areas of life, and that this collection of losses is experienced as overwhelming. Group two expressed the shock and sadness of the loss they experienced:

*You don't know what you've got until it's gone*

Both groups' feelings of loss seemed to centre on the participants' loss of abilities and their concepts of identity. Group one expressed this in terms of their difficulties carrying out their activities of daily living:

*Everything seems  
difficult to do*

Group two expressed a loss of identity that relates to the loss of sense of self:

*Where is the old me?*

This may also be interpreted as a loss of role in the family or occupation. The loss of sense of self indicates a disintegration of the self due to loss of functioning emotional and

behavioural changes. Group two's song 'our time' contains a leitmotif that captures the despair, social isolation, lack of sense of agency, and disability experienced by brain injury survivors:

*Loneliness and inability*

The participants from group two chose to use this as a leitmotif in order to emphasise the importance of this aspect of ABI. So, the sub-theme of 'loss' captures the loss of sense of self, feelings about disability, and the pain and social isolation experienced as a result. The participants expressed feelings of confusion and disorientation in the period immediately after ABI. Both 'life in our shoes' and 'our time' reflect this clearly. Group two stated their feeling of disorientation as follows:

*I feel lost, bewildered, and so alone*

Group one expressed their feeling of disorientation in a simple sentence:

*We were lost*

Then, in verse two, they expressed a state of confusion when looking for help:

*Lost in a grey world*

The imagery of a grey world is a potent metaphor for a world that seems to lack definition and boundaries: where help is difficult to find. In a world like that it would be difficult to know where to start to look for help. Group two express this more directly:

*What on Earth has happened to me?*

This question reiterates the feeling of shock and expresses a strong sense of confusion at the dramatic changes experienced by the ABI survivor. So, the initial experiences of ABI survivors following brain injury involve feelings of disorientation and confusion that relate to the shock of acquiring disability and difficulties with finding support to manage the new challenges and feelings of loss. The feeling of being overwhelmed by problems is



expressed in ‘life in our shoes’ as the participants consider the number and magnitude of their difficulties:

*Where to start?*

This is linked to, and reiterates, feelings of confusion and disorientation.

In considering their experience of group music therapy and the community rehabilitation centres the participants identify positive mental states associated with emotional adjustment, perceived benefits, and support that was available to them. Group one expressed positive mental states as follows:

*There is life in our shoes*

This gives a sense of learning to live with the difficulties of ABI and a realisation that ABI survivors can enjoy life despite the dramatic changes and impairments they experience.

Group two infer that there were positive benefits that they experienced:

*And get more things right*

*For sure a good purpose*

They also suggested that the goals were realistic and achievable:

*Not just a good purpose unto heaven but here on earth too*

This notion of realistic and achievable goals is important in rehabilitation because this sense of achievement strengthens a sense of agency and counteracts feelings of depression. Adjustment to life after ABI and coping with the associated challenges was supported in the group music therapy and community rehabilitation. The participants from group one express this in the final sentence of verse four:

*At Headway there is light*

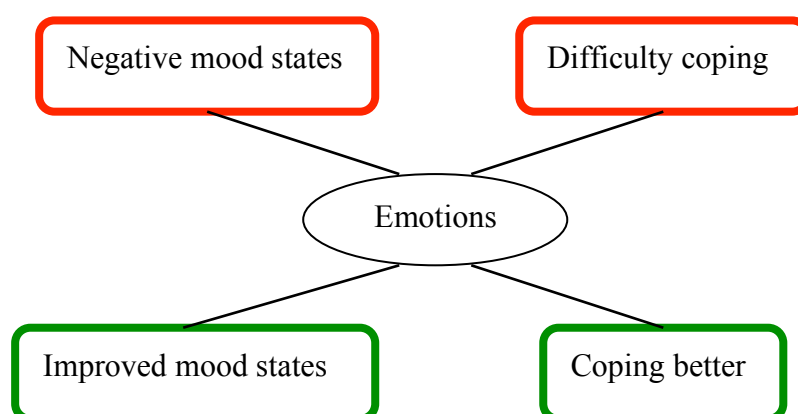
This sentence presents an image that strongly contrasts the mood and experience expressed in verse one, where the ABI survivors are overwhelmed by loss, disability, disorientation, confusion, and isolation. The use of light as a metaphor in this sentence implies that the

impact of ABI can be addressed through support, which changes the way ABI survivors experience themselves and their lives.

#### 5.2.4 Emotions

Figure 5.3 shows the thematic map of the main theme ‘emotions’ with four themes linked directly to it: ‘negative mood states’ and ‘difficulty coping’ that relate to the impact of ABI; and ‘improved mood states’ and ‘coping better’ that relate to the impact of the music therapy group.

Figure 5.3: Thematic map of main theme ‘emotions’



Emotional challenges following ABI include negative mood states, for example depression, difficulty coping with them, and difficulty with emotional regulation. Within the theme of ‘negative mood states’ participants from group one conveyed an experience of continuous anxiety following brain injury:

*Brain never stops*

This gives the impression of a state of mind that is at a state of continuous unrest due to the collection of difficulties and problems presented by ABI to the individual. Group one also stated fear as a consequence of these issues:

*We were scared*

This feeling of vulnerability may lead to anxiety issues and is associated with difficulties coping and emotionally adjusting to life with ABI. The emotional consequences of ABI include frustration, fear, anger, and anxiety. Group one in the last phrase of verse two expressed this:

*We were frustrated, we were angry and frightened*

Depression also emerged as a consequence of ABI for the participants of group two:

*Most days I start to slip down this slippery slope of depression*

This sentence suggests the strong influence negative mood states have on ABI survivors. Its imagery implies a daily struggle to remain positive in the face of looming negative mood states. Both groups expressed difficulty coping with the emotional experience of ABI. Group two focused on the difficulty coping with depression:

*And have to try to crawl back up as best I can*

Group one expressed the difficulty in emotionally adjusting to ABI:

*Hard to come to terms with this new life*

ABI survivors encounter great difficulties in emotional adjustment. This is due to difficulties managing behavioural responses in social situations, managing negative mood states, and coping with the changes in sense of self and their lives. Rehabilitation can help the survivor overcome depression and anxiety, and adjust to life with ABI. Group two expressed it in these two sentences:

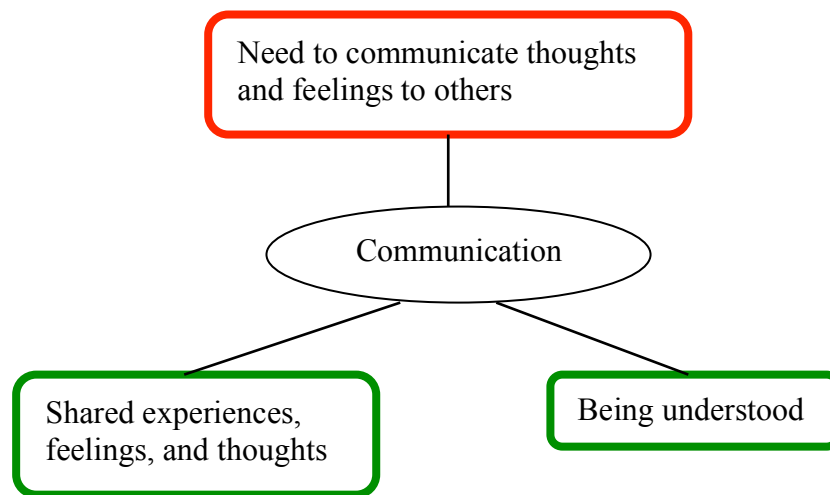
*At last I find happiness and that ever-elusive hope*

*Taking it easy, not doing things with haste*

### 5.2.5 Communication

Figure 5.4 shows the thematic map of the main theme ‘communication’ with three themes linked to it. The theme ‘need to communicate thoughts and feelings to others’ was conceived as being a result of the impact of ABI. The themes ‘shared experiences, feelings, and thoughts’ and ‘being understood’ were considered to be a result of the impact of the brief group music therapy.

Figure 5.4: Thematic map of main theme ‘communication’



Communicating thoughts and feelings to others is an important need following ABI, or indeed any trauma. Feelings of social isolation and shame may result in others not understanding how the ABI survivor has changed and why they might be feeling low or demonstrate behavioural changes. Therefore, it is important for others to understand more about the experience of ABI from the survivors’ perspective. It may be difficult for survivors to communicate due to cognitive impairments, such as attention, memory, and communication problems. Group one express this in the first line of the chorus:

*Life in our shoes  
Is hard to explain*

The positioning of this phrase as the opening line in the chorus highlights its significance as a theme, as it is reiterated each time a chorus is sung. The music therapy group provided

an opportunity and a safe environment for feelings and thoughts about acquired brain injury to be shared. The participants from group one expressed the importance of sharing a range of different emotions in the group:

*Sometime we cry  
and sometimes we laugh together*

The sharing of experiences, feelings, and thoughts enabled the group members to support each other and work through their difficulties. Through the music therapy groups and their experiences at Headway, the participants from group one were able to feel understood:

*No explanation needed*

Group two's participants echoed this, but also conveyed it with a sense of being accepted and not being judged:

*And in no way are you objected*

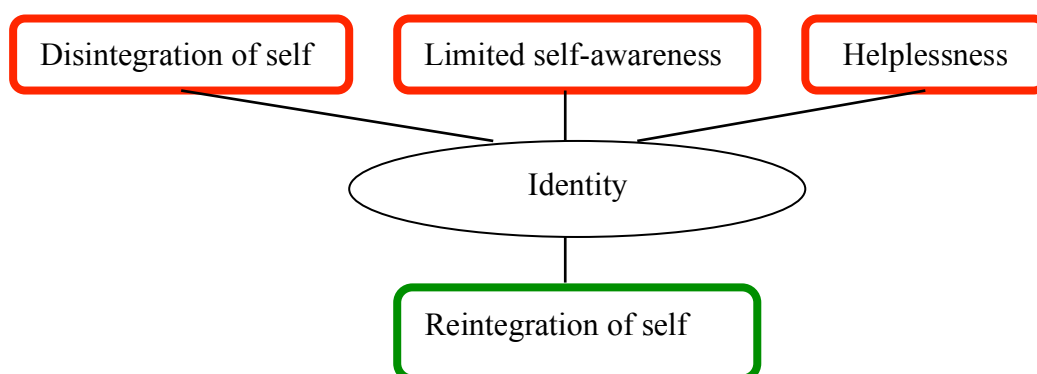
They also highlighted that when people understand more about the consequences of ABI, survivors are released from feeling shame about difficulties that are no fault of their own:

*You don't have to apologise*

### 5.2.6 Identity

Figure 5.5 shows the thematic map of the main theme 'identity'. Four themes connect to it: 'disintegration of self', 'limited self-awareness', and 'helplessness' that relate to the impact of ABI; and 'reintegration of self' that relates to impact of brief group music therapy.

Figure 5.5: Thematic map of main theme 'identity'



The impact of ABI has serious consequences for survivors' identity. The changes in functioning, family role, occupation, cognitive deficits, and behavioural changes can cause survivors to feel disconnected from their sense of self. Their sense of self is disintegrated into parts. Rehabilitation techniques often focus on addressing individual problems and this can reinforce the feeling that the individual is not whole. Group two expressed this sense of disintegration of parts of the self in the theme that guided part A of their song: disconnected. Group one also conveyed this sense of disconnection from a sense of self by referring to the:

*Machine in your head*

This use of the word 'machine' communicates a sense of disintegration of mind and body, and a loss of control, awareness, and sense of self. Identity relies on being able to know, and feel deeply connected with, who we are. This relates to lack of self-awareness experienced by people with ABI. The survivors' memories of their abilities pre-injury do not correspond with those following brain injury. As a consequence, survivors often rely on those around them for evaluation of their behavioural responses and fatigue levels. Group one expressed this at the end of verse one:

*Something was wrong  
They looked at me funny*

This reliance on others may produce feelings of helplessness and vulnerability. The survivors may see themselves as requiring continuous support. Group two expressed this sense of helplessness in part A of their song:

*I am a child  
Being told what to do and how to behave*

This communicates the lack of sense of agency, control, and independence felt by the survivors. It also suggests the need for family members or carers to help regulate behaviour appropriately. The helplessness expressed captures the lack of agency, self-worth, and

control the survivors felt. These areas of need must be addressed in order to build self-esteem and develop one's identity. Group two expressed this poetically as follows:

*Not in control of my life.  
It is a play of which I am not a protagonist  
It happens around me.*

The need to feel valued and gain a sense of control in one's life are reiterated later in group two's song:

*How can I get back to being a protagonist?*

The main purpose of emotional adjustment following ABI is to enable the survivor to cope with the consequent emotional problems and to gain a more secure sense of self. Positive experiences involving achievements and successes can improve self-esteem and allow survivors adjust to life following brain injury. Group two express this in part B of their song by stating:

*I feel more connected*

This statement may be interpreted as a greater feeling of belonging and also as a more secure sense of self. The process of emotional adjustment might involve feelings of being valued and improved self-esteem as survivors see themselves more as whole people rather than a collection of disintegrated, dysfunctional parts. Group two expressed this in part B of their song:

*A real person and not just a case.*

Group one communicated the transformation they experienced in sense of self by stating:

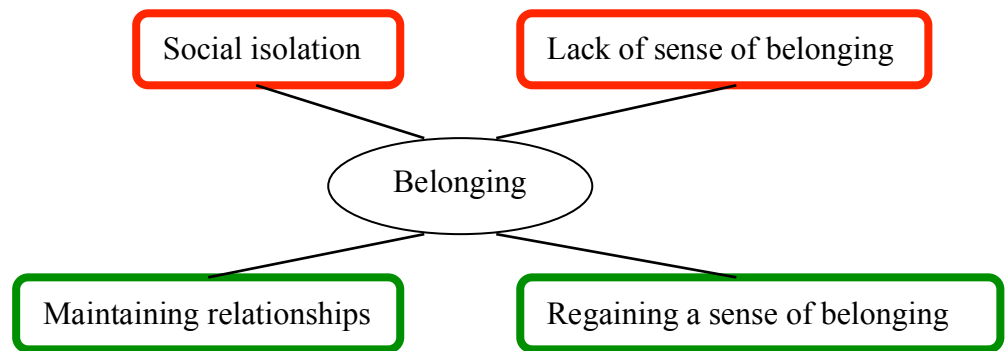
*We are comfortable in our own shoes*

This statement shows that the participants were able to address the changes and difficulties resulting from ABI and accept a new sense of self. They seemed to show that they had managed to emotionally adjust to their new lives and their altered identities.

### 5.2.7 Belonging

Figure 5.6 presents the thematic map of the main theme ‘belonging’. Four themes directly link to this main theme: ‘social isolation’ and ‘lack of sense of belonging’ are presented as results of the impact of ABI; and ‘maintaining relationships’ and ‘regaining a sense of belonging’ are shown as benefits of brief group music therapy.

Figure 5.6: Thematic map of main theme ‘belonging’



The impact of brain injury reaches into many areas of survivors’ lives. Changes in behaviour and cognitive functioning may affect survivors’ relationships and their ability to maintain relationships and be part of social groups. They may also experience loss of friendships. This may lead to social isolation and a lack of sense of belonging for ABI survivors. Group two expressed social isolation through the theme of being ‘disconnected’ in part A of their song. They further emphasise the experience of social isolation and loneliness following ABI through their use of the leitmotif:

*Loneliness and inability*

Group one also used the term ‘disconnected’ in their song to express the social isolation experienced by ABI survivors. The term was used in the first verse that describes the initial experience of ABI. In verse two about ‘looking for help’ group one describe feelings of loneliness and abandonment during the period of searching for support and being unable to find it:

*Looking for help  
Felt alone*



Group one also conveyed the lack of sense of belonging that they experienced:

*Didn't fit anywhere*

This phrase captures many of the difficulties with relationships that result from ABI. There may be loss of friendships, difficulty negotiating a role in the family beyond being dependent on them, and difficulty finding financial support and other types of support. So, there are different types of belonging that are affected: belonging to a social group, belonging in the family, and finding one's place within society and its support networks. Rehabilitation and the group music therapy addressed this need for a sense of belonging, and the two groups described the benefits of the intervention in their songs. Group one highlighted the realisation of their capacity to maintain relationships:

*There is love in our shoes*

This phrase may also be interpreted as a move from depression to emotional adjustment, as the survivors become able to give love to others rather than being consumed by their problems and the hopelessness they felt. Through rehabilitation and the group music therapy the participants regained a sense of belonging and building connections with others. Group two expressed this clearly in their theme for part B of their song: the theme of being connected. Group one stated that through the brief group music therapy they were able to regain a sense of belonging:

*At last we know that we fit we fit somewhere*

The benefits of the intervention to the participants included participating in group activities and social inclusion. Group two expressed this clearly:

*But join in with others*

This phrase captures the universality of the group as each participant contributes to a group that consists of others with problems due to ABI. Their experiences and problems are shared within the group and this helps the participants to build connections with others and

reduce feelings of isolation. The understanding participants show each other facilitates this sense of belonging. This understanding counteracts feelings of being judged. Group two identified this connection in part B of their song:

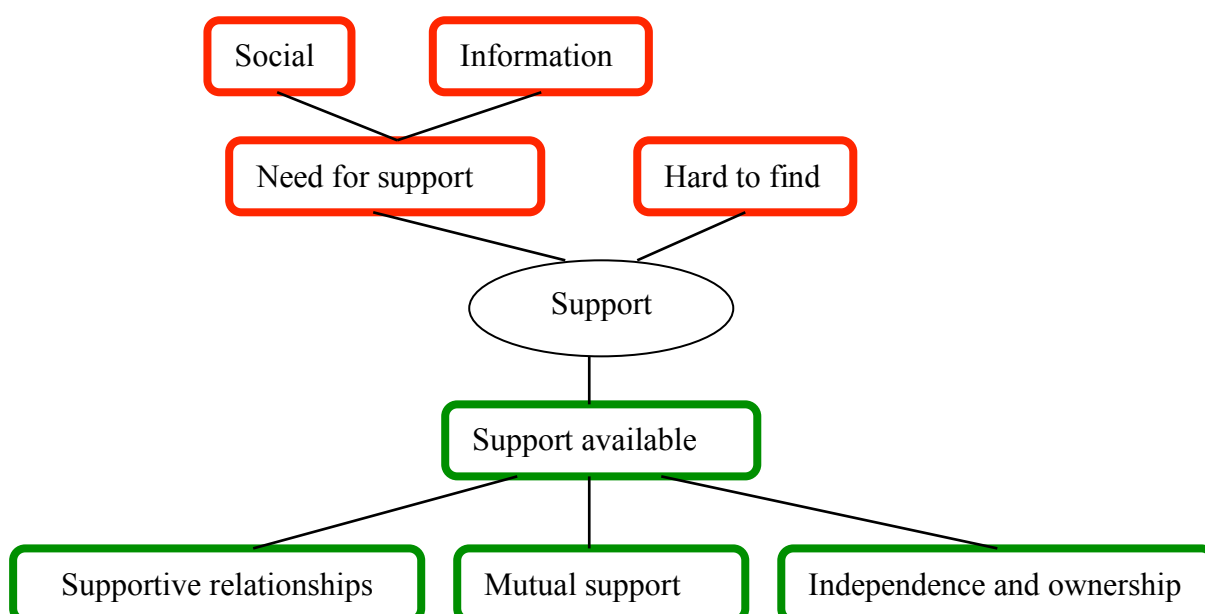
*To feel more connected  
And in no way are you objected*

So, the sense of belonging is impaired by disability and loss of relationships. In rehabilitation it is rebuilt through group participation in a non-judgemental environment with people who have a good understanding of the survivors' problems.

### 5.2.8 Support

Figure 5.7 shows the thematic map of the main theme 'support'. 'Need for support' and 'hard to find' represent themes associated with the impact of ABI. Two types of support were identified in the songs as the need for 'social' support and the need to obtain 'information' as a form of support. 'Support available' represents the participants' experience of finding support. Three sub-themes cluster around this theme: 'supportive relationships', 'mutual support', and 'independence and ownership'. These may be conceptualised as resources and criteria for providing these resources.

Figure 5.7: Thematic map of main theme 'support'



Survivors experience the need for support following ABI as a profound need. Group one expressed the importance of support by assigning it as a theme for verse two: 'looking for help'. The verse begins with this phrase:

*Looking for help  
Felt alone*

Here the participants explain that finding support was difficult, and failure to obtain support often resulted in feelings of social isolation and abandonment. As they move into community rehabilitation the amount of support available becomes more limited and survivors experience difficulties in knowing where to find it. Group one express this difficulty later in verse two with the use of 'light' as a metaphor for help:

*Couldn't find the light*

Group two also communicate the need for support and the difficulty finding it in part A of their song. They express this through the question:

*Who is going to help me?*

This phrase communicates several messages to the listener: a sense of despair and frustration at failing to find help; a cry for help; feelings of helplessness; and a lack of knowledge about where to look for help. The participants from group one identified the need to find support through social activities and helping relationships.

*We'll get by we still have you*

This phrase also suggests that survivors may be more motivated to engage in rehabilitation if interventions involve social interaction and support through the use of a relationship.

Group one also expressed the need for guidance and information in the second verse:

*Where to start?  
Point the way*

This captures ABI survivors' need to understand more about their injuries and how to manage difficulties they experience in carrying out activities of daily living. 'Point the way' also conveys the difficulty in locating services and advice for people with ABI. Survivors may not be aware of support available to them for filling in application forms for financial or medical help.

The participants acknowledged Headway as a valued resource in community rehabilitation.

The participants stated this clearly in the third verse of their song:

*And then we found headway*

The guiding theme of this verse was 'finding help', and the participants clearly identified Headway with this theme. The participants built new friendships through the music therapy group. They found in each other friends that understood their problems and did not judge them when they were struggling with their impairments. Group one expressed this in verse four of their song:

*With true friends  
We are comfortable in our own shoes*

So, supportive relationships are an important source of support for people with ABI. All of the sub-themes that cluster around the theme of 'support available' suggest that the most significant help that the participants found was in each other as ABI survivors. The above two lines from group one's song exemplify this. Group two also acknowledge the mutual support they gave and received in the music therapy group. They suggested that they were able to support each other through being part of the same group:

*That way, we can unite.*

Group two also identified the encouragement they gave each other when they felt shame because of their impairments:

*You are doing well like others here do*

This phrase suggests that there is mutual support in finding others with similar difficulties. The music therapy group consisted of participants with a range of periods since their brain injuries. This is a benefit to the participants, as those that had adjusted more were able to support those who were having more difficulties coping with acquired disability. Group two identified the value of, and need for, ownership and independence in rehabilitation. They did this through their choice of title 'our time'. Survivors' lives, identities, relationships, and functioning are dramatically affected by ABI; these changes are beyond their control. Group music therapy was able to provide them with an opportunity to develop a sense of ownership and independence through the group song writing.

### **5.2.9 Summary of thematic analysis**

Six main themes were drawn from the song lyric data: challenges due to ABI, emotions, communication, identity, belonging, and support. The song titles convey the need for ownership, privacy, and independence. Both songs describe the impact and challenges due to ABI. They also describe the value of community rehabilitation and brief group music therapy in helping them overcome these challenges. The songs give the impression of emotional adjustment to ABI and leave the listener with the sense that the songwriters have hope for the future and have learned to live with ABI.

The songs describe the participants being overwhelmed by the challenges presented to them following ABI. These included changes in identity, loss of role in family and occupation, and acquiring disability. Fatigue, confusion, and disorientation also emerged as challenges following ABI. The participants expressed difficulty with finding support to overcome these problems, and this contributed to their feelings of being overwhelmed. Community rehabilitation and brief group music therapy provided support and enabled the ABI survivors perceive benefits. These positive experiences after ABI helped the participants develop positive mental states to cope with life with brain injury.

Through the songs the participants expressed difficulties coping with the emotional consequences of ABI. Anger, anxiety, fear, and frustration were given as emotional responses. Depression emerged as a significant theme in the emotional experience of ABI. The songs describe the positive impact of the treatment and community rehabilitation. These gave them hope and the support needed to overcome negative mood states. The participants also suggested that they felt less anxious.

The songs suggest that the experience of ABI is difficult to convey to others, but also that survivors feel a need to be understood by others. The brief group music therapy gave the participants an opportunity to share experiences, feelings, and thoughts about brain injury. It helped them feel understood without being judged. It also provided them with a space and relationships in which they did not need to explain their behaviour. This reduced feelings of shame about brain injury.

The participants' songs described a loss of identity, loss of self-awareness, and loss of sense of agency due to ABI. The positive impact of the treatment helped them adjust emotionally and accept a new sense of self. The impact of the music therapy group was also associated with a change in identity from being a case, or collection of dysfunctional problems, to being viewed as a whole person.

The consequences of brain injury on the participants included social isolation. This resulted in feelings of abandonment, loneliness, and a lack of a sense of belonging. This is related to the lack of awareness and understanding of brain injury shown by friends, family, and services. Community rehabilitation and the music therapy group enabled the development of a sense of belonging through group participation and supporting the formation and maintenance of relationships.

The songs explain that support for coping with brain injury was difficult to find. The type of support needed was mainly around being socially included and gaining information

about how to live with brain injury. Community rehabilitation and the brief group music therapy intervention provided the survivors with supportive relationships. The intervention focused on their independence and ownership. It fostered their mutual support of each other and this promoted feelings of being valued, cared for, and being able to care for and support others.

## **CHAPTER 6**

### **6 DISCUSSION AND CONCLUSION**

This chapter presents the discussion of the research findings and the conclusions drawn. It begins with a description of the synthesis process of the qualitative and quantitative data. Then, the discussion of the research findings is presented with reference to current theory. For clarity this is divided into four main sections according to the research sub-questions regarding attention, memory recall, emotional needs, and time-limitation. This is followed by a discussion of the study's contributions to knowledge about self-perceptions and insight following ABI. Subsequently, the evaluation of the music therapy treatment method is discussed. This is followed by a discussion of the research methods used and limitations of this study. Recommendations for future research and clinical practice are then presented, followed by a conclusion of the thesis.

#### **6.1 Synthesising the quantitative and qualitative data**

Before presenting, synthesising, and discussing the findings of the quantitative and qualitative data it is necessary to consider the type of mixed methods data analysis. This is discussed with reference to the pre-analysis considerations that informed its selection. The data analysis used a parallel mixed methods design. The rationale for this is as follows. The quantitative and qualitative data were collected separately in a parallel manner from different data sources. The data collection methods were designed according to the research sub-questions. Analysis and discussion of the data will involve deriving inferences from each set of results. These inferences will be synthesised to form “meta-inferences” (Teddlie and Tashakkori, 2009, p.266).

Several pre-analysis considerations shaped this analytical design. The first consideration focused on the purpose of using mixed methods. In this study it was to triangulate



qualitative and quantitative findings from different data sources to derive stronger inferences. Triangulation involves the corroboration of findings from one method by those from other methods.

The second consideration determines whether the study is more variable-oriented or case-oriented. It locates the methodological position of the research study in relation to the “QUAL-MM-QUAN continuum” (Teddlie and Tashakkori, 2009, p.28) that ranges from purely quantitative to purely qualitative orientations. A variable-oriented emphasis is more quantitative and investigates the phenomenon from the viewpoint of selected variables. A case-oriented emphasis is more qualitative and examines the phenomenon in its context, acknowledging its complexity. This study is considered to be midway between pure quantitative and qualitative methodological positions, with a slight emphasis placed on the quantitative findings. Therefore, the findings from the quantitative results will be considered to be in a primary position, with those from the qualitative results being used to corroborate and add depth to them. In this way this study is more variable oriented. This will be reflected in the organisation of the synthesis and discussion, section 6.3. The qualitative findings will also add richness and complexity to the way the phenomenon is viewed and discussed.

The third consideration is whether the study is more exploratory or confirmatory. This study is exploratory as it investigates the effect of brief group music therapy on sustained attention, immediate memory recall, and emotional needs in one study. It is original and does not replicate any other study.

The fourth consideration questions to what extent the quantitative and qualitative data analyses affect each other during the overall research process. The various data sets were collected and analysed independently of one another. Therefore, this suggests a parallel mixed methods analysis.

The final consideration involves the researcher's awareness of the underlying assumptions of both the quantitative and qualitative data analysis techniques. It secures the reasonable and truthful generation of meta-inferences. The assumptions underlying quantitative data collection and analysis are concerned with eliminating bias, whereas those underlying qualitative methods focus on trustworthiness and credibility. These will be discussed in section 6.4.

So, this is a parallel mixed methods data analysis involving:

1. Quantitative analysis using descriptive and inferential statistics for selected variables.
2. Qualitative analysis using interpretative phenomenological analysis (IPA) and thematic analysis (TA) of interview data and song lyrics, respectively.

The synthesis of the results is presented in an integrated manner (Creswell and Clark, 2011) in the discussion. Therefore, the qualitative and quantitative results are discussed together, and are considered in relation to current theory. This enables meta-inferences to be drawn. The discussion of the results is guided by the research sub-questions. These questions also determine which results are selected for mixing and triangulation. The way in which the data is mixed is shown in table 3.2 in chapter three.

## **6.2 Discussion of the main research findings**

The main research findings produced the following inferences:

- Brief group music therapy improves sustained attention for chronic ABI survivors with potential long-term benefits.
- Brief group music therapy improves immediate memory recall for ABI survivors. Treatment effects vary widely, but rhythm seems to be the key element.
- There may be a link between mood state and cognitive functioning.

- Brief group music therapy improves emotional needs of ABI survivors in the immediate and short-term.
- Brief group music therapy is more effective than standard care alone in addressing cognitive functional gains of ABI survivors.
- The length of treatment was sufficient to show improvements. However, more sessions may be required to improve memory compared with those needed to improve attention.
- Song writing and rhythm emerged as salient aspects of the treatment.
- The use of self-led practice may be problematic for ABI survivors due to difficulties with motivation and memory.

The findings are synthesised and discussed in this section. Tables of the salient quantitative results are presented to aid the reader in referring quickly to them.

### **6.2.1 Does treatment have an effect on attention functioning?**

The selection and triangulation of findings for this section were guided by the first research sub-question: Does treatment have an effect on attention functioning?

#### **6.2.1.1 The impact of ABI on sustained attention**

Attention deficits after ABI are arguably the most significant impairment acquired through brain injury (2.2.2), making attention rehabilitation a priority following brain injury (Turner-Stokes, 2003; Knox, et al., 2003). The findings from the IPA of the semi-structured interviews (5.1.1.1) revealed the need to address cognitive impairments as a significant issue for the participants. This is congruent with research (Corrigan, Whiteneck and Mellick, 2004) that suggests this need is one of the most frequently cited persistent needs for chronic ABI survivors (2.2.1). The participants in this study did not specifically mention attention deficits. This might be due to lack of attention deficit being present, a

lack of awareness of attention problems, or a lack of understanding of attention as a discrete functional process. The first explanation is unlikely because the participants demonstrated problems with attention during the tasks and by the fact that they required help with ADLs. Also, the mean score for both groups at BL was 6 (table 4.6 in section 4.3.1). This indicates that there were impairments in sustained attention. The second explanation suggests that the participants lacked awareness of their attention deficits. Attention impairments may cause a lack of awareness of attention deficits by reducing survivors' abilities to attend to and evaluate their own functioning. This may be plausible but it relies on severe attention impairments, which may be reflected in scores lower than 6 in the sustained attention test used. The third explanation suggests that participants were unable to conceptualise and identify attention as a separate functional process underlying other processes and behavioural outcomes. This is plausible because people with ABI are not necessarily trained in theories of neurological functioning and, if they are, it is not certain that they would retain the information.

The participants were able to describe a general loss of cognitive functioning (5.1.1.1), and these descriptions can be interpreted in terms of attention and memory impairments.

Participants described the need for a "better brain", the need to be able to "think creatively", and to learn to read again (5.1.1.1). This implies an awareness of cognitive impairments. Deficits in attention functioning present the ABI survivor with difficulties in environmental awareness and task performance in ADLs (Ponsford, 2008) (2.2.2).

Attention processes mediate other cognitive processes (Cohen, 1993) (2.2.2). Therefore, it is reasonable to assume that attention impairments were present for the participants. The mean sustained attention score of 6 at BL for both groups supports this assumption (table 4.6 in section 4.3.1).

### 6.2.1.2 The effect of brief group music therapy on sustained attention

Table 6.1 shows the salient results for sustained attention.

Table 6.1: Salient results for sustained attention

Groups combined or separate	Source	Statistical significance	Effect size
Combined	8 weeks of SC vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .54
	8 weeks of MT vs. BL	<i>p</i> < .05	large, <i>r</i> = .68
	16 weeks of MT vs. BL	<i>p</i> < .05	large, <i>r</i> = .80
Group 1	8 weeks of MT vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .64
	16 weeks of MT vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .73
	8 weeks FU vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .53
Group 2	8 weeks of SC vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .56
	8 weeks of MT vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .70
	16 weeks of MT vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .88
	8 weeks FU vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .92

The quantitative findings suggest that brief group music therapy had a large effect on sustained attention for the two groups' combined results. This finding is concurrent with other research studies that suggest that music listening (Sarkamo, et al., 2008) and music therapy (Knox, et al., 2003; Wit, et al., 1994) improve attention functioning for ABI survivors (2.4.2.1). It also supports Thaut's (2010) postulation that rhythm can be used in attention rehabilitation through its ability to activate attention processes in the brain (2.4.2.1).

The findings also show that sustained attention improved after eight weeks of standard care (SC). This finding is presented with some caution because possible order effects may have confounded the results for the combined groups for the timepoint after eight weeks of SC. For the combined groups' results this timepoint differs between the two groups in its chronological position in relation to treatment. The researcher attempted to counterbalance for practice effects by changing the order of music therapy (MT) and SC for each group of participants (3.5.2 and 3.10.1.1). Group one had eight weeks of SC after treatment and group two had eight weeks of SC before treatment. The potential order effects may be due

to carry-over effects of treatment for group one, as they had treatment first and SC afterwards. This is discussed in more detail in section 6.4.1.1.

Table 6.1 shows that sustained attention improved between BL and eight weeks of SC for group two. The improvement was not statistically significant but had a large effect size. This unexpected result might have been due to lower anxiety levels for the participants taking the sustained attention test for the second time. Familiarity with the procedure of the test might result in lower anxiety and, hence, greater capacity to sustain attention in the test. It is highly unlikely that the participants knew the answers to the test prior to taking it because each version of the test contains different answers, i.e. combinations of letters and numbers (3.9.1.1). It is also unlikely that the participants were recovering spontaneously because all the participants were likely to be beyond the period of natural recovery (table 4.5 in section 4.2). However, the findings presented in table 6.1 show that brief group music therapy had a greater effect on sustained attention compared to SC for the combined and individual groups. Thus, the study infers that brief group music therapy is more effective for improving sustained attention than standard care alone.

The qualitative findings from the IPA showed that the participants did not state specific improvements in attention. However, they did report improvements in cognition relating to thinking creatively, communication, and learning (5.1.1.1). P10 considered herself an intellectual before her brain injury, and thinking creatively was important to her (5.1.1.1). She reported being able to “feel these connections again” between the ideas in her mind. She attributed brief group music therapy to this recovery of function (5.1.1.1).

P1 reported chronic global aphasia as a significant problem for her (5.1.1.2). She described problems with processing speech when others were talking to her. She stated that “When anybody’s talking...it’s not going in my brain” (5.1.1.2). This problem may be influenced by selective attention processing difficulties in which she struggles to filter out unwanted

stimuli in order to focus on someone speaking to her (2.2.2). She stated that over the course of the brief group music therapy she became more able to follow, and contribute to, the group discussion (5.1.1.2). P1 also reported problems with learning in general, particularly reading and recognising words (5.1.1.1). She said that over the course of treatment she became more able to read. She said to the music therapist: “You can learn me to read” (5.1.1.1).

So, the participants experienced improvements in cognition and they considered the intervention to be a causal factor. These findings corroborate the inference that brief group music therapy improves attention functioning in ABI survivors. They also suggest that the participants began to perceive improvements in cognition over the course of therapy. This implies a minimum dosage or time needed for improvements to become measurable.

### **6.2.1.3 Dosage and sustained attention**

The quantitative findings show that the effect of treatment increased as dosage (number of sessions) increased. This is shown by the effect sizes in table 6.1 increasing from eight weeks of MT to 16 weeks of MT. The assertion that the effect of music therapy on attention functioning increases with dosage is supported by findings in a brain injury study by Wit, et al. (1994). They showed that functional gains in attention were higher for subjects who had more sessions of musical attention training compared to subjects who had fewer sessions (2.4.2.1). A study by Thaut (2009) was unable to show improvements in attention functioning from a single session of music therapy. Thaut suggested that the minimum dosage of music therapy required to induce improvements in attention functioning might be more than one session (2.4.2.1). The findings from this current study indicate that the minimum dosage is equal to, or less than, eight weekly one-hour sessions. The participants expressed difficulty with carrying out the self-led practice between sessions (5.1.2.2). This resulted in a lack of quantitative data for analysis of the effect of

self-led practice on sustained attention (4.3.1). The qualitative data revealed some interesting insights into the reasons for this failure to obtain data about the effect of self-led practice. Some had not practiced at all due to difficulties being motivated to carry them out (5.1.2.2). Some of the participants reported that they had practiced a little, but had not recorded their frequency of practice in the log sheet (5.1.2.2). The participants also reported that they had difficulty remembering to carry out the self-led practice between sessions (5.1.2.2). These findings might indicate that ABI survivors require assistance to carry out rehabilitation programs and are unlikely to do so independently. It might also indicate that it is unfeasible to use self-led practice in ABI rehabilitation practice and research due to the significant issues around carrying out the exercises independently. A more detailed discussion of the self-led practice is provided in section 6.3.

#### **6.2.1.4 Sustained attention at follow-up**

The findings in table 6.1 show that both groups' scores after eight weeks FU were higher than their baseline (BL) levels, indicating potential long-term benefits of brief group music therapy. A stroke study by Sarkamo, et al. (2008) supports this inference (2.4.2.1). They showed that two months of music listening improved focused attention, and that these improvements continued at follow-up. However, there is a notable difference between the present study and the one by Sarkamo et al. (2008). The study by Sarkamo et al. (2008) involved acute stroke patients, whereas the present study involves chronic ABI survivors. So, the samples are comparable to a limited extent. However, the finding from the present study suggests that recovery and long-term benefits are possible for chronic ABI survivors. This is substantiated by Wit, et al. (1994), who stated that music therapy is feasible in attention rehabilitation (2.4.2.1). Research and clinical work with brain injury survivors in community rehabilitation should be developed further.



### **6.2.1.5 Delayed recovery of sustained attention**

The two groups show an interesting difference after eight weeks FU. For group one the effect size for the contrast of eight weeks FU and BL was lower than the effect size for the contrast of 16 weeks of MT and BL. For group two it was higher than the contrast for 16 weeks of MT and BL. There are two possible explanations for this. Perhaps group two were still in the period of natural recovery. This is unlikely, as group two's mean for the period between brain injury and referral to the music therapy group was 20.35 years (table 4.5 in section 4.2). If the participants in group two were recovering naturally at the rate shown in the data, they would have scored much higher at BL. A more likely explanation is that the data from group two showed evidence of delayed recovery due to treatment. There is a dearth of research about the phenomenon of delayed recovery during rehabilitation. However, the study by Sarkamo et al. (2008) and comments from Wilson (2012) and Malec (2012) suggest that delayed recovery is possible. Recovery patterns vary widely in the brain injury population. Neuroplasticity is experience-dependent (2.3.1), and experiences vary widely between individuals. These factors may cause results in brain injury research to vary to a significant degree, thereby confounding results and reducing their statistical significance (2.4.2).

### **6.2.1.6 Meta-inferences for sustained attention**

So, the mixed methods findings strongly infer the following. Brief group music therapy improves sustained attention for chronic ABI survivors with potential long-term benefits. Survivors perceive improvements in performing tasks and activities of daily living (ADL). Improvement increases with increasing dosage, and the minimum dosage required for improvements is less than, or equal to, eight sessions.

Attention impairments are prevalent for ABI survivors (Turner-Stokes, 2003). These impairments impact on survivors' abilities to carry out ADLs, their social participation,

and their engagement in rehabilitation (2.2). These findings suggest that musical attention training should be included in music therapy rehabilitation interventions and in music therapy training programmes. These exercises could improve attention functioning for survivors from acute to community rehabilitation. This assertion supports the recommendation by Park and Ingles (2001) for specific functional training to treat attention deficits following ABI. This study will improve the knowledge about the efficacy of music therapy attention training for ABI survivors.

### **6.2.2 Does treatment have an effect on immediate memory recall?**

The selection and triangulation of findings for this section were guided by the second research sub-question: Does treatment have an effect on memory functioning?

#### **6.2.2.1 The impact of ABI on immediate memory recall**

Memory deficits are common following ABI (Turner-Stokes, 2003). The findings from the IPA of the semi-structured interviews revealed loss of memory recall as a significant problem for the participants (5.1.1.1). This is consistent with research (Corrigan, Whiteneck and Mellick, 2004) that stated that improving cognition was one of the most frequently cited persistent needs for ABI survivors (2.2.1). The mean score for immediate memory recall for the combined groups at BL was 4.88 (table 4.19 in section 4.4.1). Therefore, the assertion that the participants were affected by memory impairments is supported by triangulation of the quantitative and qualitative results.

The qualitative findings showed that memory impairments affected levels of awareness (or consciousness), sense of reality, orientation in time, creative thinking, identity, capacity for self-evaluation, and ability to carry out ADLs (5.1.1.1). P10 described difficulties in linking ideas in her mind and stated memory problems as contributing factors to these difficulties (5.1.1.1). P8 described the need to use memory aids, for example writing lists

and self-addressed notes, to compensate for memory impairments (5.1.1.1). This compensatory strategy was required to help her maintain orientation in time and manage her home. She also reported difficulty in trusting others. Research suggests that memory is involved in learning to trust others (Prigatano and Johnson, 2003) (2.2.2).

P9 had difficulty recalling aspects of the brief group music therapy intervention (5.1.1.1). He also reported memory problems as contributory factors in the loss of sense of reality and loss of awareness of consciousness. Wilson, Kopelman and Kapur (2008) considered memory loss to have significant impact on sense of self, as it disrupts the knowledge of the facts of one's own life and the sense of continuity of experiences through time (2.2.2).

Memory is essential to learning and to engagement in rehabilitation (Turner-Stokes, 2003) (2.2.1). The IPA showed that impairments in memory recall are linked to problems with sequencing in task performance, self-evaluation, and daily conversations about events (5.1.1.1). Memory impairments might limit ABI survivors' motivation to continue with rehabilitation programmes due to difficulties in perceiving improvements in outcomes and in making sense of the therapeutic process.

So, the participants showed significant problems due to memory impairments.

### 6.2.2.2 The effect of brief group music therapy on immediate memory recall

Table 6.2 presents the salient results for immediate memory recall.

Table 6.2: Salient results for immediate memory recall

Groups combined or separate	Source	Statistical significance	Effect size
Combined	8 weeks of SC vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .55
	8 weeks of MT vs. BL	<i>ns, p</i> > .05	small, <i>r</i> = .27
	16 weeks of MT vs. BL	<i>ns, p</i> > .05	medium, <i>r</i> = .46
Group 1	8 weeks of MT vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .83
	16 weeks of MT vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .90
	8 weeks FU vs. BL	<i>ns, p</i> > .05	large, <i>r</i> = .90
Group 2	8 weeks of SC vs. BL	<i>ns, p</i> > .05	small, <i>r</i> = .28
	8 weeks of MT vs. BL	<i>ns, p</i> > .05	nil, <i>r</i> = .08
	16 weeks of MT vs. BL	<i>ns, p</i> > .05	medium, <i>r</i> = .33
	8 weeks FU vs. BL	<i>ns, p</i> > .05	small, <i>r</i> = .20

The quantitative findings in table 6.2 show that brief group music therapy had a small-to-medium effect on immediate memory recall for the groups overall. This is congruent with findings from the stroke study by Sarkamo et al. (2008) that showed improvements in verbal memory due to music listening (2.4.2.2). Other research (Samson, Dellacherie and Platel, 2009; El Haj, Postal, and Allain, 2012; and Baird and Samson, 2009) also shows that music enhances memory recall in neurologically impaired subjects (2.4.2.2), thus, strengthening the above inference.

The qualitative findings showed that the participants in the study perceived improvements in memory recall and learning capacity (5.1.1.1). P3 stated that she had more success in carrying out tasks involving sequencing as a result of her improved ability in error detection. She attributed this to the use of rhythmic exercises in the treatment (5.1.1.1). In this case, music may have acted as an organising stimulus: supporting initiation, organisation, sequencing, and regulation of functional processes (Sacks, 1998; Thaut, 2008) (2.4.2.2).

Other studies have shown that music can be used as an effective mnemonic device to enable learning and recall (Clausson and Thaut, 1997; Gfeller, 1983; Wallace, 1994; Wolfe and Hom, 1993; Moore, et al., 2008) (2.4.2.2). P1 stated that she had noticed improvements in reading ability. She learned the meaning of written words more easily as a result of the brief group music therapy (5.1.1.1). Thus, her reading and speech production improved. A study by Stahl, et al. (2011) indicated that rhythm might be crucial in speech rehabilitation. They suggested that long-term memory and automaticity seemed to mediate speech production in rehabilitation. This is in agreement with other research showing rhythm to be effective in improving performance during immediate memory recall tasks (Miller, 1956; Schellenberg and Moore, 1985; Silverman, 2007; Stoffer, 1985) (2.4.2.2). Despite having difficulty remembering semantic information about the brief group music therapy, P9 recalled the experiences of drumming and song writing (5.1.2.3). It is possible that his memories of these experiences were enhanced by the role of emotion in encoding and storing these memories. This inference is supported by research that implicates the role of emotion in memory recall through stimulation of the amygdala and hippocampus (Tomaino, 1998; Bower, 1981; Adolphs, Denburg and Tranel, 2001; Schulkind, Hennis and Rubin, 1999; Eschrich, Munte and Altenmuller, 2008; Samson, Dellacherie and Platel, 2009) (2.4.2.2). The musical experience may have improved mood and orientation and, hence, enhanced memory processes (Baker, 2001; Sarkamo, et al., 2008; Phelps, 2004) (2.4.2.2).

So, the IPA of the semi-structured interviews supports the inference that brief group music therapy improved immediate memory recall for the participants in this study.

The quantitative findings show that eight weeks of SC had a greater effect on immediate memory recall compared with 16 weeks of MT for the combined groups. A possible explanation for this is similar to the one presented in section 6.2.1.2. Order effects might

have confounded the combined groups' results for eight weeks of SC. These were probably due to the carry-over of improvements in immediate memory recall for group one from 16 weeks of MT into eight weeks of SC after treatment. This is discussed in more detail in section 6.4.1.1. The positive aspect of this finding is that it suggests that group one sustained their improvements in memory recall after treatment ended. The effect sizes for group one in table 6.2 confirm this suggestion.

Therefore, order effects are likely to have confounded the data for immediate memory recall for eight weeks of SC for the combined groups. For group two, the effect of treatment after 16 weeks of MT was greater than the effect of eight weeks of SC. This supports the assertion of order effects for group one, and substantiates the main finding that brief group music therapy improves immediate memory recall.

For group two, the effect of treatment after eight weeks of MT was less than the effect of eight weeks of SC. This might suggest that there is a minimum dosage (2.4.2.2) of weekly music therapy required to produce a measurable improvement. An alternative explanation is that there might be delayed recovery of memory functions following music therapy treatment for ABI survivors.

The findings for the individual groups show that the two groups responded to treatment differently. Treatment effects on immediate memory recall were greater overall for group one than for group two. A possible explanation for this is that some participants in group two had more severe memory impairments than those in group one. This finding might also suggest that recovery patterns due to treatment vary widely for ABI survivors. This reveals some of the diversity of the sample and supports the use of within-subjects repeated measures designs for research with this population (2.5 and 3.5). This inference is supported by comments from Wilson (2012) and Malec (2012), who also observed the variation in recovery patterns following ABI.

Table 6.2 shows an increase (small effect size) in immediate memory recall from BL to eight weeks of SC for group two. This increase cannot be due to practice effects due to different versions of short stories being used in the test. It is unlikely that the participants were experiencing natural recovery because if they were experiencing it at the rate shown, then they would not be presenting with significant memory impairments. The most plausible explanation is the one given in section 6.2.1.2: the improved score between BL and eight weeks of SC is due to reduced anxiety when the participants become more familiar with being part of the research. This might imply that future repeated measures research designs should include ways of reducing anxiety prior to, or early in, the data collection stage. The findings showed that 16 weeks of MT had a greater effect on immediate memory recall than eight weeks of SC for group two. This infers that music therapy is more effective than standard care in improving immediate memory recall. However, eight weeks of MT had a smaller effect than eight weeks of SC. This finding might have implications for dosage, discussed in section 6.2.2.3.

The quantitative and qualitative findings infer that brief group music therapy improves immediate memory recall for ABI survivors. However, treatment effects vary widely for this population.

### **6.2.2.3 Dosage and immediate memory recall**

The findings for the combined groups and for each group individually showed that the effect of treatment increased as dosage increased from eight weeks of MT to 16 weeks of MT. This is shown by the effect sizes given in table 6.2. While other music therapy studies have demonstrated improvements in memory (Sarkamo, et al., 2008; Gianutsos and Gianutsos, 1979; Morton, Kershner, and Siegel, 1990), they did not investigate the issue of dosage. Thaut (2009) suggested that more than one session is necessary (2.4.2.2). The findings show that eight weeks of MT might yield improvements in immediate memory

recall for some ABI survivors. However, after 16 weeks of MT the effect of treatment increases so that effect sizes are medium-to-large. This implies that the minimum dosage required for rehabilitation of immediate memory recall is between eight and 16 sessions of weekly group music therapy. Therefore, clinical interventions should be designed with this minimum dosage in mind. This study contributes to the limited knowledge about dosage of music therapy in memory rehabilitation.

The participants' difficulties with carrying out the self-led practice between sessions (5.1.2.2) resulted in a lack of quantitative data for analysis of the effect of self-led practice on immediate memory recall (4.4.1). The qualitative findings and inferences presented in section 6.2.1.3 are applicable here, as they provide plausible explanations for the participants' difficulties in maintaining an independent practice regime between each session. A more detailed discussion of the findings relating to self-led practice is provided in section 6.3.

#### **6.2.2.4 Immediate memory recall at follow-up**

An important difference was observed in the effect of treatment after eight weeks FU. Table 6.2 shows that group one retained improvements gained during treatment at this timepoint, whereas group two showed a fall. Wilson, JC, and Hughes (1997) stated that it is unrealistic to expect memory functioning to be fully restored following ABI (2.3.2). The findings suggest that responses to brief group music therapy may vary widely for chronic ABI survivors. While some survivors retain the functional gains in immediate memory recall, functional gains for others reduce to levels slightly above pre-treatment functioning. This explanation is supported by the large values for standard deviations for group two's results. These values were 5.18-7.95 for mean values of 5.8-7.4 (table 4.26 in section 4.4.3). Thus, group two consisted of participants with a wide range of memory functioning: from severe to mild memory impairments. This explanation is consistent with observations



by Wilson (2012) and Malec (2012) who noticed unpredictable recovery patterns for ABI survivors.

#### **6.2.2.5 Meta-inferences for immediate memory recall**

In summary, the mixed methods findings infer that brief group music therapy improves immediate memory recall for ABI survivors. However, treatment effects vary widely for this population and improvements may persist after treatment for some, but not all, ABI survivors. This study used rhythmic exercises to stimulate memory processes in the brain. Other research suggests that rhythm is the key component underlying improvements in memory recall (2.4.2.2).

The effect of brief group music therapy increases with dosage. This study suggests that the minimum dosage required for improvements in immediate memory recall is between eight and 16 sessions.

Memory deficits are common for people with ABI (Turner-Stokes, 2003). These deficits affected levels of awareness (or consciousness), sense of reality, orientation in time, creative thinking, identity, capacity for self-evaluation, and ability to carry out ADLs (2.2). These findings suggest that musical memory training should be included in music therapy rehabilitation interventions and in music therapy training programmes. These exercises could improve learning and memory recall for survivors and support other rehabilitation goals. This assertion supports the recommendation by Thaut (2010) for development of specific functional training to address memory deficits following ABI (2.4.2.1).

The Cochrane review (Bradt et al., 2010) and Thaut (2010) implied a paucity of music therapy research to address cognitive functional gains in ABI (2.4.2). This study addresses this gap in knowledge.

### **6.2.3 Mood state and cognition**

The findings from the Profile of Mood States Questionnaire revealed small effects of treatment on the four mood states: agreeable-hostile, elated-depressed, composed-anxious, and energetic-tired (4.5). The differences between the timepoints were very small and limited the interpretation of the effect of treatment. Other research has shown that music therapy improves the mood states of brain injury survivors (Baker and Wigram, 2004; Goldberg, Hoss and Chesna, 1988; and Magee and Davidson, 2002; Thaut, et al., 2009) (2.4.2.3). However, this study was unable to show similar improvements. This might be due to the lack of sensitivity of the measurement tool to detect changes in the ABI survivors in the study.

The data in this study revealed a similar pattern of increases and decreases in mean scores for the four mood states measured (tables 4.32, 4.33, 4.36, and 4.39): a rise from BL to eight weeks of SC, a fall from eight weeks of SC to eight weeks of MT, and a rise from eight weeks of MT to 16 weeks of MT. This pattern was reflected in the changes in mean scores for sustained attention and immediate memory recall, indicating a potential link between cognitive functioning and mood state. This finding is supported by research that suggests a correlation between emotional arousal and cognitive functioning (Krumhansl, 2002; Schück, et al., 2002; Nagaraja and Jayashree, 2001; Thompson, Schellenberg and Husain, 2001) (2.4.2.3-2.4.2.4). Sarkamo, et al. (2008) suggest that music mediates recovery of attention and memory for ABI survivors (2.4.2.1 and 2.4.2.2). Thus, music-induced mood states might affect learning capabilities for brain injury survivors. This might explain the similar patterns of rises and falls across timepoints for attention, memory, and the four mood states. Clinical practitioners may need to consider the type of music and its significance for ABI survivors when designing interventions for rehabilitation. Although some research has shown a link between emotion and cognition

(2.4.2.4), further research is needed to investigate the correlation between mood states and cognitive improvements in brain injury rehabilitation.

#### **6.2.4 Brief group music therapy compared with standard care**

The findings presented in table 6.1 show that brief group music therapy had a greater effect on sustained attention compared to SC for the combined and individual groups (6.2.1.2).

This assertion is based on comparing the effect sizes given in table 6.1. The findings also suggest that the number of sessions required for improvements is less than, or equal to, eight sessions (6.2.1.3).

Table 6.2 presents the effect sizes for comparisons for immediate memory recall. The findings in this table show that eight weeks of MT had a smaller effect on immediate memory recall than standard care (6.2.2.2). However, the findings showed that 16 weeks of MT had a greater effect on immediate memory recall than eight weeks of SC. This infers that there is a minimum dosage for brief group music therapy to be more effective than standard care in improving immediate memory recall. This study suggests that the minimum dosage is between eight and 16 sessions of MT (6.2.2.3).

The qualitative findings from the IPA showed that the participants reported improvements in cognition relating to thinking creatively, communication, learning, and memory (5.1.1.1, 5.1.1.2, 5.1.2.3). The participants attributed these improvements to brief group music therapy. Therefore, the qualitative findings support the inference that brief group music therapy is more effective than standard care alone in improving sustained attention and immediate memory recall.

The literature (2.4.2.1, 2.4.2.2) corroborates the above inference and this is discussed in detail in sections 6.2.1.2 and 6.2.2.2.

Overall, the quantitative and qualitative data and the literature infer that brief group music therapy is more effective than standard care in improving sustained attention and immediate memory recall for chronic ABI survivors.

### 6.2.5 Does treatment have an effect on emotional needs?

The selection and triangulation of findings for this section were guided by the third research sub-question: Does treatment have an effect on emotional needs? The following table shows the summary of the statistical analyses for each domain of the VASEN.

Table 6.3: Salient results for satisfaction of emotional needs

Domain	Statistical significance of immediate effect of treatment ( $p$ )	Effect size of immediate effect of treatment ( $d$ )	Statistical significance of short-term effect of treatment ( $p$ )	Effect size of short-term effect of treatment ( $r$ )
Part of a group	$p < .05$	medium, $d = .74$	$p < .05$	large, $r = .80$
Confident	$p < .05$	large, $d = .88$	$p < .05$	large, $r = .80$
Productive	$p < .05$	large, $d = .90$	ns, $p > .05$	large, $r = .66$
Supportive	$p < .05$	medium, $d = .75$	ns, $p > .05$	large, $r = .70$
Valued	$p < .05$	medium, $d = .74$	$p < .05$	large, $r = .87$
Enjoyment	$p < .05$	small, $d = .34$	ns, $p > .05$	medium, $r = .44$

#### 6.2.5.1 Feeling part of a group

The findings from the qualitative analyses revealed that participants experienced problems with relationships (5.1.1.5) and a lack of belonging (5.2.7) as a result of ABI. A previous study showed that ABI survivors felt lonely and isolated following ABI (Baker, Kennelly and Tamplin, 2005a). Participants in the present study suffered loss of friendships and difficulties with intimate relationships (5.1.1.5). Armstrong (1991) corroborates this finding by highlighting the importance of the ABI survivor feeling wanted and cared about (2.3.6). Problems with relationships may be due to functional impairments, behavioural problems, or difficulties in meeting the needs of others (Lezak, 1986) (2.2.1).

The analyses also showed that the participants experienced a need for supportive relationships in order to cope with the challenges of ABI (5.1.1.5). This requires those providing support to be sympathetic and to be able to help the participant find the information they need to manage problems. So, difficulties finding supportive relationships might indicate a need to educate those supporting ABI survivors about their problems and needs. This includes families, friends, service providers, and other agencies. This finding is in agreement with the guidelines from the RCP and BSRM (Turner-Stokes, 2003). They state that survivors need a suitable agency to discuss the impact of ABI on their lives (2.3.6).

The IPA of the semi-structured interviews revealed difficulty in trusting others as an important issue in developing relationships (5.1.1.5). Problems in forming and maintaining relationships can have social consequences (Hemingway and McAndrew, 1997), leading to feelings of social isolation (2.2.1). The guidelines from the RCP and BSRM (Turner-Stokes, 2003) highlight the importance of facilitating social participation for ABI survivors (2.3.7).

The findings shown in table 6.3 infer that brief group music therapy reduced feelings of social isolation during each session and over the course of treatment. This finding is corroborated by the qualitative results that show that the treatment helped the participants find, and develop, mutually supportive relationships (5.1.1.5) and regain a sense of belonging (5.2.7). These findings suggest that brief group music therapy provided a therapeutic environment and supportive group to enable the participants to share experiences and develop friendships. The qualitative findings suggest that peer group participation in a non-judgemental environment is a key component in the effectiveness of this treatment method. Other studies substantiate this assertion (Nayak, et al., 2000; Goldberg, Hoss and Chesna, 1988), and show that music therapy improves social and

behavioural outcomes, leading to greater participation in rehabilitation (2.4.2.3 and 2.4.2.3.3).

#### **6.2.5.2 Feeling confident**

Acquired disability emerged as a salient theme in the qualitative findings. It is suggested here that this has significant impact on ABI survivors' feelings of confidence. Although acquired disability has significant consequences for self-confidence, it also impacted the participants in other domains of emotional needs: 'feeling productive/useful', 'feeling supportive', 'feeling valued', and 'enjoyment'. Therefore, some of the content from this section overlaps with that of other sections.

The qualitative analysis identified several problems associated with disability due to ABI: difficulty communicating (5.2.5), disintegration of self (5.2.6), altered identity and loss of role in life (5.2.3), helplessness (5.2.6), and limited self-awareness and capacity to self-evaluate (5.2.6). These problems are linked to self-constructed and socially influenced value systems (2.3.8), and result in feelings of inferiority (Yates, 2003). In another study, ABI survivors have described having anxieties about living with disability (Baker, Kennelly and Tamplin, 2005a).

Participants experienced communication difficulties, such as aphasia (5.1.1.2), and a need to communicate their thoughts and feelings to others (5.2.5). When communication difficulties and a need to convey the experience of acquired disability coexist, the individual can become frustrated due to the conflict created by these opposing factors.

Failures in communication can result in ABI survivors withdrawing from communication with others (5.1.1.2). Fleminger, et al. (2003) support this assertion by stating that repeated experiences of failure in familiar activities may trigger serious psychological responses in ABI survivors, for example depression (2.2.3).

The participants expressed a loss of sense of self due to ABI (5.1.1.4). This is bound up with their identity and life roles, and their capacity for self-evaluation (5.1.1.4). The combination of losses in functioning produces an altered identity. This was expressed as a disintegrated sense of self (5.2.6) and an inability to perform their pre-injury roles in life and work (5.1.1.4). The participants expressed a desire to regain their pre-injury identities and to reject their disabled post-injury ones (5.1.1.4). The rejection of post-injury identity was linked to feelings of shame and fear of showing vulnerability. According to Armstrong (1991), denial can be a reaction to brain injury: serving to maintain emotional stability and motivation (2.2.3).

Helplessness emerged as a salient theme and participants reported reliance on others for self-awareness and self-evaluation (5.1.1.6, 5.2.6). They required help in monitoring and managing their fatigue levels in daily life, in monitoring progress in rehabilitation, and in carrying out ADLs (5.1.1.6). Thus, ABI had impacted on the participants' feelings of confidence by reducing their independence in daily life.

Lack of confidence in these areas resulted in emotional problems and difficulties for the participants (5.1.1.3). These included negative feelings, such as anxiety, fear, shame, hopelessness, anger, confusion, frustration, and powerlessness. The participants reported being overwhelmed by these feelings (5.2.3, 5.2.4).

The quantitative findings from table 6.3 show that brief group music therapy increased participants' confidence in the immediate term and over the course of treatment. This is substantiated by several music therapy studies (2.4.2.2 and 2.4.2.3). A study by Baker (2001) showed that music therapy reduced agitation levels in brain injury survivors. A study by Baker and Wigram (2004) showed that music therapy reduced fear, confusion, and tension. A study by Magee and Davidson (2002) showed that music therapy affected

the composed-anxious mood state in a positive direction. Therefore, the literature supports the inference that brief group music therapy increases confidence of ABI survivors.

The qualitative findings corroborate this inference. P1 reported reduced aphasia during sessions and improvements in comprehension and reading abilities (5.1.1.2).

Brief group music therapy helped the participants share experiences and thoughts without being judged or feeling shame (5.1.1.5, 5.2.7). They also showed that the participants emotionally adjusted to their new identities and experienced a reintegration of self as a result (5.2.6).

The participants reported perceived improvements in task performance during sessions and improved self-awareness (5.1.1.4). This may suggest an improved capacity for self-evaluation. P10 stated that music therapy helped her acknowledge and identify her lost functioning and this contributed to regaining some of it. Fleminger, et al. (2003) support this finding. They state that as ABI survivors become more self-aware, they demonstrate greater emotional distress and also greater motivation to alter their behaviour (2.2.3). The group musical exercises enabled greater self-awareness through experiential learning and immediate musical feedback about the participants' level of functioning through the use of live music making (3.8.2). Magee and Davidson (2004) suggested that music therapy increases self-awareness through being actively engaged in music making (2.4.2.4). The qualitative results highlighted the sense of ownership and independence brief group music therapy gave to the group members. It provided time away from the daily experience of helplessness and inability. It provided the participants with control, independence, and an opportunity to construct their identities (Magee and Davidson, 2004) (2.4.2.4).

#### **6.2.5.3 Feeling productive/useful**

The IPA of the semi-structured interviews revealed that the participants suffered loss of independence (5.1.1.6), loss of occupation (5.1.1.4), and altered identity (5.1.1.4) as a



result of ABI. These losses and changes affected their feelings of being productive in their own lives. Independence is fundamental to our sense of self and self-worth. The participants reported being dependent on their families for help with leisure activities, ADLs, and travelling. This dependency brought feelings of low self-esteem and, for some, resentment towards their families. This resentment was connected with feelings of being a burden and loss of privacy as a result of dependency. Other researchers have also identified this impact on the survivors' relationships with their families (Lezak, 1986; Hemingway and McAndrew, 1997) (2.2.1).

Table 6.3 shows that brief group music therapy had large effects on participants' feelings of being useful/productive during individual sessions and over the course of the treatment. Therefore, the quantitative findings suggest that the participants felt more productive due to brief group music therapy. At this time, this study appears to be the only music therapy research that has quantitatively and subjectively measured the effect of music therapy on participants' feelings of productivity/usefulness.

The qualitative findings support this to some extent through the participant reports of perceived improvements in functioning (5.1.1.4). The participants also described supporting each other in discussing their experiences of ABI (5.1.1.5). The TA of the song lyrics identified the participants' experiences of ownership and privacy related to the music therapy group (5.2.8). These aspects of the sessions increased their sense of independence and fulfilled their need to spend time away from family and carers. Thus, it helped them feel more independent, able, and useful.

#### **6.2.5.4 Feeling supportive**

The qualitative findings show that being able to support others was an important need for the participants. It is bound up with the individual's identity and self-worth within relationships (2.2.3). Being able to support others may be integral to an individual's

occupation or role in life, for example in the helping professions, in parenting, or in intimate relationships. This is congruent with the assertion by other researchers, who state that ABI survivors experience difficulties in maintaining friendships and family roles (Hemingway and McAndrew, 1997) (2.2.1).

Table 6.3 shows that the immediate effect of treatment on ‘feeling supportive’ yielded a medium effect size, whereas the short-term effect of treatment yielded a large effect size. Therefore, the quantitative findings suggest that the participants felt more supportive due to brief group music therapy. This finding is supported by evidence from other studies that show that music engages areas of the brain associated with social cognition and mentalisation (Steinbeis and Koelsch, 2009) (2.4.2.3.3).

The qualitative findings corroborate the inference suggested by the quantitative results. The IPA of the semi-structured interviews shows that the group members supported each other during the sessions when communicating the experience of ABI was difficult (5.1.1.5). The TA of the song lyrics showed that they shared experiences and feelings during the sessions (5.2.8). The participants valued these experiences of mutual support in the group.

#### **6.2.5.5 Feeling valued**

The IPA and TA showed that feelings of self-worth were linked to feelings about being useful (5.1.1.6), being supported by others, and being supportive to others (5.1.1.5). This also affected the participants’ feelings of confidence and sense of self. The participants reported difficulties finding help (5.1.1.5). This caused some participants to feel that they were not valued by society. Loss of friendships may have also been experienced as devaluing in a similar way: through lack of supportive relationships and feelings of rejection.

The quantitative results in table 6.3 show that the immediate and short-term effects of treatment on ‘feeling valued’ yielded medium and large effect sizes, respectively.

Therefore, the quantitative findings suggest that the participants felt more valued due to brief group music therapy.

The qualitative findings support the inference drawn from the quantitative findings. They showed that the participants developed relationships that they valued through the group (5.1.1.5, 5.2.5, 5.2.8). The group members felt understood by the therapist and their peers (5.1.1.5). The universality (5.1.2.6) and mutual support (5.2.8) within the group enabled a feeling of being valued. ABI survivors are more responsive to relationships rather than mere techniques or processes (Claeys, et al., 1989) (2.4.2.4). The findings suggest that brief group music therapy helped the participants feel more valued through the use of group therapy.

#### **6.2.5.6 Enjoyment**

The qualitative findings show that the participants in the study experienced loss of independence in social participation, ADLs, and travelling (5.1.1.6, 5.2.6). Survivors may be dependent on others in these areas due to issues around safety, behavioural problems, fatigue, and cognitive deficits (2.2.1). Dependency on others in these areas restricts survivors’ freedom to enjoy life and leisure activities (2.3.7).

Table 6.3 shows that the immediate and short-term effects of the intervention yielded small and medium effect sizes, respectively. Therefore, the quantitative findings suggest that the participants experienced higher levels of enjoyment due to brief group music therapy.

Although these effect sizes seem smaller in comparison with the other domains of emotional needs, the qualitative findings support the inference from the quantitative results. The IPA of the semi-structured interviews showed that participants found elements of the treatment enjoyable, such as the group music making (5.1.2.3), and the humour in

the attention and memory exercises (5.1.2.4, 5.1.2.5). The TA of the song lyrics showed that the brief group music therapy addressed the needs of the group members to engage in social participation (5.2.7) and regain a sense of freedom from dependency through ownership in the group (5.2.8).

Other studies have shown that music therapy can improve QOL and independence in daily life for ABI survivors (Baker, 2003; Livingston, 1996; Lee and Baker, 1997; Lucia, 1987) (2.4.1). Music therapy is able to increase positive affect and arousal levels (Thompson, Schellenberg and Husain, 2001) (2.4.2.1) leading to increased motivation for engagement in rehabilitation (Kim and Koh, 2005; Johnson, Otto and Clair, 2001; Schneider, et al., 2010) (2.4.2.3.2).

### **6.2.6 How does time-limitation affect treatment delivery?**

The selection and triangulation of findings for this section were guided by the second research sub-question: How does time-limitation affect treatment delivery? The quantitative findings show that the effects of treatment increased with dosage over time for both sustained attention (6.2.1.2) and immediate memory recall (6.2.2.2). This is shown by larger effect sizes at 16 weeks of MT compared with eight weeks of MT. Brief group music therapy was also found to have beneficial immediate effects in satisfying emotional needs in all six domains (6.2.5). The effect of treatment over the course of the 16 weeks showed large and medium effect sizes. This also indicates that there are short-term benefits in these domains of emotional needs. The above quantitative findings are supported by the qualitative results (6.2.5.1-6.2.5.6). Thus, the data suggests that this brief course of group music therapy was effective in addressing cognitive functional gains and emotional needs of ABI survivors. However, to fully understand the effect of time-limitation on treatment delivery it is necessary to consider the experiences and opinions of the clinician and the participants.

#### **6.2.6.1 Clinician's experience of time-limitation in treatment delivery**

The session protocol (3.8.2) contains several elements that were selected and designed to meet specific needs. It involved functional exercises and song writing with discussion. This resulted in sessions that felt full with little opportunities for silence. So, the clinician was aware of the need to consider the pace of the session and not to rush through it. This was important in facilitating an experience of therapy that felt comfortable but also challenging. In clinical supervision, the music therapist discussed the need for skill in balancing the need to follow the session protocol and also address members' needs as they emerged. The clinician decided that the session protocol would guide the treatment and provide a stable framework for therapy. Each aspect of the protocol was assigned a portion of time to allow for this. The therapist found this useful and the group members seemed to enjoy the combination of variety and familiarity (5.1.3.1).

Another difficulty with mixing functional and psychodynamic methods in sessions is that there may be a conflict between the aims of these clinical methods when emotional issues arise during the therapeutic process. These issues did emerge during the treatment. However, the group members and the therapist addressed these issues during the session. This mainly occurred during the song writing/discussion time. Perhaps, the time constraints created by the structure of the sessions encouraged the group to support its members' needs in a responsive manner.

#### **6.2.6.2 Participants' opinions about the length of treatment**

The IPA of the semi-structured interviews showed that the participants felt satisfied with the length of treatment (5.1.3.1). However, they stated that this was the minimum length that they expected would meet their needs and be effective. The participants also stated that the frequency of one session per week was sufficient (5.1.3.1).

The group members identified six factors that are useful in considering the length of treatment in the community setting: anxiety, familiarity with the treatment methods, time to develop a rapport, fatigue, and the need for a break (5.1.3.2). They suggested that more sessions (a longer treatment period) would allow them to become more comfortable with the exercises and lower any anxiety linked to them (5.1.3.2). The longer treatment period would also allow for absences due to illness, medical appointments and planned holidays. The group members stated that time was required to develop a rapport with each other and the therapist (5.1.3.2). This might support the argument for a longer treatment period. Fatigue emerged as a significant issue that must be considered in the timetabling of sessions (5.1.3.2). Some of the group members experienced fatigue issues when they participated in challenging activities before or after the sessions. When ABI survivors suffer severe fatigue due to an imbalance between work and rest, it can take days to recover their energy levels. This finding is concurrent with research by Ziino and Ponsford (2006) in which the researchers state that, for ABI survivors, fatigue is the result of additional effort spent in compensating for cognitive impairments when performing everyday tasks (2.2.2). This is a common problem for ABI survivors and it was the main cause of attrition in this study. This treatment protocol may be demanding for some ABI survivors due to the mental effort required to maintain engagement. It should be timetabled as much as is possible with regard to a work-rest balance within the weekly routine of the group members.

The participants considered having a clearly defined end to treatment to be useful. It reduced the risk of boredom and fatigue (5.1.3.1, 5.1.3.2). The ending of treatment represents a point of evaluation and reflection. The treatment had ended and the group members had participated in, and experienced, something new. They had engaged in the treatment until its completion. This may have aroused positive feelings, such as

achievement and confidence. It is important to note that ending treatment may also arouse negative feelings, such as disappointment and anxiety. However, the participants did not report negative feelings associated with ending treatment.

### **6.2.7 Contributions to knowledge about self-perceptions and insight for people with ABI**

This study revealed some interesting insights into the experience of ABI that may have implications for research and clinical practice.

The qualitative findings suggested that survivors' capacities for self-evaluation are reduced following a brain injury (5.1.1.4). This causes problems in successfully carrying out activities of daily living and also in self-regulation for maintaining health. It might also imply that insight-oriented methods of rehabilitation may be less effective unless the survivor's capacity for self-evaluation is increased. It is possible that cognitive deficits include impairments in processing sensory feedback during tasks. This feedback is necessary to regulate aspects of task performance, such as applying pressure and regulating speed of movement. Feedback from the body is also necessary to regulate effort in a task and to know when to rest (5.1.1.4).

A descriptive longitudinal analysis of the pre- and post-session measurements revealed similar patterns in the trends in four domains: 'feeling part of a group' (4.8.1), 'feeling confident' (4.8.2), 'feeling valued' (4.8.5), and 'enjoyment' (4.8.6). The patterns showed a decrease in values in the period from sessions two to five inclusively. A possible explanation is that these decreases reflect the development of insight and changes in identity experienced by the participants. Negative emotional states worsen due to ABI survivors' increasing awareness of their own disabilities and impairments (Fleminger, et al., 2003; Baker and Wigram, 2004; Godfrey, et al., 1993) (2.2.3, 2.4.2.3).

Fatigue emerged as an important issue that affects, and is affected by, the ABI survivor's cognitive functioning (5.1.1.4). Findings by Ziino and Ponsford (2006) corroborate this finding (2.2.2). Survivors might rely on others to monitor their fatigue, as they may have difficulties with self-awareness and self-evaluation.

Survivors may require more support when in public spaces where there may be a higher number of stimuli with varying intensities. These factors can result in processing difficulties for ABI survivors and might increase fatigue levels (Ziino and Ponsford, 2006) (2.2.2). Also, fatigue might limit survivors' capacities to process sensory stimuli. So, it may be more difficult for ABI survivors to self-evaluate when in environments that are less familiar or that contain a greater quantity of sensory stimuli (2.2.2). The implication here is that the environment should be altered to reduce unnecessary processing demands and thus reduce the likelihood of fatigue issues. This may be possible at home or other environments that can be controlled. However, in public spaces the environment is much more difficult to control. In these situations survivors might require more support. Fatigue has been reported as a significant problem that impacts on ABI survivors' attendance records (Nayak, et al., 2000) (2.4.2.3.2) and abilities to engage in activities (Magee, et al., 2006) (2.4.2.4). This poses a serious problem for brain injury research and rehabilitation. The qualitative findings identified the availability of supportive agencies as a significant issue for some people with ABI (5.1.1.5, 5.2.8). Participants stated that it was difficult to find support. Agencies that had to be consulted, for example for income support, were not aware of the cognitive difficulties for ABI survivors. Applying for financial support involves completing complicated forms and ABI survivors may need support with these. This is especially important for those with communication difficulties.



### **6.3 Discussion of the music therapy method**

This section discusses the clinical method and its value in community rehabilitation. It considers how the treatment protocol and its constituent elements addressed the needs of the participants. The individual elements of the treatment protocol are discussed. This leads to a general evaluation of the music therapy method in relation to the guidelines described by the RCP and BSRM (Turner-Stokes, 2003). A statement of the cost effectiveness of the intervention concludes this section.

The IPA of the semi-structured interviews captured group members' opinions about the individual elements of the treatment protocol (5.1.2). The between-session exercises were considered by some participants to be the least useful and by others to be useful (5.1.2.2). Benefits of the between-session exercises (also called homework exercises or self-led exercises) included focusing and sustaining attention on a task. The attention tasks were, perhaps, less demanding than the memory task. So, this might have influenced the participants to emphasise the attention tasks as beneficial. Difficulties in carrying out the between-session exercises included problems with remembering to practice, self-motivation, dependence on others, and personal relevance of the tasks. Participants reported difficulties in remembering to practice. They would often rely on their families to remind them and motivate them (5.1.2.2). Some participants also required support in carrying out the exercises at home. This highlights ABI survivors' dependence on others for engagement in rehabilitation programmes. It was also suggested that if the tasks were adapted to include the individuals' personal interests, the participants would be more motivated to regularly carry out the exercises. The between-session attention and memory exercises are flexible and can be adapted to include personal interests of individuals. Therefore, this element in the protocol could be made more interesting and enjoyable: increasing the frequency of home-based practice and improving its effectiveness. The RCP

and BSRM guidelines for ABI rehabilitation recommend the encouragement and facilitation of exercises between formal therapy sessions to maximise rehabilitation potential (Turner-Stokes, 2003) (2.3.3).

The positive impact of playing musical instruments included emotional relief (through non-verbal expression), stimulating episodic memory recall, and enjoyment (through active participation) (5.1.2.3). Drumming enabled non-verbal expression of internal feeling states: relieving inner tension. The group music making was considered enjoyable by the participants and was more memorable. Participants that suffered severe memory impairments were able to recall drumming in the group more easily than any other element of the treatment protocol. This release of inner tension and feelings of pleasure (or enjoyment) may have induced the release of dopamine and enhanced memory encoding and storage during the drumming. This may help to explain why P9 was able to recall the group drumming despite his difficulty recalling other elements of the treatment. This finding is supported by research that showed that musical experiences induce pleasure, leading to the release of dopamine in the striatal system (Salimpoor, et al., 2011) (2.4.2.3.1). This might improve cognitive functioning during music making.

The participants considered the group attention exercise (5.1.2.4) and the group memory exercise (5.1.2.5) useful, challenging, and enjoyable. Participants also related the group attention exercise to everyday attention demands in family conversations, thereby suggesting its relevance beyond the music therapy sessions. Participants stated that they were able to detect improvements in attention and memory functioning during the tasks: showing that it was possible to self-evaluate progress in task performance. Feedback about progress may be an important factor for maintaining motivation in rehabilitation and empowering ABI survivors (2.4.2.4).

The song writing and discussion emerged as the most popular aspect of the treatment for the participants (5.1.2.8, 5.1.2.6). This part of the treatment combined cognitive functional processes and emotional adjustment, and facilitated self-reflection, emotional expression, altruism, and gaining insight. Participants stated that it enabled reflection on, and expression of, the losses and difficulties due to ABI. It provided a therapeutic space for the expression of feelings of pain and loss (Robb, 1996) (2.4.2.3.4). Participants shared their experiences and supported each other. This reduced feelings of social isolation and increased feelings of being valued (Pennebaker, Mayne and Francis, 1997) (2.4.2.3.4). Participants stated that the process of capturing thoughts about brain injury in a chronological sequence was useful (5.1.2.8). Some group members gained insight by hearing about the experiences and thoughts of their peers in the groups. The process of sharing experiences aroused strong emotional responses from the group members. The brief group music therapy provided a therapeutic space in which these painful feelings were held and worked through. This helped group members emotionally adjust to ABI (2.4.2.3.4). The emotional experience of the song writing and discussion might have enhanced the encoding and storage of episodic and semantic information at these times (2.4.2.2). P9 was able to recall specific details about the song writing despite his severe memory impairments (5.1.2.3). This may have been the result of emotional arousal stimulating memory functioning, as mentioned earlier. However, it is also possible that focusing on song writing provides a concrete product that is less abstract than a free improvisation. The clarity of structure and the visual aids used in physically writing songs may have supported memory processes for P9.

Singing aroused various feelings for the group members (5.1.2.7). Although some found the singing enjoyable, others felt embarrassed and anxious about singing their own song. The main reason for this was that some group members did not like the sound of their own

voices when singing and they did not feel confident about doing this. However, despite these negative feelings about singing they suggested that it was more tolerable when the whole group was singing.

Overall, the treatment protocol addressed the needs of the ABI survivors by providing functional cognitive exercises and supporting emotional adjustment. The individual exercises within the protocol were valued differentially across the sample. However, the benefits of the whole treatment included improving attention and memory, supporting emotional adjustment, and reducing social isolation. Brief group music therapy with this treatment protocol fulfils the criteria for rehabilitation programmes described by the RCP and BSRM (Turner-Stokes, 2003) (2.3-2.3.8). It is cost effective because it was effective in addressing cognitive and emotional needs of eight ABI survivors for the cost of one hour per week of contact time for the music therapist.

## **6.4 Discussion of the design, data collection methods, and data analysis methods**

### **6.4.1 Validity of the quantitative method**

#### **6.4.1.1 Confounding variables**

Confounding variables were considered in relation to the design, the data collection methods, and measurement tools. Analysis of the data for immediate memory recall raised a potential issue with regard to order effects (4.4.1). From table 6.2 above, the comparison of eight weeks of SC with BL yielded a large effect size for the combined groups. Initially, this seemed very strange and was an unexpected result. However, the combined results for eight weeks of SC consist of data at two different timepoints for each group in relation to treatment. This was due to the counterbalanced design (3.5.2). For group one, eight weeks of SC occurred after treatment, whereas, for group two, it occurred before treatment. It is

possible that improvements in immediate memory recall from the music therapy treatment persisted into eight weeks of SC following treatment for group one. The value at eight weeks of SC for this group was used for two data sources: eight weeks of SC and also for eight weeks of FU (3.10.1.1). Therefore, by counterbalancing for practice effects, the data for eight weeks of SC for group one became vulnerable to confounding due to order effects. This would account for the large effect size shown for eight weeks of SC for the combined groups.

The data from the two groups can be viewed separately to confirm the assertion above. For group one, the contrast for eight weeks of FU and BL shows a large effect size that is equal to that shown for the contrast between 16 weeks of MT and BL. This indicates that improvements due to treatment may have been present at eight weeks FU for group one. Hence, order effects may have confounded the results for eight weeks of SC for group one for immediate memory recall. For group two, the contrasts of eight weeks of SC and BL, and eight weeks of FU and BL show small effect sizes for both. These effect sizes are nearly equivalent and are smaller than the size of the effect of 16 weeks of treatment, which had a medium effect size. The above patterns that suggest the possibility of order effects are not reflected in the results for sustained attention. Perhaps order effects are more likely to affect studies in memory rather than attention. Other studies investigating memory have used repeated measures designs and counterbalancing (Silverman 2007, 2010) (2.4.2.2). However, these studies were not conducted with ABI subjects, only normal subjects.

Another explanation might be that fatigue effects were present for group two. Comparing the means of eight weeks of SC and eight weeks FU for group two shows that the value for the former was slightly higher than the latter. This might indicate fatigue effects due to repeated testing. From the data in this study it is difficult to arrive at a firm conclusion

about the presence of order effects for the measurements of immediate memory recall.

However, these observations identify interesting routes for future research.

Ceiling effects were present in the sustained attention data for some of the subjects. These subjects attained the maximum score in the test. It is likely that this contributed to the lack of statistical significance shown in the data analysis for sustained attention.

Practice effects are not considered to be present in this study because the measures of sustained attention and immediate memory recall contained several different versions (3.9.1.1, 3.9.1.2). Thus, they were designed to eliminate practice effects.

#### **6.4.1.2 Internal and external validity**

The repeated measures design enabled the collection of within-participant data. The participants acted as their own controls and this made it possible to conduct an experiment with a small sample (3.5.1). It also eliminated the need for an independent control group that might suffer high attrition rates and threaten the outcome of the study (2.4.2.4). Two subjects dropped out from the total number of ten subjects recruited. This is acceptable and is not of great concern. The counterbalancing of the design attempted to control for practice effects but this also made the experiment vulnerable to order effects as already discussed. A way to deal with this issue would be for both groups one and two to experience eight weeks of SC prior to starting treatment. This would allow for comparisons of SC and FU for both groups and provide clearer data about the presence of order effects.

The data collection method for the standardised measures of attention, memory, and mood state were conducted in the same order each time (3.9.1.4). This somewhat reduced issues due to fatigue if other orders were used. For example, if the POMS-BI was used first, this might induce fatigue that would affect the other two tests. The POMS-BI was positioned last because it was considered to be the most demanding.

The test administrator was blinded to the timepoints for each participant (3.9.1.5). Hence, the administrator did not know what the participants had experienced in the experiment until the end of treatment.

The assessment of satisfaction of emotional needs involved pre-post session measures using a non-standardised tool (3.9.3). Although the VASEN outcome measure is non-standardised, it is highly relevant to the subjects needs due to their involvement in the design. Other research (Price, Curless, and Rodgers, 1999; de Haan, et al., 1993; Stern, et al., 1997) supports the high validity and reliability of population-specific visual analogue scales for measuring internal states of ABI survivors (3.9.3). Therefore, the VASEN may have high validity for use in the study. The measures were self-reported with the support of an independent test administrator. So, bias was eliminated as much as possible. Further research is required to develop, test, and standardise this tool for use with specific populations.

Data analysis methods included descriptive analysis, ANOVA, mixed models analysis, and effect size calculations (3.10.1). Two types of statistical analysis were used: ANOVA (3.10.1.1.2) and mixed models (3.10.1.2.1). The problem with using more than one statistical method is that the researcher may appear as though he/she is selecting the most favourable method that produces the desired result. This is not the case here. The two statistical methods were not used with the same data. ANOVA was used with the data for sustained attention, immediate memory recall, and mood state. Mixed models analysis was used with the data from the VASEN only. The reason why mixed models analysis was used for the VASEN is that it deals with missing data in a robust manner. It would have been preferable to use this statistical method for all the quantitative data. However, it only became available in SPSS towards the end of the data analysis stage.

Convergent validity from the quantitative and qualitative findings increases the internal validity of the study (3.2). Hence, it was possible to make meta-inferences regarding the effectiveness of brief group music therapy on attention and memory functioning and emotional needs. These meta-inferences improve the external validity of the findings but do not replace the need to conduct further research with larger samples.

#### **6.4.2 Trustworthiness of the qualitative method**

The evidence from the IPA of the semi-structured interviews and the TA of the song lyrics was judged in terms of trustworthiness and credibility.

For trustworthiness, an independent interviewer rather than the researcher was used to conduct the semi-structured interviews (3.9.2.1). The interviewer was trained and used a script to maintain consistency of approach and language used in each interview. The interviews were recorded using the same audio recording device and transcribed accurately to preserve the integrity of the interview transcripts. When words were not clear the principal supervisor for clarification checked the recordings.

The qualitative data analysis is explicitly described in section 3.10.2, and tables of the analyses are shown in Appendix 9 and Appendix 11. The principal supervisor checked these analyses.

#### **6.4.3 Replication of the study**

The quantitative and qualitative data collection methods have been described in detail and all tools described. The data analysis methods have also been described in detail. The treatment protocol and its individual elements have also been described in detail.

Therefore, this study is considered to be replicable by others. It is recommended that a qualified music therapist is recruited to undertake the clinical work, and that the



interviewer and test administrator are trained according to the guidelines set out in chapter three.

## **6.5 Limitations of the study**

The original sample size for this study was intended to be 30 people with ABI. However, funding constraints, availability of participants, and geographical limitations lead to a smaller sample of ten. From a quantitative perspective, this sample size and the heterogeneity of the sample limit the external validity of the findings. However, synthesising these findings with those from the qualitative methods strengthens their validity. This allows the researcher to make stronger inferences about the effectiveness of treatment.

The small sample size reduced the ability of the study to produce statistically significant results. A larger sample would be more likely to do this. The study was conducted at two sites in different geographical locations. Further studies could involve more sites and more geographical locations (possibly in different countries). The use of a larger sample and multiple sites would increase the external validity of the findings. Other research has cited the difficulty in recruiting large numbers of participants for conducting research with this population (Kim, 2010; Limond and Leeke, 2005) (2.4.2).

Limited neurological information was available from medical records (3.7.4). The information gathered varied in detail between subjects. Brain imaging and neurological assessments have experienced significant advances over the time of the subjects' brain injuries. This contributed to the variation in detail in neurological information.

The participants had difficulty with carrying out the between-session exercises (4.3.1, 4.4.1, 5.1.2.2). Problems included lack of self-motivation and forgetting to practice. Improving the personal relevance of the material used in the exercises might increase

motivation (5.1.2.2, 5.1.4). Providing participants and families with memory aids or reminders might help with remembering to practice.

The Lottery subtest from the TEA showed ceiling effects for some subjects (4.3.2). This reduced the statistical significance of the results. A more rigorous test could be used to eliminate this problem. Alternatively, subjects could be screened at the recruitment phase to select only those with very low scores, thus, reducing the likelihood of ceiling effects occurring. The Lottery subtest also required adaptation for aphasic participants. These subjects were able to successfully identify when they heard the correct lottery numbers. However, they had difficulty in recalling the letters associated with them. This problem was solved by allowing the subjects to indicate (by gesture or verbally) when they heard the correct numbers without recalling the associated letters. This is shown in the raw data for this test in table A6.1 in Appendix 6. This suggests the need for a musical attention test that isolates attention functioning and eliminates the effects of aphasia. At the time of writing up this study a music-based attention assessment was being developed by Jeong and Lesiuk (2011). However, further studies of this measure are needed to confirm its construct validity and internal consistency.

The POMS-BI (3.9.1.3) was too long and cumbersome for the participants. Some of the forms contained missing items, and one of the participants refused to complete it at one of the assessment timepoints. This indicates that this tool is unsuitable for brain injury populations. Magee and Davidson, (2002) corroborate this finding and question the suitability of this outcome measure for this population. They suggest that it lacks sensitivity and places high demands on ABI survivors. The VAMS or the VASES may have been better choices, as they are visual analogue scales and quick to complete.

## **6.6 Recommendations for further research:**

Following the suggestion by the Royal College of Physicians and British Society of Rehabilitation Medicine (Turner-Stokes, 2003) further research should be conducted to assess the value and effectiveness, timing, intensity and duration of music therapy support for carers of people with ABI. It may also be useful to use proxy reports in conjunction with self-reports to determine within subject perceptions of changes and proxy reports. The current experiment would benefit from replication in multiple settings within age bands. It may also be useful to strictly separate the specific brain injury types and areas of brain injured. This suggestion may be unfeasible. However, if the sample used was large enough, it might be possible to filter and group subjects' data depending on injury information.

The design of the VASEN involved the participants' opinions about what was important to them. This helped develop a measure that had high validity, specificity, and relevance for the sample, and possibly the population. Future researchers might consider the benefits of consulting the participants in the design of outcome measurements tools. It is the intention of this researcher to continue to develop the VASEN and to work towards standardisation of this tool for research and clinical use.

Observations from the statistical analyses of scores for sustained attention and immediate memory recall, and the comments from Wilson (2012) and Malec (2012) suggest that there is a paucity of research investigating delayed recovery in cognitive rehabilitation. Patterns of recovery vary between ABI survivors and this may be a useful area for exploratory research. It may be beneficial for clinicians to understand, or even predict, recovery patterns in rehabilitation. This may inform the timing of interventions and lengths of treatment. It might also enhance the effectiveness and efficiency of rehabilitation programmes.

Further neurological research is needed to investigate the effectiveness of music therapy on cognitive functional gains and emotional needs. This study identified a potential association between mood state and cognitive functioning. It revealed an interesting similarity in trend patterns of data between timepoints for sustained attention, immediate memory recall and four mood states (agreeable-hostile, elated-depressed, energetic-tired, and composed-anxious). The data showed similar patterns of increases and decreases between similar timepoints. This might indicate that mood state and cognitive functioning are mutually dependent. Empirical research is needed to determine whether cognitive functional improvements cause gains in the satisfaction of emotional needs, and vice versa. Music therapy researchers must address the issues of fatigue for ABI survivors. More research is needed to determine the effects of particular treatment methods on fatigue and whether some treatment methods are able to raise energy levels. This might enable clinicians to improve treatment methods; and service providers to improve programmes. There is a severe paucity of research investigating the benefits of treatment for chronic brain injury survivors. These people continue to live with disability, and their needs and difficulties often receive less attention from researchers and clinicians. Further research is needed in this neglected field of community or continuing rehabilitation to improve the functioning, emotional well being, and quality of life of these people. Although costly, it may be useful for neuroimaging to be used in more music therapy studies to provide further evidence regarding the effect of treatment. Repeated measures designs seem to be useful for this population where small samples are common, and the population are heterogeneous. If possible, a control group should be used, but researchers must be aware of the ethical issues and the problems of attrition associated with its use.

This study used a specific collection of music therapy techniques. The techniques were evaluated using quantitative and qualitative research methods. This enabled discussion of the techniques in relation to effectiveness and suitability for use in rehabilitation. More research is needed to evaluate the effectiveness of individual techniques and to provide recommendations for their use in addressing specific needs and difficulties for specific populations.

## **6.7 Recommendations for clinical practice:**

This study suggests several recommendations for clinical practice. These recommendations are drawn from the quantitative analysis of the outcome measurements and from the opinions of the participants regarding the treatment protocol.

The quantitative and qualitative data suggest that functional exercises in attention and memory may be beneficial when used as primers for more complex tasks involving a range of cognitive processes. Participants found them challenging, useful, and enjoyable. They also reported perceived improvements in performing these exercises.

The exercises should begin at a basic level and increase in difficulty and complexity as the ABI survivor improves in task performance. The musical game-like nature of these exercises seemed to enhance their enjoyable qualities and may have helped motivate the participants. Another useful function of these exercises is the way in which they reveal to the ABI survivors their own level of functioning. The use of music in tasks that target specific functional processes, e.g. attention and memory, may enable survivors to gain insight into their level of functioning. It may also enable them to perceive subtle improvements in functioning in these domains.

Care must be taken when using these functional exercises in rehabilitation because survivors may experience emotional reactions to gaining insight about their true level of functioning. Although it is important for survivors to acknowledge their loss of

functioning, they may need support in managing the pain of loss and emotionally adjusting to this realisation. Therefore, it is recommended that music therapy clinicians address emotional needs while working on functional gains, as functional losses affect concepts of identity, and emotional needs.

The participants' opinions about the treatment method yielded important considerations for design of rehabilitation treatment programmes. Rehabilitation exercises should be adapted, where possible, to match the interests of the survivor. If the exercises incorporate the survivors' interests, this will motivate the survivors and maximise outcome potential.

Pereira *et al.* (2011) state that familiarity with a piece of music is extremely important in facilitating emotional engagement and in directly accessing the emotional centres of the brain. The participants in the present study also suggested that more visual aids would help the learning aspect of treatment.

Fatigue issues were highlighted and suggestions were made regarding several areas that could be addressed to reduce fatigue issues. All sessions should be timetabled to provide space between them for rest breaks. Cognitively demanding activities and sessions should be arranged for mornings and the number of sessions in one day should be limited to reduce the possibility of fatigue issues affecting the survivors in the days that follow the session. Environments must be managed in order to limit the amount of extraneous stimuli overloading the attention processing systems of ABI survivors. The management of environments includes reducing background noise/music, eliminating interruptions to sessions, and reducing visual stimuli that are distracting. Clinicians must also be aware that emotional reactions during treatment and emotional adjustment may increase fatigue issues. Therefore, the survivors' level of fatigue must be continually monitored during treatment.

Trends in music therapy practice show that some clinicians focus on functional gains through retraining techniques, whereas others focus on emotional experiences within a psychotherapeutic framework (Magee and Wheeler, 2006). This study shows that it is important and feasible to address cognitive functional gains and emotional needs simultaneously in neurological rehabilitation. It offers a treatment protocol that is effective in addressing these aims. The study suggests that music therapy training should include techniques that address these aims and consider how to combine them in rehabilitation.

## **6.8 Conclusion**

The present study aimed to answer the following research question:

How can brief group music therapy address cognitive functional gains and emotional needs of people with acquired brain injury?

The quantitative findings suggest that brief group music therapy improves sustained attention, and that the effect of treatment increases with dosage. The data also suggests that functional gains in sustained attention continue after treatment. The qualitative findings corroborate these inferences and strongly suggest that brief group music therapy improves sustained attention for ABI survivors in community rehabilitation.

The quantitative results suggest that brief group music therapy improves immediate memory recall. The improvements for some ABI survivors may persist beyond treatment. However, responses to treatment seem to vary widely for ABI survivors. The qualitative findings support these inferences.

The quantitative results suggest that brief group music therapy addresses the emotional needs of ABI survivors in the domains of feeling confident, feeling part of a group, feeling productive/useful, feeling supportive, feeling valued, and enjoyment. The findings suggest that improvements in these domains are experienced in the immediate term and over the course of therapy. The qualitative findings support these claims and provide deeper insight

into how music therapy addresses these needs. These findings showed that brief group music therapy enabled emotional adjustment through revealing to the ABI survivors the functioning they had lost, and providing them with opportunities to regain some of this lost functioning.

The participants experienced this brief 16-week intervention as satisfying but stated that it is the minimum length required for effectiveness. Interventions must take into account participant absence, which is common in community rehabilitation.

There have been few research studies investigating the effects of music therapy on attention functioning, memory functioning, and emotional needs. There is a lack of empirical evidence investigating the benefits of music therapy in these areas. This study used a mixed methods approach to investigate the cognitive functional gains and emotional needs of ABI survivors in community rehabilitation. It provides new evidence regarding the effectiveness of weekly one-hour group music therapy in addressing cognitive functional gains and emotional needs of chronic ABI survivors. This study also makes a valuable contribution to knowledge about dosage of music therapy in this field. It contributes to the body of research that suggests that there is a link between emotional state and cognitive functioning. It supports the argument for a holistic approach to ABI rehabilitation and offers a music therapy method to deliver this approach. Finally, this research study presents the development of a new tool for measuring the satisfaction of emotional needs, which might be of use to other researchers and clinicians in searching to meaningful, quantitative evidence of effectiveness. As such, this study makes an original contribution to knowledge on this subject.



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**APPENDIX 1**

**PARTICIPANT PACK**

# **Music Therapy Research**

## **Participant Pack**

## CONFIDENTIAL

### MUSIC THERAPY SELF-REFERRAL

*Adult - age 19 and over*

**Your name:**

*personnel?*

**Male / Female** (please circle)

**Your date of birth:**

**Your address:**

.....

.....  
.....

.....  
.....

**Your ethnicity:**

.....

**Contact numbers:**

**Daytime:**

**Evening / Mobile:**

**Your primary carer or next of kin:**

*Do you give permission for the music therapist to  
contact your doctor or relevant medical*

**Y / N** (please circle)

*If YES please complete the following:*

**Your G.P. or medical consultant contact  
details:**

**Name:**

**Address:**

.....**Phone:**

---

***Please outline your reasons for referring yourself for Music Therapy***  
*(it may help to tick one or more reasons, below)*

**To be part of a group**

**To feel supported**

**To support others**

**To express myself**

**To be heard**

**To listen to others**

**To have a private space**

**To feel valued**

**To be understood**

**To feel more confident**

**To be more independent**

**To be productive/useful**

**To be respected**

**To make decisions**

**To be in control**

**To be challenged**

**To improve concentration**

**To improve memory**

**To have a new experience**

**For personal enjoyment**



***What do you hope to gain from Music Therapy?***

---

***What are your musical preferences?***

---

***Do you have or have you had?***

Headaches

Memory disturbance

Dizziness or giddiness

Blackouts

Visual problems

Difficulty with speech

Difficulty with swallowing

Weakness in your arms or legs

---

***Do you receive therapy or specialist input from any other profession?***  
***If you do, please list here:***

---

***Please give details of your brain injury:***

***How long since injury occurred***

***Type of injury***

***Location in brain of injury***

---

**DECLARATION:**

I have completed this form to the best of my knowledge.

**Signed:** .....  
.....

**Referred on (date):**

## PARTICIPANT INFORMATION SHEET

### Time-limited Music Therapy to Address Functional Gains and Emotional Needs of People with Acquired Brain Injury

You are invited to take part in our research study of time-limited music therapy. This research is part of a PhD research training.

The research study involves three main elements: group music therapy, practicing daily exercise and assessments.

**Group music therapy:** While you are attending group music therapy we would like to follow the progress of the therapy sessions by recording the sessions on a video recorder. After the sessions the music therapist will review the video. This will enable him to think more about the progress of the therapeutic work and your development during the course of therapy.

**Practicing daily exercises:** As part of the therapeutic treatment you will be encouraged to practice daily routines designed to maximise your potential for development. These will involve learning song lyrics and listening to the radio or watching television. You may find it useful and helpful to involve your families, or people that work closely with you at home, to help with these exercises. The practice will be logged in a diary so that you will have a record of when you have carried out the routines.

**Assessments:** In order to measure the effect of music therapy we need to assess how you are doing. We will measure your ability to concentrate, remember a short story and how you are feeling. The short assessments will not be every week but will take place four times over the course of the therapy.

The results of the study will be used for professional and educational purposes at Anglia Ruskin University and presented in the research entitled 'Time-limited Music Therapy to Address Functional Gains and Emotional Needs of People with Acquired Brain Injury'.

The study will be organised by Jonathan Pool who will also be your music therapist.

You are free to choose whether or not to take part in this study and you may withdraw at any time by completing the reply slip at the bottom of the Participant Consent Form and giving it to Headway staff who will inform the music therapist. If you withdraw you may choose to withdraw your data also, or you may choose to allow any of your data collected to date to be used. The final date by which you may withdraw your data is 1<sup>st</sup> December 2011.

Agreement to participate in this study should not compromise your legal rights should something go wrong.

There are no special precautions to be taken before, during or after taking part in the study. You will be required only to attend the weekly sessions and take part in them.

Any information / data / music excerpts that are recorded will be safely stored electronically in a password-protected folder and, on hard copy, in a secure room. All personal information will remain confidential. In the report of the study all reasonable steps will be taken, where possible, remove personal information and to protect the identity of the individuals. A video camera will be used to record the sessions. The recorded material will be stored in a locked cabinet in a secure room. The recordings will be destroyed after three years following completion of the research study.

By taking part in this research you may benefit from having a therapeutic relationship with the music therapist and also from the personal experience of making music.

Travel expenses will not be reimbursed by the researcher.

Disclosure of information that you are in any danger will be reported to Headway. In the unlikely event that you encounter any distress during the course of the therapy treatment, it may be necessary for your family/carer to report this to Headway. This is to ensure you are cared for adequately.

If you have any questions about the study please contact Jonathan Pool on 01223 576 550 for Headway Cambridge or 02392 829 032 for Headway Portsmouth.

**YOU WILL BE GIVEN A COPY OF THIS TO KEEP,  
TOGETHER WITH A COPY OF YOUR CONSENT FORM**

## PARTICIPANT CONSENT FORM

NAME OF PARTICIPANT:.....

Title of the project: **Time-limited Music Therapy to Address Functional Gains and Emotional Needs of People with Acquired Brain Injury**

Main investigator and contact details: Jonathan Pool  
jon.pool@student.anglia.ac.uk

Members of the research team: Professor Helen Odell-Miller  
Professor Tony Wigram  
Dr. Wendy Magee

1. I agree to take part in the above research. I have read the Participant Information Sheet which is attached to this form. I understand what my role will be in this research, and all my questions have been answered to my satisfaction.
2. I understand that I am free to withdraw from the research at any time, for any reason and without prejudice.
3. I have been informed that the confidentiality of the information I provide will be safeguarded.
4. I am free to ask any questions at any time before and during the study.
5. I have been provided with a copy of this form and the Participant Information Sheet.
6. I understand that this work may be published but my details will remain anonymous and every reasonable effort will be made to protect my identity when it is published.
7. I am happy to be recorded using a video/audio recording device.

Data Protection: I agree to the University<sup>4</sup> processing personal data which I have supplied. I agree to the processing of such data for any purposes connected with the Research Project as outlined to me

Name of participant (print).....Signed.....Date.....

Name of witness (print).....Signed.....Date.....

YOU WILL BE GIVEN A COPY OF THIS FORM TO KEEP

---

<sup>4</sup> “The University” includes Anglia Ruskin University and its partner colleges

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If you wish to withdraw from the research, please complete the slip below and return it to Headway.

Title of Project: **Time-limited Music Therapy to Address Functional Gains and Emotional Needs of People with Acquired Brain Injury**

**7 I WISH TO WITHDRAW FROM THIS STUDY**

I give permission for data collected to date to be used in the study. **Yes / No**  
(Delete as appropriate)

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

# **Music Therapy Daily Exercises**

## **Attention Exercise<sup>5</sup>**

- A. Look around the room and notice everything that competes for your attention (radio, TV, other people, ambient noise, pictures etc...). Choose one thing and focus your attention on that for a short while. Then, focus your attention on something else in the room. Keep moving your attention around until you have focused on at least ten things.
- B. Find one or more rhythm instruments (your hands to clap, fingers to click, spoons, sticks, a cardboard box, etc.). Decide on a rhythm, perform it, and try to keep it up as long as you can. Use a clock to keep track of how long you can sustain your rhythm. You can do this with a friend to make it more fun.

## **Memory Exercise<sup>6</sup>**

Listen to or watch a news report for five minutes. Then, turn off the radio or TV and write down or discuss what you can remember.

## **Song learning Exercise**

### **Steps To Learn The Lyrics:**

1. Listen to the song once through. Then, try to recall some part of the song: the title, a few words, a chorus or perhaps a verse. See how much you can remember by reciting it or noting it down. This will be a good starting point.
2. Sing along to the song with the lyric sheet and focus on learning one chunk of the song, e.g. the chorus or a verse.
3. Now try to sing along to that part of the song without the lyric sheet.
4. Then, try to sing the lyrics to the backing track only and without the lyric sheet.
5. Finally, try to sing or recite the lyrics without the music.

---

<sup>5</sup> · (Thaut, 2008)

<sup>6</sup> · (Thaut, 2008)

## Memory Song

- Chorus: Hear me sing my memory song  
Cos when I sing I remember I can't go wrong.
- Introduction: I'll tell you a story about Billy McFee  
He told me a tale of the strangest degree.
- Chorus: Hear me sing my memory song  
Cos when I sing I remember I can't go wrong.
- Verse 1: He got up in the morning and scratched his head  
Then he stubbed his toe on his bed.  
He shouted at his bed: "How could you do that to me?"  
But the bed, it did not answer. It was mahogany.
- Chorus: Hear me sing my memory song  
Cos when I sing I remember I can't go wrong.
- Verse 2: Now Billy was a dancer of the greatest skill.  
His moves are so deadly he's got a licence to kill.  
He's wanted by the MI6 for his stealthy moves.  
But the ladies and some gents just want him for his masterful grooves.
- Chorus: Hear me sing my memory song  
Cos when I sing I remember I can't go wrong.
- Verse 3: Now Billy he was planning to go to IKEA  
To get a new suite of bedroom furniture.  
The bed overheard his conversation.  
It had to act soon for its own salvation.
- Middle 8: It waited till he went to bed  
Then it whispered in his ear:  
"You clumsy fool, it's not my fault.  
But I've got an answer to your problem.  
Wear steel-toe boots to bed.  
Then when you get up and you bang your foot  
It won't hurt you anymore  
It won't hurt you anymore."
- Last Verse: So Billy took the advice.  
He thought the bed... well, the bed was right.  
He said: "Maybe my decision was drastic and hasty."  
So he got himself some boots to help his situation.  
And now he's much better in the mornings.  
And you should see him on the dance floor in his Doctor Martens.
- Chorus: Hear me sing my memory song  
Cos when I sing I remember I can't go wrong.

## Practice Diary<sup>7</sup>

[illegible]

<sup>7</sup> The participants were given more practice diary sheets as they completed them.



## APPENDIX 2

### THE LOTTERY SUBTEST

For the Lottery subtest from *The Test of Everyday Attention (TEA)* (Robertson, et al., 1994), the instructions to the administrator were as follows:

“Say

*While you are on your trip, you become interested in the [national] lottery. You buy lottery tickets every week while you are out shopping. In the task, I want you to imagine you have some lottery tickets that you need to check against winning numbers. The winning numbers are played on the radio. Imagine that you are listening to a long list of lottery numbers on the radio. Examples of lottery numbers might be WD389 or ZX638, i.e. two letters, followed by three numbers. All your tickets end in 55 so you must listen for all the tickets that end in 55. When you hear a ticket ending in this number, write down the first two letters of the ticket. So, if you hear SD355, you will write SD. To remind you, the number you are listening for is displayed here. Here is a piece of paper for you to write the letters on. OK?*

Point to the cuebook (which shows either 55 or 88 or 33).

Say

*The radio programme goes on for quite a long time. Your number is not going to be mentioned very often. Try your best to listen for your number over the fairly long radio broadcast. Let's listen to the beginning of the radio programme to make certain you are clear about what you have to do.*

Play the [CD] to the point when the first lottery number ending in 55 (or 88 or 33) is mentioned. Note that the subject has heard the series and has recorded the correct letters. If the subject fails to write the letters, remind them that they will hear two letters and three numbers and when the last two numbers are 55 (or 88 or 33) they are to write down the letters. Restart the [CD] until they successfully respond to the first number.” (Robertson, et al., 1994, p.21)

Table A2.1: Stroke patients versus control sample (Robertson, et al., 1994, p. 9)

Age category	50-64				65-80			
	Control (n = 26)	CVA (n = 39)	<i>t</i>	<i>p</i>	Control (n = 65)	CVA (n = 41)	<i>t</i>	<i>p</i>
Lottery subtest	8.9 (2.4)	8.64 (1.7)	ns	ns	9.24 (1.1)	6.62 (3.1)	-4.97	<0.000

Table A2.2: Severe and moderate closed head injury versus matched normals (Robertson, et al., 1994, p. 9)

	Head injured means	Controls means	<i>t</i>	<i>p</i> (one-tail)
Age	37.47	38.13	-1.58	ns
Lottery subtest	7.27	8.77	-2.28	0.02

## APPENDIX 3

### THE SHORT STORY – IMMEDIATE RECALL SUBTEST

The instructions to the subtest administrator were as follows:

“Say:

*Next I am going to read you a short newspaper item. Listen carefully, and when I have finished, tell me back as much as you can remember. Ready –*

*After 20 years, identical twins Jenny and Diane Black have been reunited. They had both been adopted at birth by different families. Jenny discovered that she had a twin when she requested a copy of her birth certificate. She then began to search for her, a task that took two years. The sisters said ‘it was like looking into a mirror when we met’.*

*Now tell me back as much of the story as you can.*

Encourage the examinee to remember as much as possible. Prompt with:  
‘Is there anything else you can remember?’

If the examinee is unable to remember anything say ‘It started with: After 20 years, identical twins...’ (and read the first two ideas of the story).” (Wilson, et al., 2008, p. 43).

Version 2 of the story was as follows:

*“William Carter was rescued Tuesday evening after his boat capsized. Two fishermen discovered the wreck and notified the coast guard. A patrol boat found him shortly after and brought him to the local hospital where he was met by his wife and two children. Doctors report that he spent four hours in the cold water and is being treated for exposure. He is expected to make a full recovery.”* (Wilson, et al., 2008, p.43)

Table A3.1: Mean age and educational level in clinical (n = 75) and control (n = 148) samples (Wilson, et al., 2008, p. 66).

	Control sample		Clinical sample		t-test results		Cohen’s <i>d</i>
	Mean	SD	Mean	SD	<i>t</i>	<i>p</i>	
Age	53.41	13.59	53.63	13.77	0.11	0.909	0.02
Educational level	1.95	1.50	2.07	1.78	0.48	0.635	0.07

# APPENDIX 4

## QUESTION SCHEDULE FOR SEMI-STRUCTURED INTERVIEWS

### (INTERVIEWER'S VERSION)

1.
  - a. Since your brain injury what have been your greatest needs? *Just list them.*
  - b. Has music therapy given you any benefits or difficulties with any of these needs? You may feel that there has been no change at all, and it is OK to say so. *Group the needs given in question 1 into areas of attention, memory, emotional need/well-being and other. Encourage the respondent to explain the answers given.*
2.
  - a. There were different aspects to the music therapy you had. *Show the respondent the list of aspects.* Can you say which of these aspects of music therapy you found most useful and which were least useful?  
  
Aspects of therapy:
    - Playing music
    - Singing
    - Talking
    - Group attention exercise where some of you followed a beat and someone heckled and tried to interrupt and disrupt
    - Group memory exercise where you repeated back short rhythmic phrases after a short pause
    - Writing a song together
    - Homework exercises
  - b. Please explain why you have chosen these aspects.  
*Encourage the respondent to explain the answers given.*
3. You have had 16 sessions of music therapy over about 4 months. What do you think about the number of sessions you received?  
Prompts:
  - a. Do you think that you would have liked more sessions, fewer sessions or are you satisfied with the number of sessions? Please explain why you think this.
4. How could the music therapy be improved?  
*Perhaps the respondent might have wanted more of one aspect of the therapy or less of another. Perhaps there was something missing that the respondent would have liked to experience. Perhaps there was something that happened that the respondent did not want to experience.*

## **APPENDIX 5**

### **THE VISUAL ANALOGUE SCALE OF EMOTIONAL NEEDS (VASEN)**

The following four pages contain the vertical visual analogue scale for measuring the satisfaction of emotional needs. These were used immediately before and immediately after each music therapy session. The participants were required to self-report by marking on the line how much they agreed with each of the six statements.

Initials:.....

PRE-SESSION

I feel part of  
a group

I feel  
confident

I feel  
productive/  
useful

Very  
Much So

Very  
Much So

Very  
Much So



Not at all

Not at all

Not at all

I feel I  
support  
others

Very  
Much So



Not at all

I feel  
valued

Very  
Much So



Not at all

I am  
enjoying  
myself

Very  
Much So



Not at all

Initials:.....

POST-SESSION

I feel part of  
a group

I feel  
confident

I feel  
productive/  
useful

Very  
Much So

Very  
Much So

Very  
Much So



Not at all

Not at all

Not at all



I feel I  
support  
others

I feel  
valued

I am  
enjoying  
myself

Very  
Much So

Very  
Much So

Very  
Much So



Not at all

Not at all

Not at all

## APPENDIX 6

### RAW QUANTITATIVE DATA

Note: In tables A6.1-A6.6 the following apply:

- a. An asterisk (\*) indicates that the same scores taken at one timepoint were used for two timepoints for the data analysis: 8 weeks of SC and 8 weeks FU.
- b. A U indicates a completely unanswered score sheet.
- c. Scores in **bold** indicate results from prorated scores where some items in the factors were unanswered and affect the validity of the results.
- d. Scores in italics indicate when the test was adapted for aphasic subjects.

Table A6.1: Participant scores for sustained attention

Measurement timepoint		At BL		8 weeks of SC		8 weeks of MT		16 weeks of MT		8 weeks FU	
Score type		Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled
Participant Number	1	<i>10</i>	<i>12</i>	<i>9*</i>	<i>7*</i>	<i>10</i>	<i>12</i>	<i>10</i>	<i>12</i>	<i>9*</i>	<i>7*</i>
	2	7	5	10*	13*	10	13	9	8	10*	13*
	3	5	3	10*	12*	8	4	10	12	10*	12*
	6	9	8	10	12	9	8	10	12	10	12
	7	6	4	6	2	8	6	9	8	7	3
	8	8	6	10	12	10	12	10	12	10	12
	9	8	6	8	4	8	6	8	6	10	12
	10	5	4	10	12	10	12	9	8	9	6

Table A6.2: Participant scores for immediate memory recall

Measurement timepoint		At BL		8 weeks of SC		8 weeks of MT		16 weeks of MT		8 weeks FU	
Score type		Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled
Participant Number	1	6	4	7 <sup>*</sup>	5.5 <sup>*</sup>	5.5	4.5	8	6.5	7 <sup>*</sup>	5.5 <sup>*</sup>
	2	2.5	1	9.5 <sup>*</sup>	7.5 <sup>*</sup>	10.5	8.5	8.5	5	9.5 <sup>*</sup>	7.5 <sup>*</sup>
	3	6.5	5	10.5 <sup>*</sup>	10 <sup>*</sup>	10.5	10	7.5	6	10.5 <sup>*</sup>	10 <sup>*</sup>
	6	11	9.5	16	17	16	16.5	18.5	20	16	16.5
	7	13	12.5	10	10	5.5	4	10	10	10.5	9.5
	8	4	2	2	2	5	2.5	3.5	2.5	5	2.5
	9	0	0	0.5	0.5	0	0	0	0	2.5	1
	10	6.5	5	5.5	4.5	6	4	5.5	4.5	5	3

Table A6.3: Participant scores for agreeable-hostile mood state

Measurement timepoint		At BL		8 weeks of SC		8 weeks of MT		16 weeks of MT		8 weeks FU	
Score type		Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled
Participant Number	1	26	53	23*	50*	21	47	25	52	23*	50*
	2	36	65	28*	55*	33	61	34	62	28*	55*
	3	7	31	27*	54*	5	29	24	51	27*	54*
	6	25	52	28	55	25	52	<b>28</b>	<b>55</b>	28	55
	7	30	58	28	55	27	54	25	52	24	51
	8	26	53	25	52	33	61	30	58	24	51
	9	14	39	14	39	18	44	U	U	18	44
	10	24	51	33	61	35	63	28	55	32	60

Table A6.4: Participant scores for composed-anxious mood state

Measurement timepoint		At BL		8 weeks of SC		8 weeks of MT		16 weeks of MT		8 weeks FU	
Score type		Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled
Participant Number	1	18	51	14*	47*	15	48	14	47	14*	47*
	2	30	65	22*	55*	34	68	31	65	22*	55*
	3	11	44	14*	47*	8	41	14	47	14*	47*
	6	16	49	16	49	19	52	16	49	19	52
	7	17	50	24	57	18	51	23	56	19	52
	8	28	62	25	59	24	57	26	60	22	55
	9	12	45	17	50	19	52	U	U	20	53
	10	16	49	28	62	10	43	22	55	18	51

Table A6.5: Participant scores for elated-depressed mood state

Measurement timepoint		At BL		8 weeks of SC		8 weeks of MT		16 weeks of MT		8 weeks FU	
Score type		Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled
Participant Number	1	21	54	18*	51*	13	46	22	55	18*	51*
	2	35	67	25*	58*	29	62	36	68	25*	58*
	3	17	50	21*	54*	9	42	21	54	21*	54*
	6	24	57	26	59	28	61	<b>24</b>	<b>57</b>	26	59
	7	19	52	22	55	23	56	25	58	19	52
	8	25	58	25	58	31	64	29	62	24	57
	9	4	38	14	47	18	51	U	U	10	43
	10	8	41	24	57	13	46	22	55	20	53

Table A6.6: Participant scores for energetic-tired mood state

Measurement timepoint		At BL		8 weeks of SC		8 weeks of MT		16 weeks of MT		8 weeks FU	
Score type		Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled	Raw	Scaled
Participant Number	1	14	47	9*	41*	3	34	7	39	9*	41*
	2	23	58	12*	45*	26	61	29	65	12*	45*
	3	9	41	9*	41*	1	32	5	36	9*	41*
	6	23	58	25	60	26	61	<b>31</b>	<b>67</b>	31	67
	7	20	54	20	54	25	60	21	55	21	55
	8	22	57	24	59	25	60	27	63	22	57
	9	5	36	16	49	15	48	U	U	13	46
	10	8	40	23	58	12	45	22	57	20	54

Table A6.7: Pre-session scores for ‘feeling part of a group’

Participant number	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			5.8	8	7.6	6.6	6.7	6.2		7.3	6.3	5.8	6.3	5.8	7.3	4.8
2	0		5	6.1		5.3	5.2	5.6	5.2		5.5	5.6		5.7	6.1	5.8
3		-2.1	2.4		3	1.5	2.8		-1	-0.6	-0.4		0.8	1.7	1.5	2.3
6	8.8	8.9	7.2	7.7	8		7.4	8.1	4.7	7.6	7	8.2	7.7	7.7		6.3
7	8.6	5.9	8.5	3.9	5	6.5	5.7	8	8.1	7.4	7.8	8.2	7.6	7.1	7.9	8.6
8	7.8	6.1	8	8.3	8.7	8.1	8.4		6	5.4	6.6	7.7	6.4	7.7	8.9	7.3
10		-1.6	8.3	5.3	1.3	-1.3	8.3	8.9	7.5	9	1	8.2	9	8.9	9.2	2.5

Table A6.8: Post-session scores for ‘feeling part of a group’

	Session number															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			8.8	8.2	8.5	8	7.7	8.4		8.2	7.1	6.7	7.4	7.7	7.1	7.5
2	3.6		6.1	6.6		5.7	6.3	6.1	5.8		5.9	6.4		6.6	6.7	4.6
3		1	2.7		3.4	2.7	3.2		0.8	0.4	0.6		1.4	3.1	1.8	2.9
6	8.7	8.5	7.5	7.9	8.5		8.5	8.2	7.5	8.5	8.8	8.7	8.3	8.9		8.9
7	8.8	8.4	6.7	6.5	6	6.2	7.8	8.3	7	8.1	8.4	7.3	8.7	8.7	9	8.7
8	7	9.5	8.5	7.3	9.2	8.9	9		8.9	8.3	8.3	8.8	9	8	7.2	8.1
10		3.4	8.2	2.5	3.9	6	8.9	9.4	8.9	9.3	6.9	9.2	9	8.8	8.9	8.6

Table A6.9: Pre-session scores for ‘feeling confident’

	Session number															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			2.2	0	5.6	5.3	5.1	6.5		6.5	4.7	4.9	4.8	5.1	6.3	4.8
2	-4.3		1.9	1		4.7	4.3	4.5	4.5		7	5.7		5.8	5.3	7.1
3		-3.1	2.8		1.5	1.4	2.2		-1.1	0	-0.4		1.1	2.4	1.7	2
6	8.9	6.5	6.8	7.2	7.5		7.1	7.1	6.3	7.8	8	8.2	8	7.9		6.8
7	7.7	5.8	4.7	4.4	4.8	5.6	5	6.9	8.1	8.3	7.7	7.3	8.1	7.5	8	8.5
8	9	8.1	7.2	8.3	8.5	7.5	7.5		4.1	6.1	5.9	6	7.4	6.6	2	8
10		4.4	-0.7	4.6	3.4	-1.4	8.3	8.9	1.1	8	3	6.8	6.2	3.8	7.9	8.3

Table A6.10: Post-session scores for ‘feeling confident’

	Session number															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			6.3	8.4	8.7	8.3	7.1	8.6		8.3	8.2	5.2	7.1	7.8	7.7	7.5
2	3		4.8	4.9		5.4	5.8	6.5	6.1		6.5	6.9		7.1	6.8	4.6
3		0	1.9		3.1	2.7	3.2		0.8	0.6	0.5		1.4	2.9	2.5	3.6
6	9	8.3	6.4	8.3	8.7		7.6	8.5	7.7	8.6	8.3	8.7	8.3	8.9		8.4
7	8.3	8.1	6.7	6.8	5.8	7.9	8.5	8.8	7.8	6.9	8.3	7.2	8.1	8.5	8.5	8.5
8	5.5	9.4	6.6	8	8.3	8	8.1		8	8.4	8.4	8.9	9.2	8.1	6.9	7
10		4.4	-0.9	4	8.6	2.6	8.4	-1	8	4.9	1.8	6.9	6.3	7.6	8.3	5.3

Table A6.11: Pre-session scores for ‘feeling productive/useful’

	Session number															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			9.6	-3.8	5.4	4.6	5.1	7.6		6.5	4.7	3.8	4.4	5	6.3	4.9
2	2.9		5.9	5.4		3.8	5.1	5.2	4.8		6.2	6.1		5.9	6.2	6.4
3		-1.6	0		1.6	1.8	2.4		0	0.4	-0.2		0.8	2.2	3.2	2
6	-2	4.3	4.7	5.4	5		5.4	7.2	5.4	5.8	7.5	5.7	6.4	7.6		5.7
7	9	5.3	5.1	5.3	5.3	5.6	5.6	6.5	7.6	7.6	7.3	7.2	7.3	7.1	8.7	8.8
8	8.4	8.4	8.7	9	8.6	8.7	8.7		5.6	6.1	7.6	8.2	7.4	7.9	2	8
10		-1.3	-1.2	4.7	-2.3	2.1	8.2	2.1	-1	2.7	9	6.6	8.7	8.9	8.7	8.3

Table A6.12: Post-session scores for ‘feeling productive/useful’

Participant number	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			7	7.5	8.9	8.4	6.9	8.5		8.7	7.7	4.7	7.4	7.7	7.3	6.6
2	3.9		6.1	4.1		4	6.5	6.7	6.1		7.5	7.6		7.3	7	5.4
3		1	0		2.1	2.6	2.9		1.1	0.5	0.6		1.6	2.5	2.7	4
6	1.5	7	4.6	5.9	5.6		6.4	7.4	7.3	8.3	7.5	7	7.8	7.9		7.5
7	4.5	8.9	7.7	5.2	6.1	7.6	8.1	7.6	7.9	7.6	8	8.2	8.3	8.2	8.8	8.1
8	7.5	9.2	5.5	6.9	9.3	8.4	8.5		7.1	8.6	8.5	8.9	8.7	9	8.2	8.9
10		2.8	8.3	8.4	8.4	8.2	9.3	8	9.1	8.8	4.4	8.9	9.2	7.5	9.2	2.7

Table A6.13: Pre-session scores for ‘feeling supportive’

Participant number	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			8.3	2.5	7.8	5.3	5.5	6.6		5.7	6.9	5.8	6.2	7	6.5	6.8
2	-2.3		3.4	5.2		5	5.1	5.2	5.8		6.2	5.4		6.3	6.2	5.3
3		2.3	1.9		1.6	2.7	2.1		0.6	0.5	-0.3		0.7	2	2.2	2.3
6	0.3	4.2	3	4.7	5.2		5.5	6.8	3.7	5.5	6.1	6.1	6	6.7		4.8
7	8.1	4.8	6.1	6.1	6.4	6.2	5.5	7.9	6.1	7.7	6.7	6.9	7.2	8.3	8.1	8.4
8	8.5	8.8	9	8.6	7	7.5	8.8		6.8	8.1	6.7	6.5	7.8	8.3	7.7	8.3
10		2.6	2.4	1.2	2.4	5.2	4.8	8.9	5.4	8.2	9.2	6.6	8.4	5.1	8.8	1

Table A6.14: Post-session scores for ‘feeling supportive’

Participant number	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			7.6	7.7	8.7	8.5	7.7	8		7	7.9	7.3	7.3	8.1	7.8	7.5
2	2.7		6.5	6.6		5.2	5.8	5.8	6		6.4	6.9		7	7	5.9
3		1	1.7		2.7	2.3	3.4		0.8	0.9	0.6		1.2	2	2	3.6
6	0.9	5.8	3.8	4.5	3.3		6.2	5.1	6.6	7.8	6.8	5.3	5.6	7.4		6.6
7	1.3	6.1	5.5	6.2	7.7	8	8.7	8.5	8	7.7	8.2	8.1	8.3	8.4	7.8	9.1
8	8.5	9.4	5.4	6.8	9.2	6.7	7.2		8.9	7.1	9	7.4	9	9	8.3	8.9
10		2.2	-0.7	4.9	5.5	8.4	8.6	8.7	8.3	8.7	7	9	2.9	9.3	8.8	8.8

Table A6.15: Pre-session scores for ‘feeling valued’

Participant number	Session number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			3.4	4.3	7.2	5.5	4.7	7.3		5.7	6.5	4.7	5.6	6.7	6.7	6.7
2	0		3.4	6		2.6	5	4.9	5.3		6.1	6.4		6.7	5.6	5.1
3		-1.8	0.4		0.9	1.6	2.7		0	0.5	-0.3		1	2.4	2.3	2.3
6	8.3	4.8	4	5.3	6.3		6.3	7.2	4.8	6.1	6.6	6	6.5	7.2		4.8
7	8	1.8	6.5	5.3	6.2	5.4	6.6	7.7	5.7	8	6.9	6.5	7.5	7.5	8.1	7.2
8	9	8.7	8.6	7.5	7.5	8.2	8.6		6.1	8.3	9	7.2	5.6	6.1	6.7	7.1
10		3.5	3.7	6.8	8	3.2	7.6	0.9	6.4	9	9	8.3	8.9	8.5	8.7	5.4

Table A6.16: Post-session scores for ‘feeling valued’

	Session number															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			7.9	7.6	8.3	8.4	7.7	8.1		7	8.7	7.5	7	7.6	7.6	6
2	3.3		7.1	4.1		5.7	5.6	6.1	6.3		6.8	7.2		7.1	7.3	4.9
3		0.4	1		2.8	2.1	2.5		0.8	0.7	0.5		1.5	2.2	2.5	3.4
6	4.7	5.2	4.9	6.1	5.5		6.7	6	6.8	8.7	7.5	6.9	6.5	8.1		7.1
7	8.8	5.4	5.7	6.6	7.9	8.1	8.7	8.2	7.3	8.7	8.5	7.7	8.6	8.4	8.8	8.1
8	6.6	9.3	6.4	6.4	9.2	6.9	6.6		8.3	7.7	7.2	8	8.4	7.8	7.5	8.9
10		2.1	7.8	0.9	5.7	8.6	8.7	9.3	9	6.8	1.6	8.5	9.1	9.2	8.9	3.6

Table A6.17: Pre-session scores for ‘enjoyment’

	Session number															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			7.6	6.2	7.7	4.8	3.5	6.8		5.9	6.6	3.7	5.2	6.7	7.1	6.1
2	4.3		3.4	3.4		3.8	4	5.8	4.2		6	6.9		6.6	6	5.6
3		4.4	3.5		4.6	2.2	3		0	-0.6	-0.3		1.3	2.3	2.2	2.4
6	9.4	5.8	6.7	7.7	8.3		7.6	8.5	6.3	8.2	8	8.6	7.9	8.3		6.7
7	8.5	8.2	6.1	5.8	6.9	5.1	7.3	7	6.4	7.3	7.7	7	7.1	7.6	8.3	8.5
8	9.3	9.3	9.1	9.2	9.2	8.9	9.1		8.6	9	7.2	8.9	6.1	7.6	8.6	7.3
10		4.7	3.8	8.8	-6.1	8.1	8.1	9.3	2.9	8.8	9	9.1	9.2	8.2	9.4	9.2

Table A6.18: Post-session scores for ‘enjoyment’

	Session number															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			7.9	7.7	8.9	8.6	7.8	8.2		6.8	8.5	5.6	7.4	7.7	7.5	6.7
2	3.1		4.1	3.3		5.5	6.1	5	6.3		8.2	7.1		7	7.3	4.8
3		1.6	3.4		4	2.4	3.3		0.8	0.9	0.6		1.8	2.4	2.5	3.2
6	9.2	7.5	7.4	8.4	8.9		8	8	8.1	9.2	8.6	8.6	8.3	8.8		8.6
7	8.1	7.8	6.3	6.1	7.9	6.3	9	6.5	7.3	8.4	7.9	8	8.4	8	9	8.4
8	8.8	9.4	8.8	8.5	9.2	8.7	9.2		9.3	8.3	7.2	9	8.7	8.8	8.3	8.4
10		7.6	9	7.8	9.2	9.1	9.2	7.8	9.3	7.3	7.8	7.3	9.3	2.1	8.9	8.3

## APPENDIX 7

### EFFECT SIZE CALCULATIONS

Table A7.1: Means, variances and standard deviations for calculating the effect size of measurement timepoint on sustained attention for group 1 and group 2 combined

Participant	At BL	After 8 weeks of SC	After 8 weeks of MT	After 16 weeks of MT	Participant descriptive statistics		
					mean	variance ( $s^2$ )	standard deviation (s)
1	12	7	12	12	10.75	6.25	2.5
2	5	13	13	8	9.75	15.58	3.95
3	3	12	4	12	7.75	24.25	4.92
6	8	12	8	12	10	5.33	2.31
7	4	2	6	8	5	6.67	2.58
8	6	12	12	12	10.5	9	3
9	6	4	6	6	5.5	1	1
10	4	12	12	8	9	14.67	3.83
Measurement timepoint descriptive statistics	mean	6	9.25	9.13	9.75		
	variance ( $s^2$ )	7.25	16.19	10.86	5.44		
	standard deviation (s)	2.88	4.30	3.52	2.49		
Grand mean							8.53
Grand variance							12.52



Table A7.2: Equation elements for calculation of main effect size of measurement  
timepoint on sustained attention for group 1 and group 2 combined

Component of effect size equation	Calculated value
Total sum of squares ( $SS_T$ ) ( $df = 31$ )	387.97
Within-participant sum of squares ( $SS_W$ ) ( $df = 24$ )	248.25
Model sum of squares ( $SS_M$ ) ( $df = 3$ )	70.09
Residual sum of squares ( $SS_R$ ) ( $df = 21$ )	178.16
Between-participant sum of squares ( $SS_B$ ) ( $df = 7$ )	139.72
Number of conditions ( $k$ )	4
Number of participants ( $n$ )	8
Mean squares of the model ( $MS_M$ )	23.36
Mean squares of the residual variance ( $MS_R$ )	8.48
Between-participant mean square ( $MS_B$ )	19.96
Main effect size ( $\omega^2$ )	0.11

Table A7.3: Means, variances and standard deviations for calculating the effect size of  
treatment condition on sustained attention for group 1

Participant	At BL	After 8 weeks of MT	After 16 weeks of MT	After 8 weeks FU	Participant descriptive statistics		
					mean	variance ( $s^2$ )	standard deviation ( $s$ )
1	12	12	12	7	12.00	6.25	2.50
2	5	13	8	13	9.00	15.58	3.95
3	3	4	12	12	3.50	24.25	4.92
Measurement timepoint descriptive statistics	mean	6.67	9.67	10.67			
	variance ( $s^2$ )	22.33	24.33	5.33			
	standard deviation ( $s$ )	4.73	4.93	2.31			
Grand mean							9.42
Grand variance							14.27

Table A7.4: Main effect size of treatment condition on sustained attention for group 1

Component of effect size equation	Calculated value
Total sum of squares ( $SS_T$ ) ( $df = 11$ )	156.92
Within-participant sum of squares ( $SS_W$ ) ( $df = 9$ )	138.25
Model sum of squares ( $SS_M$ ) ( $df = 3$ )	32.25
Residual sum of squares ( $SS_R$ ) ( $df = 6$ )	106.00
Between-participant sum of squares ( $SS_B$ ) ( $df = 2$ )	18.67
Number of conditions ( $k$ )	4
Number of participants ( $n$ )	3
Mean squares of the model ( $MS_M$ )	10.75
Mean squares of the residual variance ( $MS_R$ )	17.67
Between-participant mean square ( $MS_B$ )	9.33
Main effect size ( $\omega^2$ )	-0.12

Table A7.5: Means, variances and standard deviations for calculating the effect size of treatment condition on sustained attention for group 2

Participant	At BL	After 8 weeks of SC	After 8 weeks of MT	After 16 weeks of MT	After 8 weeks FU	Participant descriptive statistics		
						mean	variance ( $s^2$ )	standard deviation ( $s$ )
6	8	12	8	12	12	10.40	4.80	2.19
7	4	2	6	8	3	4.60	5.80	2.41
8	6	12	12	12	12	10.80	7.20	2.68
9	6	4	6	6	12	6.80	9.20	3.03
10	4	12	12	8	6	8.40	12.80	3.58
Measurement timepoint descriptive statistics	mean	5.60	8.40	8.80	9.20	9.00		
	variance ( $s^2$ )	2.80	24.80	9.20	7.20	18.00		
	standard deviation ( $s$ )	1.67	4.98	3.03	2.68	4.24		
Grand mean								8.20
Grand variance								12.17

Table A7.6: Main effect size of treatment condition on sustained attention for group 2

Component of effect size equation	Calculated value
Total sum of squares ( $SS_T$ ) ( $df = 24$ )	292.00
Within-participant sum of squares ( $SS_W$ ) ( $df = 20$ )	159.20
Model sum of squares ( $SS_M$ ) ( $df = 4$ )	44.00
Residual sum of squares ( $SS_R$ ) ( $df = 16$ )	115.20
Between-participant sum of squares ( $SS_B$ ) ( $df = 4$ )	132.80
Number of conditions ( $k$ )	5
Number of participants ( $n$ )	5
Mean squares of the model ( $MS_M$ )	11.00
Mean squares of the residual variance ( $MS_R$ )	7.20
Between-participant mean square ( $MS_B$ )	33.20
Main effect size ( $\omega^2$ )	0.02

Table A7.7: Means, variances and standard deviations for calculating the effect size of treatment condition on immediate memory recall for group 1 and group 2 combined

Participant	At BL	After 8 weeks of SC	After 8 weeks of MT	After 16 weeks of MT	Participant descriptive statistics		
					mean	variance ( $s^2$ )	standard deviation ( $s$ )
1	4	5.5	4.5	6.5	5.13	1.23	1.11
2	1	7.5	8.5	5	5.50	11.17	3.34
3	5	10	10	6	7.75	6.92	2.63
6	9.5	17	16.5	20	15.75	19.75	4.44
7	12.5	10	4	10	9.13	13.06	3.61
8	2	2	2.5	2.5	2.25	0.08	0.29
9	0.0	0.5	0.0	0.0	0.13	0.06	0.25
10	5	4.5	4	4.5	4.50	0.17	0.41
Measurement timepoint descriptive statistics	mean	4.88	7.13	6.25	6.81		
	variance ( $s^2$ )	18.20	27.70	27.21	36.92		
	standard deviation ( $s$ )	4.27	5.26	5.22	6.08		
Grand mean							6.27
Grand variance							25.61

Table A7.8: Main effect size of treatment condition on immediate memory recall

Component of effect size equation	Calculated value
Total sum of squares ( $SS_T$ ) ( $df = 31$ )	793.99
Within-participant sum of squares ( $SS_W$ ) ( $df = 24$ )	157.31
Model sum of squares ( $SS_M$ ) ( $df = 3$ )	23.77
Residual sum of squares ( $SS_R$ ) ( $df = 21$ )	133.54
Between-participant sum of squares ( $SS_B$ ) ( $df = 7$ )	636.68
Number of conditions ( $k$ )	4
Number of participants ( $n$ )	8
Mean squares of the model ( $MS_M$ )	7.92
Mean squares of the residual variance ( $MS_R$ )	6.36
Between-participant mean square ( $MS_B$ )	90.95
Main effect size ( $\omega^2$ )	0.01

Table A7.9: Means, variances and standard deviations for calculating the effect size of treatment condition on immediate memory recall for group 1

Participant		At BL	After 8 weeks of SC	After 8 weeks of MT	After 16 weeks of MT	Participant descriptive statistics		
						mean	variance ( $s^2$ )	standard deviation ( $s$ )
1		4	4.5	6.5	5.5	5.13	1.23	1.11
2		1	8.5	5	7.5	5.50	11.17	3.34
3		5	10	6	10	7.75	6.92	2.63
Measurement timepoint descriptive statistics	mean	3.33	7.67	5.83	7.67			
	variance ( $s^2$ )	4.33	8.08	0.58	5.08			
	standard deviation ( $s$ )	2.08	2.84	0.76	2.25			
Grand mean								6.13
Grand variance								6.73

Table A7.10: Main effect size of treatment condition on immediate memory recall for  
group 1

Component of effect size equation	Calculated value
Total sum of squares ( $SS_T$ ) ( $df = 11$ )	74.06
Within-participant sum of squares ( $SS_W$ ) ( $df = 9$ )	57.94
Model sum of squares ( $SS_M$ ) ( $df = 3$ )	37.90
Residual sum of squares ( $SS_R$ ) ( $df = 6$ )	20.04
Between-participant sum of squares ( $SS_B$ ) ( $df = 2$ )	16.13
Number of conditions ( $k$ )	4
Number of participants ( $n$ )	3
Mean squares of the model ( $MS_M$ )	12.63
Mean squares of the residual variance ( $MS_R$ )	3.34
Between-participant mean square ( $MS_B$ )	8.06
Main effect size ( $\omega^2$ )	0.34

Table A7.11: Means, variances and standard deviations for calculating the effect size of treatment condition on immediate memory recall for group 2

Participant	At BL	After 8 weeks of SC	After 8 weeks of MT	After 16 weeks of MT	After 8 weeks FU	Participant descriptive statistics		
						mean	variance ( $s^2$ )	standard deviation ( $s$ )
6	9.5	17	16.5	20	16.5	15.90	14.93	3.86
7	12.5	10	4	10	9.5	9.20	9.83	3.13
8	2	2	2.5	2.5	2.5	2.30	0.08	0.27
9	0.0	0.5	0.0	0.0	1	0.30	0.20	0.45
10	5.0	4.5	4.0	4.5	3	4.20	0.57	0.76
Measurement timepoint descriptive statistics	mean	5.80	6.80	5.40	7.40	6.50		
	variance ( $s^2$ )	26.83	45.58	41.18	63.18	41.88		
	standard deviation ( $s$ )	5.18	6.75	6.42	7.95	6.47		
Grand mean								6.38
Grand variance								36.96

Table A7.12: Main effect size of treatment condition on immediate memory recall for group 2

Component of effect size equation	Calculated value
Total sum of squares ( $SS_T$ ) ( $df = 11$ )	887.14
Within-participant sum of squares ( $SS_W$ ) ( $df = 9$ )	102.40
Model sum of squares ( $SS_M$ ) ( $df = 3$ )	12.64
Residual sum of squares ( $SS_R$ ) ( $df = 6$ )	89.76
Between-participant sum of squares ( $SS_B$ ) ( $df = 2$ )	784.74
Number of conditions ( $k$ )	5
Number of participants ( $n$ )	5
Mean squares of the model ( $MS_M$ )	3.16
Mean squares of the residual variance ( $MS_R$ )	5.28
Between-participant mean square ( $MS_B$ )	196.19
Main effect size ( $\omega^2$ )	0.001

Table A7.13: Effect size for immediate effects of music therapy on ‘feeling part of a group’

Difference between the pre-post means	Mean standard deviation	Correlation coefficient for estimates of fixed effects	Effect size (Cohen’s <i>d</i> )
0.691	0.887	-0.071	0.741

Table A7.14: Effect size for immediate effects of music therapy on ‘feeling confident’

Difference between the pre-post means	Mean standard deviation	Correlation coefficient for estimates of fixed effects	Effect size (Cohen’s <i>d</i> )
1.093	0.825	-0.136	0.879

Table A7.15: Effect size for immediate effects of music therapy on ‘feeling productive/useful’

Difference between the pre-post means	Mean standard deviation	Correlation coefficient for estimates of fixed effects	Effect size (Cohen’s <i>d</i> )
1.145	0.838	-0.149	0.902

Table A7.16: Effect size for immediate effects of music therapy on ‘feeling supportive’

Difference between the pre-post means	Mean standard deviation	Correlation coefficient for estimates of fixed effects	Effect size (Cohen’s <i>d</i> )
0.958	0.864	-0.098	0.749

Table A7.17: Effect size for immediate effects of music therapy on ‘feeling valued’

Difference between the pre-post means	Mean standard deviation	Correlation coefficient for estimates of fixed effects	Effect size (Cohen’s <i>d</i> )
0.931	0.842	-0.106	0.744

Table A7.18: Effect size for immediate effects of music therapy on ‘enjoyment’

Difference between the pre-post means	Mean standard deviation	Correlation coefficient for estimates of fixed effects	Effect size (Cohen’s <i>d</i> )
0.457	0.9	-0.087	0.344

**APPENDIX 8**

**INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS OF**

**SEMI-STRUCTURED INTERVIEWS**



## Transcript and analysis of participant 1's responses

	<b>Participant 1</b>	
	<p>Interviewer: Since your brain injury, what have been your greatest needs do you think?</p> <p>P1: What do you mean by...?</p> <p>Interviewer: Your greatest needs, you know, things that really have since the brain injury have caused you difficulties or the biggest issues for you or things that you feel just sort of best are most important to you.</p> <p>P1: What...um. I can't...um. (pause). Say that one again.</p> <p>Interviewer: Yeah? Sure. I'll tell you what I have got as well. I've put them down here for you. Will that be helpful? Yeah? So, since your brain injury, what have been your greatest needs?</p>	
<i>Brain not good enough</i>	<p>P1: So, since your brain injury, what have been your greatest needs? I just wish I had a better brain.</p> <p>Interviewer: A better brain?</p> <p>P1: Yeah.</p>	<i>Cognitive needs</i>
<i>Depressed</i>	<p>Interviewer: Yeah? So. In what way? What's....How's....</p> <p>P1: I'm... I don't feel anything...anything good really.</p>	<i>Depressed mood</i>
<i>Difficulty with speech</i>	<p>Interviewer: No?</p> <p>P1: Sometimes I can speak, sometimes I can't. So....</p> <p>Interviewer: OK. So, speech. So, communication....</p> <p>P1: Yeah.</p> <p>Interviewer: Yeah?</p> <p>P1: And that's why.</p> <p>Interviewer: Yeah. Yeah.</p>	<i>Aphasia</i>
<i>Needing permission</i>	<p>P1: Can I say?</p>	<i>Lack of confidence</i>

<p><i>Drumming when you need to express what's in your head</i></p>	<p>Interviewer: Of course you can do.</p> <p>P1: OK. When I have the ...I can't think what it's called...the round thing and you bang it.</p> <p>Interviewer: Yeah. The drum?</p> <p>P1: That's quite good though. Sometimes when you...you come...you've just got things in your brain...</p> <p>Interviewer: Yeah?</p>	<p><i>A need for self-expression</i></p>
<p><i>Communicating intense feelings through playing music</i></p>	<p>P1: You just want to...ooooooooohhhhhhhhhhh. I like that.</p> <p>Interviewer: OK. So, you found that communication really since the brain injury has been one of your biggest...</p> <p>PI: yeah</p> <p>Interviewer: sort of areas – yeah?...</p> <p>PI: yeah.</p> <p>Interviewer: anything else at all that you can think of?</p>	<p><i>Satisfaction through non-verbal expression in music</i></p>
<p><i>Lack of independence</i></p>	<p>PI: I just don't seem to be able to do anything for myself.</p> <p>Interviewer: ok – and what sort of impact has that had on your life do you think?</p>	<p><i>Loss of independence</i></p>
<p><i>Unhappy about being unable to maintain the cleanliness of the family home</i></p>	<p>PI: I like everything clean.</p> <p>Interviewer: you like everything clean?</p> <p>P1: umm they do clean but it is not the way that I like it.</p> <p>Interviewer: right...I need to write some of this down if that's ok just because it helps me later on...yeah</p>	<p><i>Loss of family role as caregiver</i></p>
<p><i>Lack of independent access to the outside world</i></p>	<p>P1: I can't go out..I haven't been out on my own...</p> <p>Interviewer: ok...</p>	<p><i>A need to socialise independently</i></p>
<p><i>Limited mobility due to dependence on</i></p>	<p>P1: and for four years I've not been on a bus.</p>	<p><i>A need for freedom</i></p>

<i>others</i>	<p>Interviewer: Ok...so its sort of being dependent?...</p> <p>P1: I haven't got that....</p> <p>Interviewer: ok so so</p>	
<i>Difficulty maintaining friendships and socialising</i>	<p>P1: I can't go out like I used to with my friends</p> <p>Interviewer: ok, so so...</p> <p>P1: dookee (sounds like)</p> <p>Interviewer: so going out with your friends...so do you ...so have friends...friendships</p>	<i>Social isolation</i>
<i>Loss of friendships</i>	<p>P1: I've got one friend. The others have all... everything...well, nearly everything...They've all disappeared.</p> <p>Interviewer: Right.</p>	<i>Loss of friendships</i>
<i>Feeling lonely</i>	<p>P1: When you think about it, I feel lonely, actually.</p> <p>Interviewer: Right. OK.</p> <p>P1: Lonely.</p>	<i>Loneliness</i>
<i>Difficulty with self awareness, insight, and expressing impact of brain injury</i>	<p>Interviewer: Just making a note of that. Is that alright? Anything else at all that's...that's really sort of since the brain injury that's...</p> <p>P1: Probably loads, but it just won't come out.</p> <p>Interviewer: It's not gonna come out. OK. That's fine. If there's anything you want me to help you with... how about...um...I mean...we talked about communication. Has that...talking about communication...what parts of the communication is it that your...that you find most difficult? What do you think is...is sort of...has been the most difficult about the communication side of things? Is it finding the words or...?</p>	<i>Limited sense of self</i>
<i>Thoughts and spoken words sometimes unconnected</i>	<p>P1: Yeah. Sometimes it's in my brain...</p> <p>Interviewer: Yeah.</p> <p>P1: And something else comes out...</p> <p>Interviewer: Yeah.</p>	<i>Aphasia</i>

<i>Energy level affects speech and language ability</i>	<p>P1: When it shouldn't come out. And that's why sometimes I try and keep quiet. Sometimes...it all depends how I feel when I come. I feel a bit more umph? You know umph?</p> <p>Interviewer: Yeah. Umph.</p>	<i>Impact of fatigue on communication</i>
<i>Keeping quiet when tired</i>	<p>P1: And then I feel OK. And then sometimes you just feel ergh (not well) and I don't...You see nothing will come out of my mouth because I'm not...not reading...</p> <p>Interviewer: Thinking?</p>	
<i>Difficulty receiving and processing speech</i>	<p>P1: Yeah. When anybody's talking...it's not going in my brain.</p> <p>Interviewer: OK. So it's not... you thinking it's not...sort of...processing in there. It's not going in there?</p>	<i>Aphasia</i>
<i>Frustration at cognitive and communication problems</i>	<p>P1: Yeah. It's sometimes when I go home I think it "oohh!"</p> <p>Interviewer: So, is that mem...memory?</p> <p>P1: Yeah. Sometimes I can go home thinking "I should have told her this or I should have said...I think "ohh"</p> <p>Interviewer: OK. So, and has that been you think sort of memory has been a problem, yeah?</p>	<i>Frustration at disability</i>
<i>Difficulties writing, reading and understanding language</i>	<p>P1: Sometimes I can't write properly...can't read...read. I can read sometimes but I still don't know what it means.</p> <p>Interviewer: OK. Yeah.</p> <p>P1: Um.</p> <p>Interviewer: And the writing...?</p> <p>P1: It's like to...to spell...that's it spell.</p> <p>Interviewer: Spelling.</p>	
<i>Comprehension and spelling difficulties</i>	<p>P1: Terrible. Spelling. Even though they'll say "this is how you spell it, [participant 1]." But to me it doesn't. I can't spell it and sometimes it doesn't...I don't know what it means as well.</p>	<i>Aphasia</i>
<i>Difficulty with</i>		<i>Difficulty with</i>

<p><i>meaning of words</i></p>	<p>Interviewer: So, the comprehension.</p> <p>P1: Yeah.</p> <p>Interviewer: OK. OK, so we've talked about a few things there. So, thinking about those needs, and I'll remind you of them. I've got them written down here, which is why I wrote them down. So that we can both remember what we talked about. Has the music therapy...</p> <p>P1: (Coughs several times.)</p> <p>Interviewer: Do you need a drink? Are you alright? Can I get you a drink? OK.</p> <p>Interviewer pauses interview while providing the respondent with a drink to help relieve the coughing.</p> <p>Interviewer: OK. So. As we were just talking about. Um. We've talked about some issues that have come up since your brain injury really...um...has the music therapy given you any benefits or any difficulties with any of these needs. The question's here for you to help. You may feel there's been no change at all and it's OK to say so. So, if we think about... um... let's go through what we talked about: communication. Do you think the music therapy has helped in respect of communication at all?</p> <p>P1: Is that like when Jon will say "Right then. I want you to bang, bang, bang that, and the other person will do something else?"</p> <p>Interviewer: Yeah. I mean, what did you...so, communication...you were talking about getting your words out...um.... Do you think having the music therapy with Jonathan, has there been anything that...that the music therapy has maybe helped you get the words out or...?</p> <p>P1: Um...I think sometimes I'm ...I must admit that when we were doing a CD, he was writing what we got onto...he used to write on the board.</p> <p>Interviewer: Yeah.</p> <p>P1: And then I could...</p>	<p><i>semantics</i></p>
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<p><i>Improved speech and language during rehearsing and recording the song</i></p>	<p>Interviewer: Could follow it.</p> <p>P1: Yeah. And I could...I have these (holds up sheets of paper), and then I'd say "Oh, this is what it says. It says blah, blah, blah, blah, blah. And sometimes I wouldn't do that.</p> <p>Interviewer: Yeah.</p> <p>P1: Well, that was quite good. Um....</p> <p>Interviewer: Any difficulties from the communication side of things. Do you think the music therapy directly has sort of given you any difficulties with communication, you think?</p>	<p><i>Reduced aphasia during musical tasks</i></p>
<p><i>Mixed feelings about the effect of music therapy on communication problems</i></p>	<p>P1: Sometimes I think it has, and sometimes no.</p> <p>Interviewer: You think not and... yeah... and the other thing is that you know do you think there has been any change at all...um...as a result of the music therapy and it's absolutely OK to say...</p>	
<p><i>Difficulty recognising own progress</i></p>	<p>P1: People will always say to me "[participant 1], you've done really well." And I'll go "Don't be silly." And they've gone "But you've done really well." But I can't see it.</p> <p>Interviewer: Yeah.</p>	<p><i>Difficulty recognising own progress</i></p>
<p><i>Partner recognises progress of participant</i></p>	<p>P1: That's the only trouble with me. It's like John would say to me "you've done really well, [participant 1]." And I look at him (presents a facial expression)...</p> <p>Interviewer: (laughs)</p> <p>P1: "You really have." And I can't see it even at home. So, I don't know.</p> <p>Interviewer: OK. Well, that's fine. That's fine. What about...um...memory? Your memory. Anything that the music therapy has benefited your memory or made any difficulties or...?</p> <p>P1: With getting there.</p> <p>Interviewer: Yeah?</p> <p>P1: Yeah. We used to do...and I can't remember...in the afternoon, what we did the first...when we got</p>	<p><i>Dependent on others to recognise progress</i></p>

<p><i>Remembered the group attention exercise</i></p>	<p>there. He used to be the baddy....</p> <p>Interviewer: Right.</p> <p>P1: And he used to be the baddy and we had to do this banging, let's say, to make sure we don't do what he's doing.</p> <p>Interviewer: So you don't do what he does.</p> <p>P1: Yeah.</p> <p>Interviewer: Oh. Right. OK. And if you end up doing what he does, then he's caught you.</p> <p>P1: Yeah.</p> <p>Interviewer: Yeah?</p>	
<p><i>Noticed improvement at task</i></p>	<p>P1: Uhuh. So, first of all I thought "ooooohhhh!" And then sometimes I'm thinking "Oh God, yeah."</p> <p>Interviewer: (laughs) OK. So, you found that a benefit. Yeah? And, in terms of...um...sort of independence...we talked about how independence and friendships and things...um...that that's been since the brain injury you've had some sort of difficulties in that area. Has the music therapy been any benefit sort of with regard to sort of independence and friendships and loneliness...um.... Any difficulties?</p>	<p><i>Recognised own progress in music therapy sessions</i></p>
<p><i>Able to be open without feeling pressured to talk</i></p> <p><i>Group talked about how they felt</i></p>	<p>P1: It was with...you can talk to Jon. If I didn't feel...if I was a bit down...I didn't have to talk to him if I didn't want to. But then, I would say "Oh, this has happened to me today" or "This happened to me yesterday" you know. And then, even the other two with head...with the music...to me we could us three could talk to Jon.</p> <p>Interviewer: Right.</p> <p>P1: Of...you know...how they felt or....</p> <p>Interviewer: And you felt that that's been a benefit?</p>	<p><i>Therapist was helpful</i></p> <p><i>Shared experiences</i></p>
<p><i>Beneficial to talk</i></p>	<p>P1: Yeah. It's been quite nice actually. So sometimes when you... it's not just me; there's others...you just want to talk to somebody and it's quite nice.</p> <p>Interviewer: And did you talk just to Jonathan or did</p>	<p><i>A need for self-expression</i></p> <p><i>A therapeutic space for group discussion</i></p>

<p><i>Group talked to each other</i></p> <p><i>Enjoyed group discussion</i></p>	<p>you talk with each other?</p> <p>P1: Us. All of us.</p> <p>Interviewer: All of you together.</p> <p>P1: Yeah. That was nice.</p> <p>Interviewer: OK. How about with your reading and spelling. We talked about how Jonathan would put things up on the board...um...with the singing...</p> <p>P1: Yeah?</p> <p>Interviewer: Yeah. And that how that helped you... um... were there any difficulties that you had...um...with your sort of reading and spelling that you felt that music therapy was involved in in some way?</p> <p>P1: Say that again.</p> <p>Interviewer: That's fine.</p>	<p><i>A therapeutic space for group discussion</i></p> <p><i>Group discussion was beneficial</i></p>
<p><i>A little fatigued and hard to communicate</i></p>	<p>P1: I'm tired. My brain....</p> <p>Interviewer: That was a big old question I just asked there.</p> <p>P1: Yeah.</p> <p>Interviewer: So, we were talking about reading and spelling and that you've had some difficulties since the brain injury.</p> <p>P1: Yeah.</p> <p>Interviewer: How...um...was music therapy...um...and relating it to your reading and spelling? Um...were there any benefits or any difficulties?</p> <p>P1: I think I say that to Jon. As I said, he would write something on the board...oh, it wasn't just straight away...this has gone one week after the other week.</p> <p>Interviewer: OK.</p> <p>P1: When we started to do it I didn't know what it...he was just writing.</p>	<p><i>Impact of fatigue on cognition</i></p>



<p><i>Noticed gradual improvement in comprehension</i></p> <p><i>A perceived improvement in ability to read</i></p> <p><i>Attributes music therapy to changes in reading ability</i></p>	<p>Interviewer: Right.</p> <p>P1: Then bit by bit I used to go “I know what that says”. I says “Oh”. So that was quite...</p> <p>Interviewer: OK.</p> <p>P1: Quite nice. I says “You can learn me to read”</p> <p>Interviewer: And was it just in music therapy or was it outside of music therapy as well, do you think that that...</p> <p>P1: No. I think with the music</p> <p>Interviewer: Just with the music therapy, yeah? OK. Right. We’re going to move on to the next question. So, there were different aspects to the music that you had and I’ve got a list of them here and I’ll read them out to you. So, Jonathan’s just identified seven different things that happened in the music therapy...and...could you just say which of these you found the most useful and which you found the least useful? So I’ll read them out to you and we can talk about them if you’re not clear. So, playing music, singing, talk....</p> <p>P1: Good one or not...no...</p> <p>Interviewer: So, if we read through them all first.</p> <p>P1: OK.</p> <p>Interviewer: Yeah? And see if you...um...could pick out the one you found the most useful...um...and the least useful.</p> <p>P1: OK.</p> <p>Interviewer: Yeah? So, playing music, singing, talking, the group attention exercise where some of you followed a beat and someone heckled and tried to interrupt and disrupt, the group memory exercise where you repeated back short rhythm phrases after a short pause, writing a song together, and the homework exercises. OK. Of those seven things, which one did you find the most useful. And if you want to go through them again or...we can do...we can...</p>	<p><i>Improved learning capacity</i></p> <p><i>Effectiveness of treatment</i></p>
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<p><i>Found all of the tasks useful</i></p>	<p>P1: Um. Play music, singing, talking...</p> <p>Interviewer: Which one was the most useful do you think?</p> <p>P1: I don't know; I've liked it all.</p> <p>Interviewer: You liked it all?</p> <p>P1: Yeah.</p> <p>Interviewer: Anything the least useful?</p>	<p><i>Treatment was useful</i></p>
<p><i>Homework exercises were least useful</i></p>	<p>P1: The homework exercises.</p> <p>Interviewer: The homework exercises the least useful. Yeah?</p> <p>P1: Yeah. Mainly that one.</p> <p>Interviewer: Why was that?</p>	<p><i>Homework exercises were least useful</i></p>
<p><i>It was difficult to remember to practice at home and homework exercises reminded of school</i></p>	<p>P1: Because I forget. I forget and I don't remember when.... I try to remember and then...it's like the week goes so quick and you got to try and remember and then you forget...and you're thinking "ooh". So, mainly the homework...they're like when I went to school.</p> <p>Interviewer: So, did you...did you do the homework or did you...?</p>	<p><i>Negative aspects of homework exercises: required self-motivation and remembering, reminder of school experience</i></p>
<p><i>Attempted the homework exercises</i></p>	<p>P1: I think I did try.</p> <p>Interviewer: OK.</p> <p>P1: Yeah.</p> <p>Interviewer: And even...sort of...with trying you still would say that was the least useful of all the other things?</p>	
<p><i>Homework exercises always required help of someone else</i></p>	<p>P1: Yeah. Cos' I always have to have somebody to help me anyway.</p> <p>Interviewer: Yeah.</p> <p>P1: So...hmmm.</p> <p>Interviewer: OK.</p>	<p><i>Negative aspects of homework exercises: dependence on others for practice</i></p>

<p><i>Liked in-session exercises</i></p>	<p>P1: The rest...</p> <p>Interviewer: The rest of them?</p> <p>P1: Yeah. To me, I've enjoyed it when you play your music, which is quite good, singing, even though I haven't got a good...voice...um...,as I say, talking, and I like them...the group attention exercise where some of you followed a beat and someone heckled and tried to interrupt and disrupt.</p> <p>Interviewer: Disrupt. Yeah?</p> <p>P1: So, that wasn't too bad.</p> <p>Interviewer: So, which...any of them you can pick...I'm going to...I'm going to make you pick one out of all of them as your favourite...OK...as the most useful. I'm going to force you into a decision...bully you into it.</p>	<p><i>Liked session exercises</i></p>
<p><i>Playing music was most useful</i></p>	<p>P1: Play music.</p> <p>Interviewer: Playing music. Yeah?</p> <p>P1: Yeah.</p> <p>Interviewer: And, why did you pick that one over the others? I know it was a tough choice, but what did you find most useful about playing music?</p>	<p><i>Playing music was most useful</i></p>
<p><i>Playing until you feel better</i></p>	<p>P1: When playing music you can bang until your heart is contented.</p> <p>Interviewer: Right. OK.</p> <p>P1: Um. Yeah. Play the music and you can...I think that you can bang with...it's one of them thingibobs...you see I don't know...bang it.</p> <p>Interviewer: Oh. Yeah. With the silver...yeah the tambourine</p> <p>P1: Yeah. I like doing that.</p> <p>Interviewer: Yeah.</p> <p>P1: Yeah.</p>	<p><i>Cathartic quality of playing music</i></p>

<i>Expressing internal feeling state</i>	<p>Interviewer: So you found playing music the most useful because it...you could bang the drums.</p> <p>P1: Get rid of your...not the emotion.</p> <p>Interviewer: Yeah? Get rid of what was inside and...</p> <p>P1: That's it. Yeah.</p> <p>Interviewer: OK. So, was there anything that you wanted to say about any of these? Anything else that you...em... sort of found useful about any of them?</p>	<i>Cathartic quality of playing music</i>
<i>Highlighted group attention exercise</i>	<p>P1: The group attention...</p> <p>Interviewer: Yeah.</p>	<i>Group attention exercises were useful</i>
<i>Highlighted group memory exercise</i>	<p>P1: And the memory. You know...that...em...instead of trying to...you find the beat.</p> <p>Interviewer: Heckle</p> <p>P1: The heckle and try to.... Well, the heckle used to interrupt. Yes.</p> <p>Interviewer: Yeah. Yeah.</p> <p>P1: So, you've got to try and think "I've got to bang what he's...heckle is doing I've got to do. And that is...you know...at first you're thinking "Oh, my God!"</p> <p>Interviewer: Was it hard?</p>	<i>Group memory exercises were useful</i>
<i>Recognised improvement in group exercises</i>	<p>P1: It was at first, but then I think bit by bit...you know</p> <p>Interviewer: It improved.</p> <p>P1: Mmm.</p> <p>Interviewer: Can you relate that to anything in...sort of everyday life at all? Has there been any...sort of...help from that in your everyday life do you think? Is there...and there doesn't have to be. It's fine to say "no".</p>	<i>Recognised progress in group exercises</i>
<i>Difficulty in determining carry over of improvements into</i>	<p>P1: I can't...</p> <p>Interviewer: No?</p>	

<i>daily living skills</i>	<p>P1: There might be but I can't remember.</p> <p>Interviewer: And that's fine. And what about...em...OK. So, we've talked about playing music and the homework exercises and the attention exercise. Singing. How did you find the singing?</p> <p>P1: Not too bad. You know...I used to sing at school, so now I'm singing again.</p> <p>Interviewer: Oh. There you go.</p> <p>P1: Oh no. I'm not good. It's just that...I don't know...obviously, I wasn't singing on my own...just me</p> <p>Interviewer: Yeah.</p>	<i>Difficulty in determining benefits to daily living</i>
<i>Enjoyed singing in a group due to others singing too</i>	<p>P1: As long as the others were singing...well, that was OK</p> <p>Interviewer: OK. And what about talking.</p>	<i>Group singing was useful</i>
<i>Found talking in the group useful</i>	<p>P1: Yeah. I like talking.</p> <p>Interviewer: Yeah?</p> <p>P1: Yeah</p> <p>Interviewer: We said about that earlier. That you...em...like talking...being able to talk to Jonathan.</p> <p>P1: Yeah.</p> <p>Interviewer: Yeah? And share...</p> <p>P1: Yeah.</p> <p>Interviewer: And share your problems...and actually all talking together as well.</p> <p>P1: Yeah.</p> <p>Interviewer: OK. And writing a song together. How did you find that?</p> <p>P1: Em...</p> <p>Interviewer: Useful or not particularly useful?</p>	<i>Group discussion was useful</i>

<p><i>Mixed feelings about the song-writing</i></p>	<p>P1: A yes and a no.</p> <p>Interviewer: A yes and a no.</p> <p>P1: Yeah.</p> <p>Interviewer: Any reasons for that?</p>	
<p><i>Artistic differences – unsure about rhyming lyrics</i></p>	<p>P1: Sometimes I’m thinking that rhymes nice and sometimes I’m a bit unsure...trying to put that... music?</p> <p>Interviewer: The lyrics?</p> <p>P1: Yeah.</p> <p>Interviewer: Yeah? Or the music?</p> <p>P1: When you have to write the music.</p> <p>Interviewer: Yeah. OK. So, the lyrics. The words that go with the music. Yeah?</p> <p>P1: Yeah. I’m thinking “Don’t know whether it’s that that should go. We ought to put something...something else.” But then I try to think what to put down...do you know...so...</p> <p>Interviewer: So you found it quite tough.</p>	<p><i>Importance of the finished product</i></p>
<p><i>Writing the lyrics was challenging</i></p> <p><i>Does not separate the finished artistic product with the value of the song-writing process.</i></p>	<p>P1: That, yeah.</p> <p>Interviewer: Yeah? And you weren’t quite happy with it.</p> <p>P1: That went a bit...mmm.</p> <p>Interviewer: Right. OK. Right. We’ll move on to the next question. Thanks for that. This is the next question here for you, alright. So. You’ve had 16 sessions of music therapy over about four months. What do you think about the number of sessions that you’ve received?</p> <p>P1: It’s gone quick.</p> <p>Interviewer: It’s gone quick?</p> <p>P1: Yeah.</p>	<p><i>Challenge of writing a ‘good’ song</i></p> <p><i>Product vs process</i></p>

<p><i>Time of session should have been earlier</i></p> <p><i>Fatigue in the afternoon</i></p> <p><i>16 sessions was just the right amount</i></p> <p><i>A break is useful</i></p> <p><i>Breaks counteract boredom and fatigue</i></p>	<p>Interviewer: Do you think you would have liked more sessions, fewer, or was it about right?</p> <p>P1: That I don't know. Just wish it wasn't...tight. We used to come half-past three?</p> <p>Interviewer: Yeah.</p> <p>P1: And I wish he would have come about one.</p> <p>Interviewer: OK.</p> <p>P1: So...because round about...we used to come tired</p> <p>Interviewer: OK.</p> <p>P1: but...</p> <p>Interviewer: So, would you like to have more music therapy? Jonathan won't mind you saying whatever you want to say. Don't worry. Em...so, would you want more, less, or is it about right?</p> <p>P1: No. Good. 16. Yeah.</p> <p>Interviewer: About right.</p> <p>P1: Yeah. Yeah.</p> <p>Interviewer: Is there a reason why you...sort of...didn't want it maybe to have more or...</p> <p>P1: Because sometimes it's nice to have a break, don't you.</p> <p>Interviewer: So, maybe relating what you were saying about the half-past three start and being tired.</p> <p>P1: Yeah.</p> <p>Interviewer: Yeah?</p> <p>P1: Yeah. But it's like anything. If you do the same thing over and over and over again, you get bored then, don't you. So, if you have enough...</p> <p>Interviewer: Yeah?</p> <p>P1: And then...now...</p>	<p><i>Timing and fatigue</i></p> <p><i>Satisfied</i></p> <p><i>Need for a break</i></p>
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<p><i>16 sessions was the right amount</i></p>	<p>Interviewer: Enough, but not too much.</p> <p>P1: Yeah.</p> <p>Interviewer: Yeah? So, just the right amount that you don't get bored...</p> <p>P1: Yeah. That's it.</p> <p>Interviewer: But if you have too much of it, you end up getting bored</p> <p>P1: Yeah.</p> <p>Interviewer: OK. How do you think the music therapy could be improved? Anything that you think that...anything to do with the music therapy how might it have been improved? Is there something that you liked more than another, or something missing, or something that had happened that you didn't want to experience</p> <p>P1: I'm trying to think.</p> <p>Interviewer: That's fine. It's hard.</p> <p>P1: That's hard, that one</p> <p>Interviewer: It is hard, yeah. Was there anything that you...did you want more of one aspect and less of another? So, you know we looked at those...so...let's have a look at those aspects again. Here you go. So, was there any of these that maybe you'd want to have more of or less of...anything that you think could have been...that was missing?</p> <p>If there isn't anything that's not a problem.</p> <p>P1: No.</p> <p>Interviewer: No? So, you think that, as it was, it was good as it was...</p> <p>P1: Yeah.</p> <p>Interviewer: You are happy. And you said about...em...sort of...that you could have ended up getting bored...sort of...doing the same thing. Did you find the sessions themselves boring or...?</p>	
<p><i>The sessions did not</i></p>	<p>P1: No.</p>	



<i>get boring</i>	<p>Interviewer: But if it had gone on, then you...</p> <p>P1: Yeah</p> <p>Interviewer: Yeah? OK. Um...was there anything in there...in the music therapy that you did want to join in or you didn't want...you wished you hadn't been asked to do or anything like that?</p>	
<i>Being motivated by group peers</i>	<p>P1: Sometimes you're thinking "Oh God, No. Do I have to do that." And they're thinking "Oh. Go on, Angie. Do it. Go on." So...</p> <p>Interviewer: And, those things, would they be a good...would it still be good...</p>	<i>Motivated by group</i>
<i>Good to move out of comfort zone and be challenged</i>	<p>P1: I think it was good, actually, instead of me just being sat there and not doing anything</p> <p>Interviewer: Ok. So, things that maybe made you feel a bit uncomfortable but...</p> <p>P1: It's good, yeah.</p> <p>Interviewer: But it's good for you as well.</p> <p>P1: Yeah.</p> <p>Interviewer: Um...Anything else that you want to say about the music therapy that we've not covered?...um...your thoughts</p> <p>P1: Oh. My thoughts.</p> <p>Interviewer: There doesn't have to be anything else. You don't need to say anything more if you don't want to, but just if there's anything that we've missed</p> <p>P1: No. I can't...</p> <p>Interviewer: No? Fantastic. Thank you.</p>	<i>Value of music therapy</i>

## Transcript and analysis of participant 2's responses

	<b>Participant 2</b>	
	<p>Interviewer: I'm just going to ask you a few questions...em...about the music therapy...just various questions just to see what your thoughts are really. So, I've got my first question here, and I'll read it out to you. Firstly, since your brain injury what do you think have been your greatest needs?</p> <p>P2: To stay neutral really.</p> <p>Interviewer: Meaning...</p> <p>P2: Can I swear?</p> <p>Interviewer: Of course you can.</p>	
<i>Angry</i>	P2: Don't let the bastards beat you.	<i>Anger</i>
	Interviewer: Right. OK.	
<i>Fighting against vulnerability</i>	P2: That's what I said to the doctor when they asked me. I said that. I said "It's not going to beat me."	<i>Anger at disability</i>
	Interviewer: Anything else...sort of...that your...you know...since acquiring the brain injury...?	
<i>Loss of ability</i>	P2: I just regret that I can't do what I used...you know.	<i>Loss of physical ability</i>
	Interviewer: Yeah. OK. I'm just making notes. Is that alright? Just because it helps on this next question, that's all. Um...regret that you can't do things. What sort of things have been...sort of...impacted.	
<i>Loss of physical ability</i>	P2: Well. Mainly physical because I've got a frozen shoulder at the same time as the stroke.	
	Interviewer: Right. OK.	
<i>Left-sided weakness</i>	P2: So, I've lost the use of this left side completely...well not completely. I can't even knock a nail in because I can't hold a nail to hit it with a hammer. Because I was always really constructive.	
<i>Loss of usefulness</i>	Interviewer: So, the impact on your physical...sort of...abilities and capabilities...you found that quite hard.	<i>Loss of usefulness</i>



	<p>can't pick it up.</p> <p>Interviewer: Yeah. Yeah.</p> <p>P2: Very difficult.</p> <p>Interviewer: But laser treatment is amazing these days.</p> <p>P2: Yeah. They're going to have a look at it.</p> <p>Interviewer: Yeah. Yeah.</p> <p>P2: But they won't touch this eye again because they said if they touch it and they lose that sight and you lose the other one, you'll be blind. So, I can understand that...you know...that they won't touch that one again.</p> <p>Interviewer: Yeah.</p> <p>P2: I have got good sight in it really.</p> <p>Interviewer: Right. OK.</p> <p>P2: At the moment they won't...they don't focus. It's like having two kids; they keep fighting. And these two fight with each other, and I find it difficult. It's blurry isn't it.</p> <p>Interviewer: Yeah. Which must be quite tiring.</p> <p>P2: Ooh. It's not too good.</p> <p>Interviewer: Mm. OK. So, really...sort of...physicality and your eyesight. Anything else at all since the brain injury that...there doesn't have to be anything else...just...</p> <p>P2: Not really. Only...all the people before I had the brain injury were always scrounging off of me. I had hundreds of people all around you, and they don't come now. Only some of them...you know.... It's surprising how many people disappear.</p> <p>Interviewer: Right. OK.</p> <p>P2: And then it's surprising some of the people that turn up who you'd never think would...you know.</p> <p>Interviewer: Yeah.</p>	
<i>Denial about disability</i>		<i>Difficulty accepting vulnerability</i>
<i>Making a joke</i>		
<i>Loss of friendships</i>		<i>Loss of friendships</i>

	<p>P2: And you find out things that...I found out things that I didn't know about a partner years and years ago and we split up...and I don't know why we split up but I thought it was because of his friends. But it wasn't, it was my wife that done it. And I found that out afterwards.</p> <p>Interviewer: Right.</p> <p>P2: So, she pushed all my friends away. That upset me when I found that. And that was because my partner, he was the first one to come see me in hospital. I couldn't believe it when he stood there...you know. I couldn't see him but I could hear him. We spoke and I knew straight away who it was...you know.</p> <p>Interviewer: So, actually your friendships...I mean...in some ways there's been some...sort of...negatives but also some positives as well.</p> <p>P2: Yeah, with Beryl. I rung her up...you know.... She's an ex-girlfriend that I'd messed about. I daren't tell her how much, but...you know. And she said I'll come and see you. But you let me down, you did this and swear and shouted and hollered at me and the next thing is she's looking after me.</p>	
<i>Dependent on others</i>		<i>Being dependent</i>
<i>Humour as a coping mechanism</i>	<p>Interviewer: So, friendships have been an issue but in some good ways and in some bad ways. Alright. I'm going to quickly make a note of that. That'll just help me in a second.</p> <p>P2: But we get on well together. She shouts at me and I laugh at her.</p> <p>Interviewer: Yeah. Certainly your POMS...um...your questionnaire that we do about how you've been feeling over the last week...you're always positive, [P2]. That's great. So, there were different aspects to the...um...music therapy that you had. Sorry. I've missed a question out. So, we've talked about the greatest needs...so, the impact on your physical ability...um...friendships...um...and also sort of emotionally how you...you know...sort of regret losing some of the things that you were doing. Has music therapy given you any benefits or difficulties with any of these needs? You may feel that there hasn't been any change at all, and it is OK to say so.</p>	
<i>No perceived</i>	<p>P2: I don't think so really.</p>	<i>Effectiveness of music</i>

<i>change due to treatment</i>	Interviewer: No? Nothing that's linked to...physicality...	<i>therapy</i>
<i>Difficulty seeing benefit</i>	P2: No. We banged on some old drums. That was all.  Interviewer: Right. OK.	
<i>Did not use music in life before.</i>	P2: But I've never been musical so it's no good asking me anything about music. I never listened to music all my life. Never had time. Even when I was driving I never had the radio on. I think it's a distraction...you shouldn't be allowed to. I think it's worse than drinking and driving...radio on. You see these kids. They're going like this [impression of young person overtly enjoying music in a car]...and the noise...they're definitely not concentrating on the road. What I've seen of them...once they get music in their head they go silly. But, em...no....	
<i>Music as a distraction</i>	Interviewer: So, the music therapy really...so...your physical needs...sort of...	
<i>Trying something new – QOL</i>	P2: Well, it was something to do that I've never done...you know.... I've never ever listened to music and it was something different that I'd never done so I don't mind trying it. I'll have a go at anything.  Interviewer: Absolutely. OK. The next question...there were different aspects to the music therapy that you had. OK? And I'll just talk with you now all the different aspects of the therapy...and I just want you to say which one of these aspects you found most useful and which one you found least useful. So, we playing music, singing, talking, there's also a group attention exercise where...	<i>A new experience</i>
<i>Group discussion was helpful</i>	P2: Yeah, we done a lot of talking between the group.  Interviewer: Yeah?  P2: Yeah. We did a lot of talking. Jonathan was quite helpful in that.  Interviewer: Right. If I just...there six different...seven different aspects. If I read out all of them and then we'll go through and pick which one you think out of those seven was the...uh...was your...was the most useful. So, there was a group attention exercise where some of you followed a beat and someone heckled and	<i>Group discussion was useful Therapist was helpful</i>

<i>Group attention exercise was fun</i>	<p>tried to interrupt and disrupt...</p> <p>P2: Oh, yeah. That was funny that was.</p> <p>Interviewer: Group memory exercise where you repeated back short rhythmic phrases after a short pause...</p>	<i>Group attention exercise was fun</i>
<i>Group memory exercise was fun</i>	<p>P2: That was funny.</p> <p>Interviewer: Yeah? Writing a song together?</p> <p>P2: That was good.</p> <p>Interviewer: Homework exercises?</p>	<i>Group memory exercise was fun</i>
<i>Did not do homework exercises</i>	<p>P2: Non-existent.</p> <p>Interviewer: [laughs] Don't own up [whispered dramatically]. Talking?</p> <p>P2: Yeah. We did a lot of talking.</p> <p>Interviewer: Singing and playing music.</p>	<i>Did not practice homework exercises</i>
<i>Singing and playing music was good</i>	<p>P2: Yeah. That was alright.</p> <p>Interviewer: So, out of those seven things what would you say was the most useful...and I can always remind you if...</p>	<i>Singing was useful Playing music was useful</i>
<i>Talking was most useful</i>	<p>P2: Talking, I think more than...</p> <p>Interviewer: Talking, yeah?...the most useful?</p> <p>P2: Yeah.</p> <p>Interviewer: And why did you choose that?...talking over the others?</p>	<i>Group discussion was most useful</i>
<i>Talking was useful – thinking about past and present</i>	<p>P2: The others were not really anything to do properly...like...music...playing is different isn't it...tapping and keeping in tune but.... I relate things back to what I used to do...what I could do...</p> <p>Interviewer: Yeah.</p>	<i>Reflecting on life before and after ABI</i>
<i>Highly productive</i>	<p>P2: Because I was a mechanic I used to strip engines and rebuild them. I could build chassis and build kit cars. I had a kit car company. I designed chassis body</p>	

<p><i>and successful before ABI</i></p> <p><i>Loss of occupation</i></p> <p><i>Talking was useful</i></p> <p><i>Memory exercise was challenging</i></p> <p><i>Writing a song together was most useful</i></p> <p><i>Writing a song was the most useful</i></p> <p><i>Songwriting useful – self-reflection and self-evaluation</i></p>	<p>and made moulds and all things like that all my life. And then in the building trade I built about eight of my own houses and...sold them on.... It was a different thing in life...totally different.</p> <p>Interviewer: Yeah. And so, being able to talk in the music therapy...</p> <p>P2: Yeah. That was good.</p> <p>Interviewer: Did you talk about that?</p> <p>P2: We talked about the music and we talked about the lyrics and things like that. It was very good.</p> <p>Interviewer: And what about the least useful would you say? Do you want me to remind you of them all? So, playing music, singing, talking, the group attention exercise with the heckling, group memory exercise where you were repeating back a rhythmic...</p> <p>P2: That was difficult.</p> <p>Interviewer: Writing a song together or the homework exercises?</p> <p>P2: Writing a song together was the best part of it.</p> <p>Interviewer: Yeah? So, would you say which was the least useful. You said writing a song was the best...and talking...so, would you say those were your top two?</p> <p>P2: Yeah.</p> <p>Interviewer: Which one over...which one...talking or writing a song? I'd like to make you choose.</p> <p>P2: Writing the song was the best.</p> <p>Interviewer: Writing the song was the best. Yeah? Why was that?</p> <p>P2: It always made your brain think about what you had wrong with you...you know...</p> <p>Interviewer: Right.</p> <p>P2: It made you think a bit more about it.</p> <p>Interviewer: Yeah.</p>	<p><i>Loss of occupation</i></p> <p><i>Memory exercise was challenging</i></p> <p><i>Songwriting was most useful</i></p> <p><i>Songwriting was most useful</i></p> <p><i>Songwriting enabled reflection and self-evaluation</i></p>
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<p><i>Being listened to</i>  <i>Listening to others</i>  <i>Sharing experiences</i>  <i>Having something in common</i>  <i>Being cared about</i></p>	<p>P2: You got your own thoughts but then when other people were listening...you know...you could relate to what had...what...because since I've had this brain injury no one ever bothered with me. You know...I got thrown out of hospital within about a week and that was the end of it...no therapy of any description. But then, I did go back to France, so....No it was different with the old drums...the beat...doing the beat...</p> <p>Interviewer: Yeah.</p>	<p><i>Feeling supported</i>  <i>Supporting others</i>  <i>Shared experiences</i>  <i>Sharing common problems</i>  <i>Feeling valued</i></p>
<p><i>Memory exercise was fun</i></p>	<p>P2: And the delayed beat was quite funny.</p> <p>Interviewer: Right.</p> <p>P2: Where you had to wait and then go dunun...repeat it</p> <p>Interviewer: Yeah. And did you find...which of these did you find the least useful did you think?</p>	
<p><i>Memory exercise was useful</i></p>	<p>P2: Well, that was quite useful, that one was.</p> <p>Interviewer: Right. What was the least...your least favourite or...you know...the thing that didn't really...you didn't enjoy or you don't feel you got anything out of particularly?</p> <p>P2: When we first started...just banging the drums each...didn't really do a lot for me. When I went home from that I thought "Well, that was a waste of time"...you know. But the rest of it was fairly constructive.</p> <p>Interviewer: You can always...Jonathan's not here. I'm not involved in the music therapy. Feel free to say whatever you want to say. You don't need to be polite.</p> <p>P2: I am saying what I think.</p> <p>Interviewer: That's great.</p>	<p><i>Group memory exercise was useful</i></p>
<p><i>Being understood by therapist</i></p>	<p>P2: I found he was quite...when we got through to him...he's on a different planet to me but...once I got through to him it was alright.</p> <p>Interviewer: Good. Good. So, we've mentioned the talking and we've mentioned writing a song and the group memory exercise. What about the playing</p>	<p><i>Therapist was helpful</i></p>

<p><i>Aphasia in expressive speech</i></p>	<p>music...was that the beat at the beginning...</p> <p>P2: Yeah. What a waste of time that was.</p> <p>Interviewer: Yeah. Singing?</p> <p>P2: Well. That was funny.</p> <p>Interviewer: Funny? You enjoyed it?</p> <p>P2: Well, now I can't talk because this side of my mouth don't work properly...I find it very difficult to sing because like when you've had a stroke you have to wait to talk.</p> <p>Interviewer: Yeah.</p> <p>P2: I know what I want to say but...um...you have to kind of send a message to your stomach and when it comes back up you can talk. That's the way I explain it...you know...you just can't. You used to in a spot minute you could do something. Now you have to wait for it to happen.</p> <p>Interviewer: So, the singing was...funny.</p> <p>P2: Yeah. It was funny, I must admit. Trying to read this writing at the same time as...the funniest thing was the abbreviations he had. I said to Beryl "Why the heck's this word?". She said "Well, it's an abbreviation for we will." It was will I. I said "Well it's will I". Then another one he had abbreviated and I said "What the heck's this then?" And so we worked out it was I could. And things like that...you know.</p> <p>Interviewer: And what about the homework exercises?</p>	<p><i>Aphasia</i></p>
<p><i>Dependent on others to carry out homework exercises</i></p>	<p>P2: Well. We did that at home, yeah. I got my friends involved. Because we go to the Baptist Church and they're pretty good...and she runs the girl's brigade. So one the ladies there was asking about the writing the song. I was talking to her about it and they was giving me some ideas. Yeah. I tried you know.</p> <p>Interviewer: and the group attention exercise with the heckling. Did you find that useful?</p> <p>P2: Yeah. That was funny.</p> <p>Interviewer: So, you enjoyed. Did you think it was</p>	<p><i>Dependent on others for practice</i></p>

	useful?	
<i>Fun vs useful</i>	P2: I enjoyed it but I don't think it was useful.	<i>Fun vs useful</i>
	Interviewer: So, your most useful was the writing a song?	
	P2: Yeah.	
	Interviewer: The least useful was the playing music?	
<i>Playing music was least useful</i>	P2: Yeah. Writing a song is how you feel and because I was with two girls who had...two youngsters...who compared with me are young...you know...and their strokes are totally different to mine. I mean...I'm at the end of my life. I mean...I'm seventy-four...I mean...you know...they've got another whole of their life to go...and I can well imagine what they're feeling...and if I had to be like this for the next thirty or forty years I'd shoot myself. There's no doubt about...you know...because it is going to stay with you forever. It's never going to go. Although, when you have...they say it will get better but it doesn't. I think if anything it gets worse.	<i>Playing music was least useful</i>
<i>Hopelessness Suicidal thoughts</i>	Interviewer: You think it gets worse.	<i>Hopelessness Suicidal thoughts</i>
	P2: Coming to Headway was quite nice...you know...to think that there was somebody out there that even cared. I mean like Orla...she was brilliant. Some of the other girls...Louise and Charlene. I mean...they're there and they just. I mean they're only volunteers but I mean they really care what they're doing. I've never had that. I mean...I've always paid people to do what I want them to do and then they didn't do it very good.	<i>Feeling valued</i>
<i>Being cared about</i>	Interviewer: Sometimes paying is not always the best way is it.	<i>Feeling valued</i>
<i>Feeling valued</i>	P2: You know what employees are like. They always know better.	
	Interviewer: Exactly. OK. We'll move on to the next question. OK. So, you have had sixteen sessions of music therapy over about four months. What do you think about the number of sessions that you received?	
	P2: They were alright, but I missed most of them. I missed a load of them.	

	<p>Interviewer: Did you?</p> <p>P2: Because we were away, but yeah, it was quite a long session but it was enough to get into it...you know.</p> <p>Interviewer: OK. Do you think you would have liked more?</p> <p>P2: Well, no. If I hadn't have missed so many it would have been about right I think.</p> <p>Interviewer: Right. OK. So, more, fewer or are you satisfied?</p>	
<i>Length of treatment was about right</i>	P2: Well, yeah. It was enough.	<i>Satisfied</i>
<i>Need time to become familiar with treatment protocol</i>	Interviewer: Just enough. Yeah? OK. And...sort of...why do you...any reasons why you think it was about right.	<i>Familiarity with treatment</i>
<i>Need time to develop relationships</i>	P2: It gave you a chance to get into it...to get to know Jonathan...and to get to know the group...and stop being embarrassed at trying to sing when you can't sing.	<i>Relationships</i>
<i>Need time to relax</i>	Interviewer: OK.	<i>Time needed to relax</i>
<i>Fewer sessions would be ineffective</i>	P2: If it had been less than that it wouldn't have worked I don't think.	<i>Minimum length</i>
	Interviewer: Right.	
<i>Important to get comfortable with group</i>	P2: You have to get comfortable with each other.	<i>Time needed to develop relationships</i>
	Interviewer: Yeah.	
	P2: And you can't do anything in five minutes...I mean...in my day an apprenticeship was five years and then you had another twenty-five years learning it.	
	Interviewer: Yeah.	
	P2: And now everybody thinks you can learn it in five minutes. Well, you can't...you know. You need time for it to settle in and I think that was about enough.	
	Interviewer: And you think it was enough time to settle in. You wouldn't have liked it to have continued....	

<p><i>Dysphagia?</i></p>	<p>P2: Too much more...</p> <p>Interviewer: Much longer.</p> <p>P2: No.</p> <p>Interviewer: Why would that be?</p> <p>P2: Because he would have wanted us to sing or something silly.</p> <p>Interviewer: [laughs] You were dreading what might be coming next.</p> <p>P2: Yeah. I think so.</p> <p>Interviewer: Yeah?</p> <p>P2: Yeah. Because I can't talk. A lot of the time I get saliva in the throat here and I have a job to talk or even sing...you know. When we were singing, he'd start and I could join in until we were halfway through it because it takes that time to start the old engine up...you know.</p> <p>Interviewer: Right. OK.</p>	<p><i>Dysphagia</i></p>
<p><i>Delayed speech</i></p>	<p>P2: It's like this delayed action trying to talk.</p> <p>Interviewer: Yeah.</p>	<p><i>Aphasia</i></p>
<p><i>Difficulty with projecting voice</i></p>	<p>P2: I find it very difficult to get over the top of other people when they are talking.</p> <p>Interviewer: Well, you are doing very well today, [P2].</p> <p>P2: Yeah. Well, you're making me comfortable, aren't you.</p> <p>Interviewer: Good. That's nice to hear. OK. The last question then. How could the music therapy be improved?</p>	<p><i>Dysarthria</i></p>
<p><i>Need more variety of instruments</i></p>	<p>P2: Some decent things to play with instead of them blooming old drums all the time.</p> <p>Interviewer: Right. OK. Any suggestions? What would you have fancied?</p>	<p><i>Wider variety of instruments needed</i></p>

<p><i>Individual musical preference is important Preferred softer music</i></p>	<p>P2: Well, there must be other instruments we could have had.</p> <p>Interviewer: Right.</p> <p>P2: They were all clonk, clonk, clonk...you know.</p> <p>Interviewer: Yeah.</p> <p>P2: That's not music to me. What little bit of music I like is mellow.</p> <p>Interviewer: Right.</p> <p>P2: Subtle...you know.</p> <p>Interviewer: OK.</p> <p>P2: Romantic, putting it mildly.</p> <p>Interviewer: Yeah.</p> <p>P2: That's me. That's the only music I like. I don't like head-banging stuff.</p> <p>Interviewer: Right. OK. Fantastic. So, more diversity in the instruments...yeah?. Anything else at all? Was there something that happened that you didn't want to experience? Was there anything that happened in the music therapy classes that you didn't want to be involved in or you didn't want to experience?</p>	<p><i>Importance of individual music preference</i></p>
<p><i>Singing was challenging – conscious of voice</i></p> <p><i>Self-conscious about voice</i></p>	<p>P2: Well, the singing was the most embarrassing.</p> <p>Interviewer: The singing.</p> <p>P2: Yeah because I sound awful at the best of times.</p> <p>Interviewer: Did you not want to do it?</p> <p>P2: No.</p> <p>Interviewer: Would you rather it had not been in there or...</p>	<p><i>Singing – challenged self-consciousness</i></p>
<p><i>Singing was essential to treatment</i></p>	<p>P2: Well, no. you couldn't do it without it, could you.</p> <p>Interviewer: Right.</p> <p>P2: That was the worst thing I suppose.</p>	<p><i>Singing as essential to treatment</i></p>

<p><i>Would have liked to listen to music</i></p>	<p>Interviewer: Yeah? The singing. OK. Is there anything else that you want to add about the music therapy experience...anything that you think is important that maybe had not had a chance to...sort of...come out as we have been discussing it?</p> <p>P2: Perhaps, if we had listened to a bit of music from time to time.</p> <p>Interviewer: OK.</p> <p>P2: We didn't. It was just us...you know...I thought music therapy you'd have a bit of music or something apart from him on his old fiddle...you know</p> <p>Interviewer: Right.</p> <p>P2: I think if there had been a bit of background music or something. But then, I like...like in a restaurant when you got a very subtle background music...to me that's music. That's nice.</p> <p>Interviewer: OK.</p> <p>P2: In other words, that's romantic...you know.</p>	<p><i>Receptive music therapy</i></p>
<p><i>Listening to music to escape to a dreamworld Music as a vehicle to get away from current situation/pain</i></p>	<p>Interviewer: So, maybe having some time to listen to music and...</p> <p>P2: Yeah. It would have been nice to go into dream...you know.</p> <p>Interviewer: OK. Anything else at all? No? Fantastic. Thank you very much, [P2].</p>	<p><i>Music listening as an escape</i></p>

## Transcript and analysis of participant 3's responses

	<b>Participant 3</b>	
	<p>Interviewer: OK. So, I'm just going to ask you some questions. I've got the questions written out as well so you can see them. Yeah?</p> <p>P3: OK.</p> <p>Interviewer: So, first of all, I just want to ask since your brain injury what have been your greatest needs do you think...as a result of the brain injury do you think?</p> <p>P3: Um. Sorting some stuff out or given to sort it out.</p> <p>Interviewer: Right.</p> <p>P3: Yeah. It's getting help...uh...appropriate help.</p> <p>Interviewer: OK. In what way...sort of...what's been...?</p> <p>P3: How can I put it? Um. I seem to be falling in between things...like...I was...the house...can't get it out.</p> <p>Interviewer: Do mean like support services and things?</p>	
<i>Difficulty finding support</i>		<i>Lack of support</i>
<i>Difficulty finding the right support</i>	<p>P3: Yeah. Well, I didn't have any so I had to go out and find help, and it's finding the right one because I was single, I have my own house, but I couldn't say everything about the house I could sort out because there was another person involved. Do you know what I mean? It was complicated. Sort of...half in one camp, half in another, and they couldn't give me proper help.</p> <p>Interviewer: Yeah?</p>	<i>Difficulty finding support</i>
<i>Didn't fit neatly into a single category</i>	<p>P3: You know...and I just seem to be awkward. Do you know what I mean? My situation seemed to be awkward and people couldn't give me an answer...like...you're not that one and you're not that one.</p> <p>Interviewer: And is that the sort of...is that the medical profession, or the social services, or...?</p> <p>P3: Social...it was like trying to find things like</p>	<i>Support services' knowledge</i>



<p><i>Felt unsupported</i></p>	<p>um...they're not very helpful. Put it that way.</p> <p>Interviewer: Who? The...</p> <p>P3: Well, all the way round. They don't want to...what's the word...put themselves in a corner is the wrong phrase...</p> <p>Interviewer: Right.</p> <p>P3: You know what I mean? Don't want to put themselves out on a limb. The only people that did help me was Frank Sorrell Centre. They helped me sort out my benefit...and when I didn't realise that you can go back to your doctor. And he sorted some stuff out for me. I didn't realise that he could. But I didn't realise that it was under his area...sort of thing. He's got a lot of say.</p> <p>Interviewer: So, actually, one of the big things for you has been...sort of...support with lots of practical...practicalities...</p> <p>P3: Practical. Yeah...uh...things.</p> <p>Interviewer: Really getting things straight.</p>	<p><i>Felt abandoned</i></p>
<p><i>Needed support in managing practical changes in life</i></p>	<p>P3: Yeah. Trying to sort it out because I was sort of in between things. I was trying to get rid of the house...uh...sort out benefits...you know...because people wouldn't give answers about things or...clear information.</p> <p>Interviewer: Uh.uh.</p>	<p><i>Impact on daily living skills</i></p>
<p><i>Frustration at unsupportive services</i> <i>Anxiety about income</i></p>	<p>P3: You know...everyone assumed you've got access online. It does your head in if you try and go online. Do you know, if you don't answer that question properly, you lose out on your benefits, and I'm thinking "Well, what are they on about?" I seemed to be thinking of a different answer to what they're...</p> <p>Interviewer: OK.</p> <p>P3: You know...and it...sort of...I needed time to do that as well.</p> <p>Interviewer: So, really, and support services really needed to have been there for you through that.</p>	<p><i>Frustration – limited access to help</i></p> <p><i>Anxiety</i></p>

<i>Frustration at limited availability of services</i>	<p>P3: Because I had to go out and find...citizens advice bureau...you know...I had to find...wait a couple of weeks just to get an appointment to see someone. Do you see what I mean? And I needed help to do the form.</p> <p>Interviewer: Yeah.</p>	<i>Frustration – limited availability of help</i>
<i>Aphasia – needs support in reading</i>	<p>P3: Things like that, because after a while, your brain just locks up and you're thinking "It's better if someone reads it to me", and I have a good think, and think "That's what you meant".</p> <p>Interviewer: Yeah.</p> <p>P3: You know...not a big block of things, you know...</p> <p>Interviewer: So, breaking the information down, so you're not overloaded.</p> <p>P3: Easier. Yeah.</p> <p>Interviewer: So, one thing has been the support for practicalities. Anything else that...since the brain injury...that's your biggest areas of need that you've found?</p>	<i>Aphasia</i>
<i>Fatigue</i>	<p>P3: Um. Yeah. Fatigue.</p> <p>Interviewer: OK.</p>	
<i>Planning ahead to account for fatigue</i>	<p>P3: Um. I know now that I can't...I have to plan ahead, or try to plan ahead, or stop...wrong word...um...I've got a limited window to do things at.</p> <p>Interviewer: Yeah.</p>	<i>Managing fatigue</i>
<i>Fatigue affects speech, walking and cognition</i>	<p>P3: When I get really tired, my speech will go and my walking and things like that...and my attention span. So, I know if I want to do something important, I have to give myself space to do it in as well as before hand...you know what I mean? Not to be rushed or trying to set it out...you know...throughout the week. Otherwise, what will happen is that I will try and do too much and then I'll spend the rest of the weekend or the next couple of days so tired that I won't be able to go out and get milk or...you know...I get so tired that I think that I haven't got enough milk.</p>	<i>Impact of fatigue on functioning</i>
<i>Fatigue impacts on daily living and ability to support self</i>	<p>Interviewer: So, is the fatigue problem from doing too</p>	<i>Impact of fatigue on daily living</i>

<p><i>Irregular sleep patterns increase fatigue</i></p>	<p>much or you feel fatigued and then you find those things more difficult?</p> <p>P3: Yeah.</p> <p>Interviewer: Or is it a cycle?</p> <p>P3: Yeah, it's like a cycle...and also sleep. Sleep seems to be...no matter what I try and do it just seems to go through phases. I can't...you know...I got a couple of days really good sleep. Then, all of a sudden it just goes out of the window and...like...I will stay up...I'm wide awake really late at night and, of course, about early in the morning, I'll then want to go to sleep. And that's the day I have to be somewhere...</p> <p>Interviewer: To go and do something...</p>	<p><i>Impact of fatigue on sleep</i></p>
<p><i>Fatigue linked with anxiety</i></p>	<p>P3: Yeah. So, whether I'm tensing up I don't know. I've tried to have short sleeps, but sometimes that doesn't work because I will be up all night.</p> <p>Interviewer: Yeah.</p>	<p><i>Fatigue and anxiety</i></p>
<p><i>Need to manage sleep patterns</i></p>	<p>P3: And then, a couple days ago...like...I was disturbed sleep...a couple of days. Then, I was really, really tired. I slept even during the day, got up for another couple of hours, then went back to sleep and slept all the way round.</p> <p>Interviewer: Right. OK.</p> <p>P3: Do you know what I mean?</p> <p>Interviewer: Yeah.</p> <p>P3: So, I had to reset myself sort of thing...and then I'm back on...</p> <p>Interviewer: Then you are back on track.</p> <p>P3: Track. It's a thing I have to do every now and again. It's weird but it works for me. Don't ask me why.</p> <p>Interviewer: Right. OK. So, really the brain injury...since then, your greatest needs have been the fact that you needed the support for practicalities...</p> <p>P3: Yeah.</p>	<p><i>Impact of fatigue on sleep</i></p>

<p><i>Fatigue affects concentration</i> <i>Fatigue affects walking</i></p>	<p>Interviewer: Your fatigue has been a big problem...</p> <p>P3: Yeah.</p> <p>Interviewer: Anything else that you found...um...there doesn't have to be but if there is anything else that you want to mention...</p> <p>P3: I don't know...</p> <p>Interviewer: You say the fatigue in relation to...you know...your attention starts to go.</p> <p>P3: Yeah. I know my concentration goes because my speech slows down. Physical things...I will drop things or I'll think "OK. Pick up your..." My foot will drop. So, I'll think "OK. I've gone too far." I'll have to sit down and re...what's the word...re-ener...</p> <p>Interviewer: Recharge?</p>	<p><i>Impact of fatigue on functioning</i></p>
<p><i>Dependent on family for evaluation and management of fatigue</i></p>	<p>P3: Yeah. Recharge. I know that if I get really...tired, my mum seems to know when I'm out. "You're getting tired, aren't you? We'll go for a cup of tea." Just that bit of a break because it's like it's overload sometimes and I just have to sit down and just stop for a minute.</p> <p>Interviewer: Yeah.</p> <p>P3: I can't seem to keep going.</p> <p>Interviewer: So, really the...since the brain injury you've had difficulties in keeping going and...</p> <p>P3: Yeah. Definitely.</p> <p>Interviewer: But really you find that fatigue really sets in on you undertaking anything for a long while.</p>	<p><i>Dependence on others for self-evaluation</i></p>
<p><i>Need for motivation to overcome consequences of fatigue</i></p>	<p>P3: Yeah. I have to push myself...like...I haven't been going out much. So, I need to walk more because the weight's going on and the arse is getting bigger. So, I know damn well...</p> <p>Interviewer: It has been Christmas.</p> <p>P3: Yeah. But I haven't had that much. That's the thing. When I used to...if I remember right...I used to stuff everything in there, but even that seems to go</p>	<p><i>Fatigue and motivation</i></p>

<p><i>Difficulty in managing fatigue in daily life</i></p>	<p>through swings and roundabouts...you know...like...sometimes I'll stuff everything in and then I won't want to eat.</p> <p>Interviewer: Right.</p> <p>P3: So, that sort of thing is a bit iffy sometimes</p> <p>Interviewer: Up and down.</p> <p>P3: Yeah.</p> <p>Interviewer: So, a lot of it is...sort of...the...um...fatigue relating to your concentration and your ability to complete tasks and to get through the day...</p> <p>P3: Yeah.</p> <p>Interviewer: And also, you're...unbalanced...sort of...</p> <p>P3: Yeah. I have to try and do it...level.</p> <p>Interviewer: Yeah. And you've found times where...like...you were saying about your sleep patterns where you are up and down.</p> <p>P3: Yeah. That doesn't help.</p> <p>Interviewer: So, you get up and down with things. And your physical side of things starts to...</p> <p>P3: Yeah. Get in the way. The thing is that I can guarantee that it's going to be on the week that I'm supposed to be doing things. Do you know what I mean? So, I know that the psychologist says to try and do allotted times...you know...half an hour, then have a rest. But, you can't really do that throughout the day. Do you know what I mean? So...</p> <p>Interviewer: In real life...</p> <p>P3: That's what I mean. You can't decide you're going to do it there and then, or try to because other people will butt in or try to take over things.</p> <p>Interviewer: OK. Right. In respect of those things...so, I'll just make a note of them because we'll need to come back to them. So, in relation to those things has music therapy given you any benefits or any</p>	<p><i>Managing fatigue</i></p>
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<p><i>Listens to music more due to treatment</i></p> <p><i>Uses music to reduce anxiety and stress</i></p>	<p>difficulties...in relation to those things. So...your fatigue...dealing with practicalities...</p> <p>P3: Yeah. Umm.</p> <p>Interviewer: It's OK to say if not. If there's been no change, then it's OK to say so.</p> <p>P3: I think it has because I listen to music more and it sort of calms me...that's the wrong word.... It does calm me a bit, especially if I'm uptight. I just have to remember to put the music on to...chill out. Do you know what I mean? Just take that whatever's the problem away for a minute and then calm things down a bit.</p> <p>Interviewer: And has that been since starting music therapy you've sort of increased listening to music...using music.</p> <p>P3: Yeah. Because I've got more music given to me. Do you know what I mean? I'm better listening to the music than watching it on TV. Sometimes the flashing of the music...uh...</p> <p>Interviewer: The over-stimulation.</p> <p>P3: Yeah. It's like I can close my eyes and listen to that. That's a lot easier than watching it because sometimes it's like right in your face and you think "I don't need to know that." You know it's like over much, too much...wrong word...you know...like...I can hear it without pain, if you know what I mean, yeah?</p> <p>Interviewer: Absolutely. So, really, a benefit has been to your...calming you down. So, perhaps where we've been talking about the ups...where you've been feeling up and down...</p> <p>P3: It tries to level...</p> <p>Interviewer: To level you.</p> <p>P3: Yeah.</p> <p>Interviewer: OK. And any help in relation to fatigue?</p> <p>P3: Yes and No.</p>	<p><i>Effect of music therapy</i></p> <p><i>Music reduces anxiety and stress</i></p>
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<p><i>Fatigue issues important when timetabling sessions</i></p>	<p>Interviewer: Or has it caused you difficulties...you know...more issues or anything relating?</p> <p>P3: It's better probably to do the therapy another day other than gardening because sometimes the physical takes a while to recharge...do you know what I mean? Sometimes I'm so tired and trying to concentrate on what I'm supposed to be doing, and then like "Oh, what the hell" you know...attitude. But, yeah.</p> <p>Interviewer: So, one of the difficulties has been the impact on fatigue...</p> <p>P3: Yeah.</p> <p>Interviewer: When it's been after another club.</p> <p>P3: Yeah.</p> <p>Interviewer: OK.</p>	<p><i>Fatigue affects engagement</i></p>
<p><i>Fatigue reduces ability to engage</i></p>	<p>P3: You're not really giving it attention. Do you know what I mean? Proper attention. You think "I could have done that better, but I was really tired" or you know, it's...</p> <p>Interviewer: OK. So, that's been a difficulty. Anything with regards to your sort of physical states? So, has music therapy had any benefits or any difficulties in relation to your sort of physical...you were saying about...</p>	
<p><i>Self-evaluation during musical tasks</i></p>	<p>P3: I've noticed my left hand is much better at keeping time than my right. But then, that's because maybe I'm tired or it's the end of the day. It goes achy. You know...it won't respond the way I would like it to. But that hand is taking more...easier, sort of...re-routing...do you know what I mean...I'm trying to concentrate more on the left-hand side. So, yeah.</p> <p>Interviewer: And, has that in your everyday life...</p>	<p><i>Self-evaluation during musical tasks</i></p>
<p><i>Increased self-awareness in daily tasks</i></p>	<p>P3: I've noticed that I'm doing that more left-handed. Especially, the tea because I can't control the milk...pouring the milk...you know...especially at the end of the day I know I drop things, but I've noticed if I'm really tired I will do it left-handed...try and do it left-handed. So, I haven't done much writing but that's probably because I'm tired and I sprawl...you know...sp...</p>	<p><i>Increased self-awareness in daily tasks</i></p>

	<p>Interviewer: Sprawled...</p> <p>P3: Yeah. All over the place, and I think: "How the hell do you spell that?"</p> <p>Interviewer: OK. That's great. So, there were...practicalities. Has it given you any support with practicalities at all the music therapy? Anything that you can...any benefits or has it caused you any difficulties in relation to practicalities...practical things in life?</p> <p>P3: I don't know really. Just to try and remember the sequence of things. You know...if it starts off and I think something is not right, and then all of a sudden it dawns on me I've done it the wrong way round. Then, I'll stop and do that, and I'll think "Why the hell did I start off that step, and not that step. Do you know what I mean? It's like "That's not right".</p> <p>Interviewer: Are you finding you're relating that to music therapy to perhaps to something that</p> <p>P3: Sort of, because of the beat. I don't know. Maybe it's because...like a rhythm sort of thing. You think: "Something's not right. Hold on. I've started at the wrong place again." Go back. Remember the sequence sort of thing. Yeah.</p> <p>Interviewer: So, in some way your...the rhythm...the rhythms are helping your...have helped your...</p>	
<i>Increased self-awareness and ability to correct sequencing errors</i>		<i>Increased self-awareness in daily tasks</i>
<i>Improved memory</i>	<p>P3: Jogging my memory. You think: "Something's not right." You know when you feel...at ease...wrong word...slightly off...that's not right..."Oh, crap. I forgot the bloody..." You know...and I think...tries to think backwards and think: "OK. I did that wrong." And then go forward a bit...better. Oh. Getting tired now.</p> <p>Interviewer: That's fine.</p> <p>P3: Oh. Give up.</p> <p>Interviewer: That's really interesting. OK. So, I'll move on to the next one. There were different aspects to the music therapy that you had. I've got a list of them here. These are just things that were involved in the music therapy. OK?</p>	<i>Improved memory</i>



	<p>P3: OK.</p> <p>Interviewer: So, there was playing music, singing, talking, a group attention exercise where some of you followed a beat and someone heckled...</p> <p>P3: Yeah.</p> <p>Interviewer: And tried to interrupt and disrupt, the group memory exercise when you repeated back short rhythmic phrases after a short pause, writing a song together, and homework exercises. Could you say which of these aspects of music therapy that you found most useful and which were least useful? So, first of all, just go through and pick the most useful, and it may be that there are one or two or all of them, but I'm going to force you into a decision to pick one.</p>	
<i>Songwriting was the most useful</i>	<p>P3: Um. I would say writing the song together was the most useful.</p> <p>Interviewer: OK. And, why that one over the others?</p>	<i>Songwriting was most useful</i>
<i>Songwriting – expressing thoughts</i>	<p>P3: Um. Probably because it got thoughts down on paper...sort of logical...no, not logical...sequence again...you know...where to start, middle, the end...what to put words down as...do you know what I mean?</p>	<i>Songwriting – expressing thoughts</i>
<i>Songwriting – sequencing and planning</i>	<p>Interviewer: So, how to build a sequence, yeah?</p> <p>P3: Yeah.</p> <p>Interviewer: Put things in the right order.</p> <p>P3: Yeah. It always seems to be a bit [makes sound of air passing through teeth as if something is deflated], but I would say that, yeah.</p> <p>Interviewer: Anything else at all with writing the song together that you found particularly useful, more useful than the others</p>	<i>Songwriting – sequencing and planning</i>
<i>Talking was useful</i>	<p>P3: Talking probably. Yeah. Talking. I'm not comfortable with singing. Definitely not. Um. And, the heckle. That took a lot of...what's the word...trying not to follow in the rhythm again...</p> <p>Interviewer: Concentration.</p>	<i>Group discussion was useful</i>

	<p>P3: Yeah. Because your instinct is automatic. You're hearing one thing and trying to do another, and all of a sudden you find you're doing...</p> <p>Interviewer: I'm not sure I could do it.</p> <p>P3: Yeah. Well, it shouldn't be...you know...you fall into it, so, it takes a lot of...unless you're somewhere else trying to...you know...cut off that.</p> <p>Interviewer: So, we'll go through each one in a second. But out of those that you can see there, which do you think was the least useful?</p>	
<i>Homework was least useful</i>	<p>P3: That would probably be the homework, but then, that's because I haven't done any. Sorry.</p> <p>Interviewer: They'll all own up now.</p>	<i>Homework was least useful</i>
<i>Did not record practice Practiced some exercises</i>	<p>P3: Yeah. Well. To be honest, I did do bits and pieces but I didn't write it down, and also, I didn't do the whole list if you know what I mean. There are different exercises. But some were easier...listening to the music, trying to get the music in your head, like the rhythm and the...not background, but...trying to get the songs along with the background...</p> <p>Interviewer: OK.</p> <p>P3: But, the...oh, actually the homework exercises like you're supposed to watch something and trying to remember what you watched.</p> <p>Interviewer: Yeah?</p> <p>P3: That I'm reasonably better at.</p> <p>Interviewer: OK. Were you practicing that?</p>	<i>Homework – difficulty with motivation</i>
<i>Motivated to do homework exercises if interests could be accommodated</i>	<p>P3: Yeah. Especially the craft channel. Sorry, but if you remember how to do things, occasionally you thought "No. That wasn't like that. Oh, that was it." So, you fold it backwards and not forwards, and that sort of thing.</p> <p>Interviewer: Does Jonathan know about the homework?</p> <p>P3: No. Sorry.</p>	<i>Homework – interests and motivation</i>

<p><i>Homework – difficulty with self-motivation</i></p>	<p>Interviewer: It's OK. But, it might be quite good if he can get it on tape what you were doing.</p> <p>P3: Some it was er...</p> <p>Interviewer: He won't mind either. He'll be fine.</p> <p>P3: To be honest, I've always done that – shirking the homework – until I'm actually told to do it, but yeah.</p> <p>Interviewer: OK. So, the homework, but you were tending to watch things on the craft channel.</p> <p>P3: Yeah. Trying to remember. Especially if I'm interested in a subject then, that can...you know...that will go straight over.</p> <p>Interviewer: Uhuh.</p>	<p><i>Homework – difficulty with self-motivation</i></p>
<p><i>Being interested in subject is important in motivation to practice</i></p>	<p>P3: So, you have to be interested in the subject to...you know...</p> <p>Interviewer: And, so, I think you were thinking about saying that the homework exercise was perhaps one of your least useful, but what are we going for? Playing music, singing, talking, the attention exercise, memory exercise, writing a song...</p>	<p><i>Homework – interests and motivation</i></p>
<p><i>Singing was least useful</i> <i>Singing – uncomfortable about using voice</i></p>	<p>P3: Singing. I wasn't really comfortable with the singing because I haven't sung for God knows how long, but yeah, I would say that was the least...</p> <p>Interviewer: The least useful. Yeah?</p> <p>P3: Yeah.</p> <p>Interviewer: And, why was that?</p>	<p><i>Singing was least useful</i> <i>Singing – anxiety about voice</i></p>
<p><i>Uncomfortable about speech and singing</i></p>	<p>P3: I'm not comfortable with my speech anyway since the stroke anyway. I'm uncomfortable with speaking. Sometimes I'm more aware of it than others, especially if I get tired or get stuck. And I realise sometimes some people...I don't know if they pick it up...or they give...their face gives me a...all of a sudden it dawns on them, and sometimes I think "What?" And you think "Is it the speech?" That's the first thing. And that puts me...</p> <p>Interviewer: And then that makes...</p>	<p><i>Anxiety about voice</i></p>

<p><i>Anxiety increases speech problems and reduces motivation to speak</i></p>	<p>P3: The tension level just goes up and I think “I’m not going to say a word”...sort of...so, yeah. So, I’m always aware of it, especially if I’m put under pressure.</p> <p>Interviewer: So, in relation to the singing...</p> <p>P3: Yeah. That’s definitely a no-no.</p> <p>Interviewer: You associate the singing with having the speech...</p> <p>P3: Performance. You know...trying to get the word in a sequence. It’s like if someone got...tried to make me stand up and say that...also. So, yeah.</p> <p>Interviewer: OK. So, the most useful was the writing the song?</p> <p>P3: Yeah.</p> <p>Interviewer: The least useful was the singing.</p> <p>P3: Yeah.</p> <p>Interviewer: Anything else you want to say about any of these. What about talking?</p>	<p><i>Anxiety affects aphasia and motivation to speak</i></p>
<p><i>Anxiety about speech problems impacts ability to engage in discussion</i></p>	<p>P3: Talking is OK, but...how can I put it...not comfortable...with talking, but in a way you have to do it, but sometimes it’s...you don’t feel satisfied because, whether it’s the use of words or at the time you are tired and that’s the one you picked...although it may be similar it’s not...</p> <p>Interviewer: Quite what you’re...</p> <p>P3: Accurate. Yeah. Do you know what I mean?</p> <p>Interviewer: So, sometimes you feel you’re not quite getting over what you’re wanting to say. How about in sort of music therapy, when you’ve been in your music therapy sessions? Have you been talking in that, and...you know...how have you found that within the music therapy?</p>	<p><i>Anxiety affects engagement</i></p>
<p><i>Group discussion was useful Common difficulties</i></p>	<p>P3: Yeah. It’s not too bad actually because the others have the same problem and I can generally see what way they were going and you think “Well, OK. I might be able to say the word they were after”. And then</p>	<p><i>Group discussion was useful Common difficulties</i></p>

<p><i>Shared experiences</i> <i>Shared understanding</i></p>	<p>sometimes you think “I know what you mean”. And...like...stuck...both of us...all three of us are thinking...you know...and it gets frustrating. So, I can understand that, yeah.</p> <p>Interviewer: OK. Let me just double-check anything else. How about the memory exercise – having to repeat back short rhythmic phrases after a pause?</p> <p>P3: Sometimes that worked and sometimes it didn’t, but then that could be because you were tired...you know what I mean...or if you had a long day or some days where you were fresher than others and that probably made it easier. But, yeah...</p> <p>Interviewer: OK. And did you enjoy that?</p> <p>P3: Uh. Yeah...until you got it right, but if it’s the other way.</p> <p>Interviewer: Fantastic. Alright. We’ll move on to the next question. You have had sixteen sessions of music therapy over about four months.</p> <p>P3: Yeah. That doesn’t seem like...</p> <p>Interviewer: It seems like only yesterday. What do you think about the number of sessions you received? Do you think you would have liked more, fewer or you were satisfied with how it went?</p>	<p><i>Shared experiences</i> <i>Being understood</i></p>
<p><i>Fatigue affects task performance</i></p>		<p><i>Impact on engagement in therapy</i></p>
<p><i>Wanted more sessions</i> <i>Need time to become familiar with treatment and group members</i></p>	<p>P3: I think it could have been more because by the time you got into the stride of it, you’re...sort of...more comfortable with what you’re supposed to do.</p> <p>Interviewer: Yeah.</p>	<p><i>More needed</i> <i>Familiarity with treatment</i></p>
<p><i>Need time to relax</i></p>	<p>P3: And that probably would have done more...do you know what I mean...so, it took about a month or so just to get to what you were supposed to do and you felt uncomfortable...you know...like being put somewhere where you...</p> <p>Interviewer: A bit embarrassed?</p>	<p><i>Need time to relax</i></p>
<p><i>Absence issue – offering more sessions allows for missed ones</i></p>	<p>P3: Yeah. That sort of thing. Until you are more comfortable with what you were doing, then...yeah...I think a little bit longer, probably. Because I missed a few...you know...some people have as well. Yeah.</p>	<p><i>More sessions accounts for absences</i></p>

<p>6 months</p> <p><i>Wanted more reminders at end of session to guide between session tasks</i></p>	<p>Interviewer: So, a few more...</p> <p>P3: A few more, probably. Yeah.</p> <p>Interviewer: How many more?</p> <p>P3: I would say six months maybe.</p> <p>Interviewer: Yeah?</p> <p>P3: Yeah.</p> <p>Interviewer: OK. Then, the final question is how could the music therapy be improved? So, was there anything that you liked more than another, or less than something else, or was there something missing, something that you didn't want to participate in?</p> <p>P3: I'm not sure. Um. Improved.</p> <p>Interviewer: So, was there anything that in the music therapy sessions...anything that might...that you thought...you know...maybe you had a small something that you'd rather have had more of it, or anything that you had too much of that you didn't find particularly useful and...you know...you'd rather not do that...or something...you know...a completely different idea. Anything that was missing. Anything that you were expecting that you didn't get or...</p> <p>P3: I'm trying to think actually. Um. Probably more structured...um...maybe the reminders at the end of the session like you're supposed to do something or get something back for the next session.</p> <p>Interviewer: Yeah.</p> <p>P3: Maybe that's a reminder like a...reinforcement of what you've done in the last one to carry on in the next one.</p> <p>Interviewer: OK.</p> <p>P3: Maybe. I don't know.</p> <p>Interviewer: That's fine. Jonathan won't mind you saying anything. Don't worry.</p> <p>P3: Yeah. I know. I'm just trying to think because sometimes it was better if it sort of carried on.</p>	<p>6 months</p> <p><i>Consolidation at end of session was important</i></p> <p><i>Consolidation helps reflection and planning in treatment</i></p>
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<p><i>Wanted a more flexible approach to take more time</i></p>	<p>Interviewer: What. So, things that you were to be carrying on in the following week.</p> <p>P3: Yeah. Sort of...carrying on and then...you know...it's like "OK. In half an hour we'll try and do this. I know you...it doesn't always work with us time-wise because we've got no sense of time in some respects because it might take longer to do one thing in one session than do in the next one...you know what I mean? You can't allot half an hour to do that, that and that. It won't always work. So, that might need to be more fluid or...either way sort of thing.</p> <p>Interviewer: Yeah. So, a bit more flexibility maybe, but also...</p> <p>P3: Like it's not going to work today and that sort of thing.</p> <p>Interviewer: And you also said about being more structured in...</p> <p>P3: Sort of...the problem we had with the song would be...um...OK, it was good writing it, but...how can I put it? When you had to put the words to the music...like the beats in between...like you had to have a...distance...wrong word...no...gap.</p> <p>Interviewer: Yeah.</p> <p>P3: And then, say...song...you know...the next part of the song. Maybe explain why...tempo.</p> <p>Interviewer: Yeah.</p>	<p><i>Flexibility in treatment was important</i></p>
<p><i>More visual prompts to support song rehearsal</i></p>	<p>P3: Do you know what I mean? Like different tempos. And you think "One, two, three..." Uh...come on...visual...like...</p> <p>Interviewer: To have some visual...</p>	<p><i>Need for visual prompts</i></p>
<p><i>Smaller chunking of lyrics for rehearsal</i></p>	<p>P3: You know...like...it had to be "One, two, three..." Then, the...you know...like...broken down more. And maybe...chunks. Break it down.</p> <p>Interviewer: So, the way that Jonathan could have...sort of...conveyed some of the bars...the music in the bars or the four beats or...</p>	<p><i>Chunking of lyrics important</i></p>

<p><i>More visual prompts to support song rehearsal</i></p>	<p>P3: Yeah. If you had to put that in two sentences...two lines. Do that, but also do if there was...like...a beat in between “One, two, three...” then you start the next one...do you know what I mean?</p> <p>Interviewer: Yeah.</p> <p>P3: Do you know...like a reminder because sometimes I had to remind...like...do a bar there saying that’s the next you know there was a gap or two beats before the next one like “One, two...” then the next one started like a reminder.</p> <p>Interviewer: So, you could’ve done with maybe developing how you can remember the song and manage the words with the music.</p>	<p><i>Visual prompts important</i></p>
<p><i>Considering individual learning styles</i></p>	<p>P3: Yeah. Because some people are better at reading...you know...like...”dot, dot” then, but I’m better listening “one, two, three” then...you know...visual as well as...</p> <p>Interviewer: Auditory.</p> <p>P3: Yeah. That’s it. Different versions.</p> <p>Interviewer: OK. Anything else at all? Was there anything that was in the music therapy that you didn’t want to be experiencing or...?</p> <p>P3: Well. Most people. I don’t know. I think that sometimes I was uncomfortable, but then because I’ve never been put in that position before. I think that most people would be uncomfortable. Do you know what I mean?</p> <p>Interviewer: So, the uncomfortableness. Was that a negative or was it...?</p>	<p><i>Learning styles important</i></p>
<p><i>Music therapy as a challenge</i></p>	<p>P3: It’s both and both. Do you know what I mean? It pushed you a bit because you are going to get that anyway from somewhere else but it’s better...learn how to...not control it...wrong word...uh...accept it or work around it. You’ve got your own way of working around it.</p> <p>Interviewer: OK. That’s fantastic. Well done. Anything else that you want to add?</p> <p>P3: I could probably write a list later but...</p>	<p><i>Value of music therapy</i></p>



	<p>Interviewer: That's fine.</p> <p>P3: At the moment I cant' think.</p> <p>Interviewer: That's fine. OK.</p>	
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## Transcript and analysis of participant 6's responses

	<b>Participant 6</b>	
	<p>Interviewer: So, these are general questions as I said. There are four but some are split into different sections. So, the first one is: since your brain injury, what have been your greatest needs? Now, that can be social needs, or physical needs, or emotional needs. Can you hear me all right because sometimes I speak too softly?</p>	
<i>Regain former self</i>	<p>P6: I can hear you fine. Yes. I suppose my greatest need right from the start was to get back to normal.</p> <p>Interviewer: Yeah.</p>	<i>Need to recover former sense of self</i>
<i>Need to recover ability to walk</i>	<p>P6: I wanted to be able to walk again. That was my first real...to be able to walk again independently...but I was in a wheelchair to start with, and from then I had a stick...um.... Even still I've got goals to reach. I mean...I can walk...as you can see, I can walk without a stick, but that's inside. As yet, I still have to use a stick when I'm out of the house on the pavement, or when I go shopping with my helper or my daughter. I have to use a stick when I go into town...you know...but that's another aim...to be able to walk without a stick...you know...in town. As I say, out of the house I can, if I have somebody on my right hand side, so I know that if I stumble, there's somebody there to grab. I can walk, but to just be able to get out of the car and just walk like I used to...you know...in town or on the pavement without even thinking about it...without it occurring to me that I'm walking...like I used to. That is one of my big aims. And, we live just across the road from fields and our dog, a golden retriever, and to be able to walk across the road and to walk across the field, and just to do that is one of my aims. Just to be able to walk across the field like I used to be able to walk across the fields with him...you know.</p>	<i>Need to recover mobility</i>
<i>Dependent on others for safety</i>		<i>Being dependent</i>
<i>Need to have freedom – QOL</i>	<p>Interviewer: That lovely freedom.</p> <p>P6: Yeah. Just stride across the field like I used to.... Sorry, I'm waffling on again as I always do.</p> <p>Interviewer: This is where you can, I wouldn't call it waffling, but this is where you can talk. Um...so, I would call that a physical need, but also an emotional</p>	<i>A need for freedom</i>

	<p>need, for needing to have choices and freedom and these sorts of things.</p> <p>P6: Mm.</p> <p>Interviewer: OK. What about socially? Are you able to do things that you...?</p> <p>P6: I still go out socially. And we live only four houses away from our local pub. So, we still go to our pub on Friday nights. But I won't walk in the pub with a stick. I feel I know I just can't...and I walk holding my husband's hand. I think it's safer to walk out holding of a pub holding his hand, if you see what I mean.</p> <p>Interviewer: It might be safer for both of you, yes.</p>	
<i>Rejection of disabled self</i>		<i>Rejection of disabled self</i>
<i>Need to socialise independently</i>	<p>P6: Yeah. I know it's a cheat's way of doing it, but the...the other thing...I mean...the way I used to just...years ago I used stand at the bar for hours, just standing at the bar. But now, as soon as we get in the pub, we find a seat and sit down and don't sort of walk around and mingle like we used to. That's another social thing that I'd like to be able to do...independently, though. But, of course, there are old flagstones in the pub, which are sticking up and I'd trip over them if I tried to walk on my own. I could walk with [help], you know, but I want to be able to walk on my own. Silly things like that.</p>	<i>A need to socialise independently</i>
<i>Need to be independent</i>	<p>Interviewer: Oh. It's very important. It's independence, isn't it.</p>	<i>A need to be independent</i>
<i>Self-conscious</i>	<p>P6: I'm so self-conscious. Even...I know it sounds silly...even at Headway, if we're walking from one end of the hall to the other I still feel self-conscious. Isn't that silly? You know...everybody here at Headway is in the same boat. Well, not everybody, but...and here am I feeling self-conscious about walking from one end of the hall to the other...which is ridiculous but I'm just...everywhere, apart from when I'm at home, I feel self-conscious about...do I look silly? Am I straight when I am walking? Am I making a fool of myself? You know...is my knee bending when I walk? You know...it's just that sort of thing. Does that answer you question?</p>	<i>Shame</i>
<i>Shame</i>	<p>Interviewer: Yes. Do you ever talk to Jonathan, or in the music...do people ever talk about self-consciousness, things like this in the music therapy?</p>	

	<p>P6: No. I don't think I've mentioned that in the music therapy.</p> <p>Interviewer: I just wonder whether other people might say they feel the same. I don't know. Sometimes we assume that we feel a certain way and no one else feels the same way but we find out that they do. We'll move on to the next bit. So, has music therapy given you any benefits or difficulties with any of these needs? You may feel that there's been no change at all, it's made no difference, and that's OK to say so. It's just what your thoughts are.</p>	
<i>Music therapy developed inter-participant relationships</i>	<p>P6: No. I've enjoyed the music therapy. I've enjoyed the sessions. I think it's brought us all closer together in a way.</p> <p>----- Interruption (20 seconds) -----</p>	<i>Music therapy developed inter-participant relationships</i>
<i>Shared thoughts, feelings and experiences</i>	<p>P6: Yes. As I was saying, I think it's brought us all closer together. We've opened up to each other. Yes. I think especially writing 'Our Time'...you know...</p> <p>Interviewer: Yes. 'Our Time.' Is that the...</p> <p>P6: Song.</p> <p>Interviewer: The song. Oh. That's coming up. Alright. Let's move on then to these...because the song is mentioned in some of this. Um. So, there were different aspects to the therapy you had, which were playing music, singing, talking, group attention exercise where some of you find a beat and someone heckled and tried to interrupt or disrupt.</p>	<i>Shared experiences</i>
<i>Group attention exercise was useful</i>	<p>P6: Yeah. It was good fun doing that. I enjoyed that part of it.</p> <p>Interviewer: OK. Group memory exercise, where you repeated back a rhythm...</p>	<i>Group attention exercise was fun</i>
<i>Group memory exercise was useful</i>	<p>P6: I enjoyed that too.</p> <p>Interviewer: We'll do these in a bit more detail. Um...writing a song together and homework exercises. So, we'll go through the list a little bit in depth. So, what did you think about playing music in music therapy?</p>	<i>Group memory exercise was fun</i>

<p><i>Playing music was useful</i></p>	<p>P6: Playing music? Playing drums you mean?</p> <p>Interviewer: It could have been. Yes.</p> <p>P6: Oh. I enjoyed anything that we did involving the music part.</p> <p>Interviewer: What about singing? Did you do singing?</p> <p>P6: We didn't actually sing as such. No.</p> <p>Interviewer: Talking? You must've done some talking because you said that...</p>	<p><i>Playing music was fun</i></p>
<p><i>Songwriting facilitated emotional expression</i></p>	<p>P6: We did some talking when we were...sort of...starting to do the song and...um...yes...that brought out some emotions. Um...</p> <p>Interviewer: What about the emotions with the talking? Were they...what sort of emotions were they? Do you think...positive or negative or mixtures...?</p>	<p><i>Songwriting facilitated emotional expression</i></p>
<p><i>Discussing the 'dark days' was useful</i></p>	<p>P6: Well, they were just sort of...they were just reminders of what I call the dark days. But then on the other hand they made me feel positive because they were in the past and I've come through them and out the other side. So, I'm lucky to be here, really. And um...[knock]...I always touch wood. I'm real superstitious about touching wood. So, they're in the past and I've got through them and survived them.</p> <p>Interviewer: Sounds good.</p>	<p><i>Group discussion was useful</i></p>
<p><i>Drive to overcome difficulties</i></p> <p><i>Hatred of ABI</i></p>	<p>P6: Anyway, I don't know if I mentioned this in music therapy but I look upon my haemorrhage as a thing to be beaten...you know...it's an entity. I have to get the better of it. I always have done. You know...from the start I had this thing...I have to get the better of it. So...because I hate it so much...I've hated it from the start. So, if anything I have to...any of my goals that I try to achieve is to get the better of this thing...this thing that I hate so much. I have to do it...you know...to get one over it.</p> <p>Interviewer: Yeah.</p> <p>P6: So, that's what I do.</p> <p>Interviewer: You sound like quite a fighter.</p>	<p><i>Drive to overcome brain injury</i></p> <p><i>Anger</i></p>

	<p>P6: You have to be.</p> <p>Interviewer: Um. Jonathan's written here that there was a group attention exercise where some followed a beat and some heckled and tried to interrupt or disrupt. Just now you said that was quite fun or...</p>	
<i>Group attention exercise was useful</i>	<p>P6: Yeah. I enjoyed doing that.</p> <p>Interviewer: So, were you a heckler?</p> <p>P6: I was a heckler. We took it in turns to be heckler or leader...you know.... I enjoyed being the heckler. I like being naughty sometimes.</p> <p>Interviewer: That sounds fun.</p>	<i>Group attention exercise was fun</i>
<i>Exercises were fun</i>	<p>P6: It was good fun, yeah.</p> <p>Interviewer: And there was a group memory exercise where you repeated back short rhythmic phrases after a short pause.</p>	<i>Group attention exercise was fun</i>
<i>Group memory exercise was useful</i>	<p>P6: Yeah. Because that was testing our memory. I enjoyed doing that as well.</p> <p>Interviewer: Good. Writing a song together. You've mentioned the song. What did you call it?</p> <p>P6: Our Time.</p> <p>Interviewer: Our time.</p>	<i>Group memory exercise was useful</i>
<i>Being involved in group without support of carers means to be independent</i>	<p>P6: Yes. Because I always think that when I come to Headway it's my time...you know.... I'm away from the home environment...not...you know...I love my home and my family. I mean, they've been absolutely brilliant, but it's my time. I'm away from my helper and everything. From the start I had my carers and I'm away from my carer...well, I don't have carers anymore...I have a helper...I'm away from all that. The reason I call it my time is because I'm away from all that sort of thing. It's my personal time...you know...it's where I do my own thing and I...if you see what I mean?</p>	<i>Independence in music therapy</i>
<i>Need a break from being dependent</i>	<p>Interviewer: I do see what you mean.</p> <p>P6: It's purely my time, so the song is called 'Our</p>	

<p><i>Motivated to practice some, but not all, of the homework exercises</i></p>	<p>Time' because we're all together. We have our own time here. We do our thing.</p> <p>Interviewer: It's seems a very striking title, and very lovely. It encapsulates what Headway is giving you.</p> <p>P6: Thank you. Yes.</p> <p>Interviewer: Oh. We've got here...um...homework exercises.</p> <p>P6: Yeah.</p> <p>Interviewer: What did they involve?</p> <p>P6: That was listening to the CD of the memory song and there was the memory exercise in which we were supposed to listen to an item of news and try and remember it afterwards. Or was it the weather? No. It was an item of news for five minutes. Um...And then there was looking at objects...five different...or was it three different objects for five seconds each...and concentrating on them for that amount of time and nothing else. That was the memory exercise and we were supposed to do those three things every day. I'm afraid I did the...was it memory...no, attention and song, but not the memory, the news one. I'm afraid I didn't want to do that one very often...</p> <p>Interviewer: It doesn't matter.</p> <p>P6: I didn't do them all every day.</p> <p>Interviewer: You did what you could. Two more questions, but they're not broken up into other sections. So, you've had sixteen sessions of music therapy over about four months. What do you think about the number of sessions? So, that is 'is sixteen a nice kind of number'? Are you ready to end it now or would you have liked some more or would you have liked them more frequently or more spaced out?</p>	<p><i>Homework exercises – motivation needed</i></p>
<p><i>Satisfied by length of treatment</i></p>	<p>P6: No. I think they are just right as they are. One a week is just fine. It's just good.</p> <p>Interviewer: The last question is just here. How could the music therapy be improved?</p>	<p><i>Satisfied</i></p>
<p><i>Wanted more</i></p>	<p>P6: That's a bit hard for me to say. The only thing I would maybe suggest is maybe we could sing songs</p>	<p><i>More singing of</i></p>

<p><i>singing of familiar songs</i></p>	<p>together would be nice. But that's purely in my opinion because I enjoy singing. Not that I've got any voice, but...</p> <p>Interviewer: Singing is wonderful.</p> <p>P6: I just enjoy singing as a group.</p> <p>Interviewer: What sort of songs would you like to sing if you were singing? What would you like if you could choose.</p> <p>P6: Oh, dear. What. You want specific titles or...well, we do singing on a Thursday afternoon, anyway with Ben.</p> <p>Interviewer: Do you?</p> <p>P6: Yes. He comes in on Thursday afternoons. We sing songs all across the board, and I really enjoy singing...our singing sessions. We do all manner of different songs. A lot of seventies songs, and even before then...sixties.</p> <p>Interviewer: That's good.</p>	<p><i>familiar songs</i></p>
<p><i>Personal relevance of song material is important</i></p>	<p>P6: And my favourite one is...I say this because it's mine and my son's song, I call it...it is 'Stand By Me' by Ben E King.</p> <p>Interviewer: Yes.</p> <p>P6: What else do we sing? 'Scarborough Fair' we do. Isn't it stupid? When you want to think of something it goes right out of your head.</p> <p>Interviewer: It always happens when we feel we're on the spot a little bit, but it's fine it's...</p> <p>P6: Me and my son enjoy...um...'Proud Mary'...</p> <p>Interviewer: It's a real mixture.</p> <p>P6: Oh. Yes.</p> <p>Interviewer: That's plenty. Thank you very much. I've got no more questions to ask.</p>	



## Transcript and analysis of participant 7's responses

	<b>Participant 7</b>	
<i>Need for a partner</i>	<p>Interviewer: So, since your brain injury, what have been your greatest needs?</p> <p>P7: I think my greatest need is a good woman.</p> <p>Interviewer: OK. So...OK. And anything else at all. So, a good woman as in a relationship...</p> <p>P7: It would be nice.</p> <p>Interviewer: OK.</p>	<i>Need for relationships</i>
<i>Independence – driving</i>	<p>P7: I would like to get back driving again.</p> <p>Interviewer: Driving.</p>	
<i>Independence</i>	<p>P7: Mm. And just to be independent: without my parents sticking their oar in, if you like. You know what I mean?</p> <p>Interviewer: Absolutely.</p> <p>P7: Well. Yeah. Just independence more than anything.</p> <p>Interviewer: So, we're looking at relationships that have been impacted since the brain injury.</p> <p>P7: I had my best relationship with a lady since my injury and she had had a brain...what do you call it?</p> <p>Interviewer: Haemorrhage?</p> <p>P7: Haemorrhage. That's right, yeah. But she's married now. Well, not married but she's got two kids and lives with some bloke, so...</p> <p>Interviewer: Right. OK. So, that's been a bit...tricky.</p> <p>P7: I've seen her since, but...we're still friends, and that's all we are is friends. But, that was my best experience.</p> <p>Interviewer: Yeah. OK. And also...so the driving. Is that related to the independence really?</p>	<i>A need to be independent</i>
<i>Freedom – QOL</i>	<p>P7: Yes. It would be nice to be able to go where I</p>	<i>Difficulty with finding a partner</i>
		<i>A need for freedom</i>

<p><i>Visual problems</i></p> <p><i>Visual neglect?</i></p> <p><i>Dependent on parents</i></p>	<p>wanted really.</p> <p>Interviewer: And, is it the...what's the issue with the driving? Is it the physical challenges?</p> <p>P7: No. It's my eyes. I've had lessons since but the instructor said there's nothing wrong with my driving, it's just my eyes.</p> <p>Interviewer: OK.</p> <p>P7: He said "You...to see a sign it has to be sort of there."</p> <p>Interviewer: In your peripheral. And that's your peripheral vision has gone a bit.</p> <p>P7: Well. To drive, it's got to be spot on I guess.</p> <p>Interviewer: Yeah. Yeah.</p> <p>P7: So...</p> <p>Interviewer: OK. So, the third thing was independence again. So, linking to the driving...not having to rely on...</p> <p>P7: Yeah. Because I have to rely on my parents to go anywhere. Because they both drive. To go anywhere for a discs...</p> <p>Interviewer: Distance.</p> <p>P7: Distance. Sorry.</p> <p>Interviewer: That's OK.</p> <p>P7: But anywhere around Peterborough I'm fine. I can get the bus and whatever, but to go anywhere I want to go I have to rely on my parents to take me.</p> <p>Interviewer: OK. So...</p> <p>P7: Because if I had a taxi where I wanted to go it would be so expensive.</p> <p>Interviewer: Yeah. OK. Now, just thinking about those things that you have listed.</p> <p>P7: Yeah.</p>	<p><i>Visual problems</i></p> <p><i>Being dependent</i></p>
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<p><i>Physical difficulties</i></p>	<p>Interviewer: Has the music therapy given you any benefits or difficulties with any of the needs, and you may feel there has been no change at all and it's OK to say so.</p> <p>P7: I feel as though my...because I suffer with...getting things together...banging things together or...you know...like...reach.</p> <p>Interviewer: Right. OK.</p>	<p><i>Loss of physical ability</i></p>
<p><i>Music therapy improved physical functioning</i></p>	<p>P7: And I feel as though my...doing the music therapy has slightly got my rhythm back together.</p> <p>Interviewer: Right. OK. And, in relation to your relationships, your emotional needs and well-being. Has it had any...have you found any benefits or not...has there been any impact on that at all?</p> <p>P7: Well. No, not really. Because, although I do get on with everybody in the group and they seem to get on with me as well. So...but, this is the only time that I see anybody... the people that are in the group, if you like.</p> <p>Interviewer: Yeah. OK. So, it helped your sort of physical side and it helped you feel better physically, but emotionally it has not necessarily had any great...</p> <p>P7: No. Probably the wrong thing to say, but....</p> <p>Interviewer: Oh, no. Absolutely not at all. I mean it's important to hear that. And the fact that it's...you know...your physical side...and I think the rhythms etcetera...I think it's man important thing. OK. So, the next question. There were different aspects to the music therapy you had, and here's a list of them here. Can you say which of the aspects of music therapy you found most useful, and which were least useful? This ties in a bit with what we were just saying actually.</p>	<p><i>Improved physical functioning</i></p>
<p><i>Group discussion was useful</i></p>	<p>P7: Right. I guess the talking would have been important...em....</p> <p>Interviewer: What I'm going to do is after you've had a little think and a little look at them I'm going to get you to choose the most useful and the least useful, but we'll talk about each of them as well.</p>	<p><i>Group discussion was useful</i></p>

<p><i>Group memory exercise was useful</i></p>	<p>P7: OK. The repeating one, I guess.</p> <p>Interviewer: Which one?</p> <p>P7: The repeating...</p> <p>Interviewer: Oh, the group memory exercise. Repeating back short rhythmic phrases after a short pause.</p> <p>P7: Yes.</p> <p>Interviewer: You would say that was your most useful. Yeah?</p>	<p><i>Group memory exercise was useful</i></p>
<p><i>Group memory exercise was most useful</i></p>	<p>P7: Yes.</p> <p>Interviewer: And, why that one over the others?</p>	<p><i>Group memory exercise was most useful</i></p>
<p><i>Perceived improvement in memory during musical tasks</i></p>	<p>P7: Because it got me to think about what Jonathan was playing to us and we had to repeat back what he had played, and I felt as though probably towards the end of the group it was getting better.</p> <p>Interviewer: Right. OK. And how about the other areas? Which was the least useful do you think?</p>	<p><i>Music therapy improved memory</i></p>
<p><i>Group attention exercise was least useful</i></p>	<p>P7: Well, the heckling was just...I mean...I could take the sound and just repeat the sound without the...the heckling just didn't make any difference whatsoever.</p> <p>Interviewer: It didn't make any difference.</p> <p>P7: Not really.</p> <p>Interviewer: So, it didn't distract you in any way.</p> <p>P7: No.</p> <p>Interviewer: So, for you that wasn't such a helpful part.</p> <p>P7: No. Not really.</p> <p>Interviewer: It wasn't a difficult task for you.</p> <p>P7: I remember when I was the heckler, the girls were saying they couldn't hear a thing at a certain point because I was banging the drum so hard.</p> <p>Interviewer: Right. And what about the homework</p>	<p><i>Group attention exercise was least useful</i></p>

	<p>exercises? Did you do anything with the homework exercises?</p> <p>P7: Yes. I did the memory and the other one was attention. Attention, memory and the 'What do we do with the drunken sailor' song. Most of it.</p> <p>Interviewer: And did you do them?</p> <p>P7: Yes.</p> <p>Interviewer: Yeah? And did you find them useful? Have you found them useful?</p> <p>P7: Yes. In a way, because...holding your attention on things really.</p> <p>Interviewer: Yeah. Let's see...what else is there? You said talking was important. That was an important aspect. In what way?</p> <p>P7: Just the fact that I could communicate and I could say something that somebody else in the group was trying to say but couldn't. I could make sense of it and say to Jonathan what they were trying to say to him.</p> <p>Interviewer: So, the group talking together, you were actually offering support for each other. OK. And did you enjoy the singing? Did you find that useful?</p> <p>P7: We didn't do any singing.</p> <p>Interviewer: Did you not do any singing? OK. I'll put a circle around that one.</p> <p>P7: Oh. Ah. Sorry. The song. The song at the end.</p> <p>Interviewer: Ah. Writing the song together and then the singing, yeah? How about writing the song?</p> <p>P7: The writing was good, but I found that when we were singing it I went first and I was shouting at the microphone instead of trying to sing to the microphone. Mind you, the microphone was miles away, well, a few metres away. So, I felt that I had to project my voice and shout at it instead of singing.</p> <p>Interviewer: Did you enjoy that aspect or not particularly...?</p>	
<i>Homework exercises were useful</i>		<i>Homework exercises were useful</i>
<i>Group discussion – supporting others and feeling supportive</i>		<i>Group discussion – supporting others</i>
<i>Songwriting was useful Difficulty regulating force of voice Singing was difficult due to cerebral dysarthria</i>		<i>Songwriting was useful Dysarthria Singing was challenging</i>

<i>Anxiety about recording song</i>	P7: I didn't enjoy the final recording of it because I was shitting myself, but it was g....	<i>Anxiety – recording the song</i>
<i>Songwriting - express about feelings and reflect on them</i>	Interviewer: But the actual process of writing the song.  P7: Yeah. It was good. It made you think about your feelings of what we put down and made you think 'Oh Yeah. Maybe that was me.'	<i>Songwriting – self-expression and self-reflection</i>
<i>Perceived improvement in timing during musical tasks</i>	Interviewer: Right.  P7: So.  Interviewer: OK. And then the last one, playing music.  P7: Yeah. I just found that the beat was...was... every time I did it, was getting better, if you like.  Interviewer: So, actually playing the beat helped you.  P7: Seemed to.	<i>Improved physical functioning</i>
<i>Satisfied with length of treatment</i>	Interviewer: OK. The next question we have: So, you've had sixteen sessions of music therapy over about four months. It's gone quickly hasn't it. What do you think about the number of sessions you received? So, would you have liked more sessions, fewer sessions or do you think it was about right?  P7: I think it was about right.	<i>Satisfied</i>
<i>Music therapy was successful</i>	Interviewer: Yeah? Any reasoning behind that?  P7: I think that we got everything that we wanted to do in it and I think Jonathan was quite happy with what we did at the end...and I hope they can see that there was little improvement for everybody.  Interviewer: Yeah? And you felt that from the end.  P7: Mmm  Interviewer: And do you think that maybe if it had been longer would that improvement have continued or do you think that maybe it was enough?  P7: It was enough. I think it would have just stayed the same really.  Interviewer: Then, the final question is how could the	<i>Effectiveness of music therapy</i>

<p><i>Could not be improved</i></p>	<p>music therapy have been improved?</p> <p>P7: I don't think it could really.</p> <p>Interviewer: Was there one aspect that you would have preferred more and less of another aspect of it?</p> <p>P7: I don't think so. I think what we did was good and I hope Jonathan felt it was important for us all and I hope he has learned from it.</p> <p>Interviewer: I think he has. I think he has thoroughly enjoyed every part of it. Was there anything missing from it that you can think of or anything that happened that you didn't want to experience. You mentioned the singing.</p> <p>P7: Apart from the shouting that I did. That was quite....You, of course, weren't there.</p> <p>Interviewer: I wasn't there. No.</p> <p>P7: So, that's what we'd miss about it you see.</p> <p>Interviewer: Thank you. That's very kind of you.</p> <p>P7: Quite alright.</p> <p>Interviewer: You wouldn't have enjoyed hearing me sing on that microphone, believe me.</p> <p>P7: You don't know until he says that you weren't there. We'd say 'Oh, no. Not you again.'</p> <p>Interviewer: Yeah. Exactly. That would have been sixteen weeks...would have been enough of that I'm sure</p> <p>P7: I don't think that would have happened though.</p> <p>Interviewer: OK. Well, that's the end of the interview. Thank you.</p>	<p><i>Could not be improved</i></p>
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## Transcript and analysis of participant 8's responses

	<b>Participant 8</b>	
	<p>Interviewer: So, first of all. The first question. Since your brain injury what do you think have been your greatest needs?</p> <p>P8: My greatest needs. Making sure I get things right.</p> <p>Interviewer: Making sure that you get things right. Yeah?</p> <p>P8: Yes.</p> <p>Interviewer: OK. So, in what way?</p> <p>P8: That's why I write out my shopping list. It's the simple, bare necessities.</p> <p>Interviewer: OK.</p> <p>P8: Yes.</p> <p>Interviewer: I'm just going to jot this down to remind me in a bit. OK. So, making sure you get things right. That's good for you. You found that's important for you since your brain injury?</p> <p>P8: Yes.</p> <p>Interviewer: Why is that in particular?</p> <p>P8: Now, I'm not overspending my money also.</p> <p>Interviewer: OK.</p> <p>P8: And, if there's something I want the next day and I don't usually get it, I know.</p> <p>Interviewer: Right. OK. So, is it helping your memory?</p> <p>P8: Yes. To do it like this.</p> <p>Interviewer: OK. And any other areas? So, making sure you're organised and writing your lists, to help your memory, and....</p>	
<i>Need to manage daily life and needs</i>		<i>Impact on daily living skills</i>
<i>Managing money</i>		



<p><i>Need for orientation in time</i></p> <p><i>Orientation is important</i></p>	<p>P8: And also, when I go to bed, instead of taking the newspaper up with me I jot it down on a piece of paper what night it is.</p> <p>Interviewer: OK.</p> <p>P8: So I know what day it is when I wake up.</p> <p>Interviewer: Oh. That's a good idea.</p> <p>P8: Yes.</p> <p>Interviewer: So, last thing at night, and that helps you first thing in the morning to get your head straight.</p> <p>P8: I know I'm right, that it's that day.</p> <p>Interviewer: So, what you've found since the brain injury is that you are needing to do these lists and keep yourself organised.</p>	<p><i>Impact on orientation</i></p>
<p><i>Need to maintain the home</i></p>	<p>P8: The housework. Certain things on certain days.</p> <p>Interviewer: Right. OK. And you've found that useful and helpful. OK. Any other areas? So, if we leave the sort of organising and lists and...sort of...helping with memory to one side. Anything else that you've found particularly...sort of...has been one of your greatest needs with your brain injury?</p>	<p><i>Impact on daily living skills</i></p>
<p><i>A need to have access to support</i></p>	<p>P8: It always pays to ask. Don't be frightened to ask if you're not sure about something.</p> <p>Interviewer: OK. So, what...to other people...asking other people?</p> <p>P8: Yes.</p> <p>Interviewer: Yeah? OK. I'll just jot that down. So, having support from others.</p> <p>P8: Yes.</p> <p>Interviewer: OK. And anything else at all, do you think since your brain injury that are your greatest needs?</p> <p>P8: Also, I've noticed sometimes I've had to watch the shop assistants.</p> <p>Interviewer: Right.</p>	<p><i>Need to have access to support</i></p>

<i>Difficulty trusting others</i>	<p>P8: They might try to short change me and what have you, or not give me what I've bought.</p> <p>Interviewer: OK.</p> <p>P8: Yes.</p> <p>Interviewer: So, you're concerned sometimes that...you get quite worried that you're...</p> <p>P8: They might notice that I'm wearing an SOS.</p> <p>Interviewer: Right.</p>	<i>Difficulty trusting others</i>
<i>Fear of being deceived and exploited</i>	<p>P8: And they go out of sight to wrap something. They have done. That's happened I know. And then, they've come back with it in a bag like, and they've said the price what have you.</p> <p>Interviewer: Yeah.</p> <p>P8: So, sometimes I haven't paid them straight away, looked in the bag and I haven't got it.</p> <p>Interviewer: Right. OK.</p> <p>P8: Especially with shoes. They've put an empty box in the bag.</p> <p>Interviewer: So, being able to trust other people has been bit difficult.</p> <p>P8: Yes. I know you hear of shoplifters and that don't you.</p> <p>Interviewer: Yeah.</p> <p>P8: Well, this is the shop assistants.</p> <p>Interviewer: OK. Sort of...trusting others...that you feel sometimes you may be taken advantage of.</p>	<i>Fear of being exploited</i>
<i>Fear that overt signs of disability will be exploited</i>	<p>P8: They might see I'm wearing an SOS, and think I don't know what they're doing.</p> <p>Interviewer: Right. OK.</p>	<i>Fear of showing vulnerability</i>
<i>Hiding signs of disability</i>	<p>P8: Yes. I might just pop this inside me when I'm in some shops or take it off.</p>	

<p><i>Anxious about shopping</i></p>	<p>Interviewer: Yeah. That's a good idea.</p> <p>P8: Also, if I go in the odd shop, they might recognise me and say 'Oh. It's her again.' And so, and so, and so, and so. So perhaps, I've just walked out then.</p> <p>Interviewer: Right. OK. Do you find it quite stressful...the shopping experience?</p> <p>P8: Sometimes. Bless you.</p> <p>Interviewer: Right. Well, that's given us a bit of a starter. So, thinking of those different things we've talked about, has the music therapy given you any benefits or difficulties with any of those specific things we talked about? And you may feel that there's been no change at all, and that's OK as well.</p>	<p><i>Anxiety</i></p>
<p><i>Music therapy lowers anxiety</i></p>	<p>P8: Yes. It has helped. I don't fret on it.</p> <p>Interviewer: OK. You don't fret on things outside, so if something happened outside you don't fret about that?</p> <p>P8: No.</p> <p>Interviewer: And that's been since the music therapy?</p>	<p><i>Music therapy lowers anxiety</i></p>
<p><i>Lower anxiety in daily life since having treatment</i></p>	<p>P8: Yes.</p> <p>Interviewer: Yeah?</p> <p>P8: Yes.</p> <p>Interviewer: And in what way do you think the music therapy has helped you not fret?</p>	<p><i>Lower anxiety in daily life since having treatment</i></p>
<p><i>More secure in self</i></p>	<p>P8: Bless you. Trying to be more cheerful. Let them fret, not me.</p> <p>Interviewer: OK.</p> <p>P8: Yes.</p> <p>Interviewer: That's always a good way.</p> <p>P8: Yes. And keep smiling.</p> <p>Interviewer: And talking about your memory. Making sure that you're getting things right, and writing your</p>	<p><i>More secure sense of self</i></p>

<p><i>Music therapy has helped a little with memory problems</i></p>	<p>lists down. Has the music therapy helped you in that area at all. And, again, it's OK to say if it hasn't but has it helped you or has it made things worse?</p> <p>P8: It's not made things worse.</p> <p>Interviewer: OK. That's a good start. Jonathan will be relieved.</p> <p>P8: Olay, olay.</p> <p>Interviewer: OK. And you don't think it's really helped with your memory as such.</p> <p>P8: I think it has a bit like. Yes.</p> <p>Interviewer: OK. In any particular way do you think.</p> <p>P8: Now, now, now.</p> <p>Interviewer: It's OK to say if it hasn't. That's absolutely fine.</p> <p>P8: Yes, it has but I can't just point it out.</p> <p>Interviewer: Absolutely. You just feel that it's been...the whole thing has been good for you.</p>	<p><i>Improved memory</i></p>
<p><i>Perceived music therapy as beneficial</i></p>	<p>P8: Yes.</p> <p>Interviewer: OK. And what about getting support from others. We were talking about you saying it was OK to ask people. And we were talking about support. Has the music therapy given you any benefits in that area or any difficulties or has it not made a difference with the support you get from other people or how supported you feel?</p>	<p><i>Effectiveness of music therapy</i></p>
<p><i>Feeling supported through music therapy group</i></p>	<p>P8: I suppose so. Yes.</p> <p>Interviewer: Anything in particular that you think...</p> <p>P8: Well, it don't make me drowsy what have you.</p> <p>Interviewer: OK. So, it keeps you awake and keeps you...</p>	<p><i>Feeling supported through music therapy group</i></p>
<p><i>Change in mood due to treatment</i></p>	<p>P8: More cheerful.</p> <p>Interviewer: OK. Fine. Thank you. OK. So, the next</p>	<p><i>Change in mood due to treatment</i></p>

	<p>question that we've got. There's a big list here.</p> <p>P8: Me Oh my</p> <p>Interviewer: There are different aspects to the music therapy that you had. OK. And here's the list individually. There we go. If you hold that. Just have a look through those and can you say which of those aspects of music therapy you found the most useful, and which were the least useful. And we'll have a little chat about the different things.</p> <p>P8: Mmm.</p> <p>Interviewer: So, in your music therapy you did things like playing music, singing...</p> <p>P8: That was nice.</p> <p>Interviewer: Yeah?</p> <p>P8: Yes.</p> <p>Interviewer: Talking together.</p> <p>P8: Mmm. Indeed.</p> <p>Interviewer: And you did an exercise where some of you followed a beat. Yeah?</p> <p>P8: Yes.</p> <p>Interviewer: And then someone sort of shouted out and tried to disrupt you.</p> <p>P8: This is it. Yes. One of us had to try and disrupt.</p> <p>Interviewer: Right. OK.</p> <p>P8: Yes. Yes. Me Oh my.</p> <p>Interviewer: And then you also did one where you had to repeat back rhythms to Jonathan.</p> <p>P8: Yes. Bless him.</p> <p>Interviewer: And writing a song together.</p> <p>P8: Ah. Yes. Yes.</p>	
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<p><i>Songwriting was most useful Using creativity</i></p>	<p>Interviewer: And also some homework.</p> <p>P8: Righty ho, righty ho.</p> <p>Interviewer: So, which out of those do you find most useful do you think?</p> <p>P8: I like writing a song because it's coming here I got to doing my rhymes.</p> <p>Interviewer: So, you enjoyed that.</p> <p>P8: Yes. Yes.</p> <p>Interviewer: So, would you say that was the most useful thing? Writing a song. Yeah?</p> <p>P8: Yes.</p> <p>Interviewer: And that's because you got to use your rhymes?</p> <p>P8: Yes. And my rhyme book.</p> <p>Interviewer: Yeah? And anything else at all?</p> <p>P8: Bless you. And to follow the beat, so we know what to do sort of thing and having a go.</p> <p>Interviewer: Was there anything that you did not find very useful?</p>	<p><i>Songwriting was most useful – being creative</i></p>
<p><i>Group attention exercise was challenging due to selective attention deficits</i></p>	<p>P8: When they heckled a bit.</p> <p>Interviewer: Were you able to keep the beat?</p> <p>P8: I tried. I did my best, I might say.</p> <p>Interviewer: But you didn't find that one...</p> <p>P8: I'm not sure exactly though.</p> <p>Interviewer: And what about the talking? Did you find that useful?</p>	<p><i>Group attention exercise was challenging</i></p>
<p><i>Group discussion was useful</i></p>	<p>P8: Yes. Yes. Yes.</p> <p>Interviewer: In what way? Or did you not find it useful really?</p>	<p><i>Group discussion was useful</i></p>



	<p>Interviewer: Or anything that you wanted less of.</p> <p>P8: Not less of. No. I did...I've liked.</p> <p>Interviewer: But you think you had just about the right amount of everything. Was there anything that happened that you didn't want to do?</p> <p>P8: Not that I recall. Bless you.</p> <p>Interviewer: OK. And that's it. Well done.</p>	
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## Transcript and analysis of participant 9's responses

	<b>Participant 9</b>	
<p><i>Loss of occupation</i></p> <p><i>Physical disabilities</i></p>	<p>Interviewer: So, the first question. Since your brain injury what have been your greatest needs do you think? It's written down here if you need it to remind you. So, what do you think since having the brain injury your greatest needs have been?</p> <p>P9: Well, at first when I had my brain injury I thought...I thought the work I'm doing...you know...crane operating. That's going to be no good to me now because it's all arm and leg work, and down my right hand side that's as bad as anything.</p> <p>Interviewer: So, basically, your work, your job, your career. Yeah?</p> <p>P9: Yeah.</p> <p>Interviewer: That's been badly affected. And so, that's been as a result of your sort of physical side. Yeah? OK. Anything else? What else are you finding are your greatest needs. I'm just going to write these down, so I can remember.</p> <p>P9: Oh. Egham. Egham.</p> <p>Interviewer: Yeah.</p> <p>P9: Well, that's a big place. Well, I can't remember going there, but I did. I was there for...what...ooh, I was there for...I don't know how long I was there for now. It's a place...Oh, blimey, how can I put it?</p> <p>Interviewer: So, you can't remember being at Egham even though you were there for a long time?</p> <p>P9: Yeah, yeah, yeah.</p> <p>Interviewer: So, is that your memory? So, your greatest needs really since your brain injury you are saying...sort of...your memory.</p> <p>P9: Mmm. Well, the funny thing is...even though it was quite a long time I can't even remember going there, but I did.</p> <p>Interviewer: So, just having a lack of memory about</p>	<p><i>Loss of occupation</i></p> <p><i>Loss of physical ability</i></p> <p><i>Loss of memory</i></p>

<p><i>Confused</i> <i>No choice</i></p>	<p>things. Yeah? You're finding that really difficult since the brain injury.</p> <p>P9: I left there before I should have done because...what I was doing...I didn't even know what I was doing there. It wasn't up to me. Since I left.</p> <p>Interviewer: Right. OK. And anything at all? So, since your brain injury your greatest needs have been really the effect it has had on your ability to work...</p> <p>P9: Yeah.</p> <p>Interviewer: On your memory...</p> <p>P9: Yeah. I'm always aware that...the [company] I used to work for...well, our foreman, he said: "How would you like to go on a crane course?" I said: "What for? I can drive a crane. He said: "Yeah. I know, but do you want a go?" I said: "If you say I've got to go, I've got to go." He said: "Right." But I don't even remember going there either. No.</p> <p>Interviewer: OK. You've just told me a good story though that you just must have remembered back then.</p> <p>P9: Oh, that was a long, long time ago it was.</p> <p>Interviewer: OK. So, thinking about your memory and your sort of ability to work really. Has the music therapy given you any benefits or difficulties with those? So, has there been any...it's OK to say there's been no change at all. So, has music therapy helped you in any way with your memory or hasn't it at all, or has it made it worse, or...? What are your thoughts? And if you're not sure that's fine to say.</p> <p>P9: No. I'm not even sure about that either. No.</p> <p>Interviewer: No? OK. That's fine. So, the music therapy. Have you got a memory of some of the things that you've been doing in the music therapy? So, banging the drums, and writing the song, and talking with other people, with Jonathan. No? Has it gone?</p>	<p><i>Confused</i> <i>Powerless</i></p>
<p><i>Difficulty remembering the treatment in detail</i></p>	<p>P9: Afraid not, afraid not.</p> <p>Interviewer: OK. That's fine. OK. So, these...</p> <p>P9: I was in hospital. I was doing things but I didn't</p>	<p><i>Difficulty remembering the treatment in detail</i></p>

<p><i>Coma Memory loss</i></p>	<p>know I was doing them. If you know what I mean.</p> <p>Interviewer: Right.</p> <p>P9: Also, when I woke up...well, I didn't know I was awake. I had loss of memory.</p> <p>Interviewer: You had loss of memory. Yeah?</p> <p>P9: Yeah. What was I going to say?</p> <p>Interviewer: So, you were saying about when you were in hospital and you woke up and your memory was gone. You had lost the memory.</p> <p>P9: Yeah. Oh, I forget what I was going to say.</p> <p>Interviewer: It'll come back. The harder you work sometimes, the harder it is to get it back.</p> <p>P9: It won't come.</p> <p>Interviewer: It won't come. I know that some of these things are really hard [participant 9] that I'm asking you to do, so...em.... These are the different things. I'm just going to show you this list and see if it helps you at all. These are the different things that you have done on the music therapy. See if anything sort of triggers anything with you. So, with Jonathan and [participant 10] and [participant 6] and participant 7] and [participant 8] you've been playing just once a week been playing music and singing songs, writing a song together...</p>	<p><i>Loss of memory</i></p>
<p><i>Difficulty remembering the treatment in detail</i></p>	<p>P9: What...I've been doing that?</p> <p>Interviewer: Yeah.</p> <p>P9: I don't remember.</p> <p>Interviewer: It's only been once a week. Once every couple of weeks.</p> <p>P9: I still don't remember. Sorry.</p> <p>Interviewer: See if there's anything there that comes back.</p> <p>P9: Sorry?</p>	<p><i>Impact on engagement</i></p>

<p><i>Remembered drumming in the group</i></p>	<p>Interviewer: Just see if there's anything there that reminds you because it might be that something there triggers a.... Apparently, and I don't know this, but apparently you've all been banging drums and then somebody shouts out....</p> <p>P9: Oh, yeah. Um. When we're drumming</p> <p>Interviewer: That's it.</p> <p>P9: We haven't got a group this week. That finished last week.</p> <p>Interviewer: Yeah. You got me instead this week. So, not so much fun.</p> <p>P9: That's alright, that's alright.</p> <p>Interviewer: So, the music therapy.</p> <p>P9: Yeah.</p> <p>Interviewer: Can you remember writing the song with Jonathan and you talked about different words to be put into the song about you had been feeling?</p>	<p><i>Remembered drumming in the group</i></p>
<p><i>Remembered a moment during the songwriting exercise</i></p>	<p>P9: Yeah. What...I did say to him: "That third line Jonathan" I said. "Could we have it second because I've got a third line to put in." Something like that.</p> <p>Interviewer: Yeah? And did you get a third line put in?</p> <p>P9: I did. I did. Yeah. Yeah.</p>	<p><i>Remembered a moment during the songwriting exercise</i></p>
<p><i>Songwriting was useful</i></p>	<p>Interviewer: Well done. Good work there, [participant 9]. And did you find that enjoyable?</p> <p>P9: Yeah. Quite enjoyable, quite enjoyable.</p> <p>Interviewer: Yeah?</p> <p>P9: Mmm.</p> <p>Interviewer: Have you found it's helped you with your memory at all doing the music therapy with Jonathan? Or not at all? Do you think any of the things have helped you at all?</p> <p>P9: Um. Mmm.</p>	<p><i>Songwriting was useful</i></p>

<p><i>Remembered recording the song</i></p>	<p>Interviewer: If any of these are ringing a bell, pick out the one that you enjoyed the most maybe and the one that you didn't enjoy so much.</p> <p>P9: Mmm.</p> <p>Interviewer: Can you remember singing a song? Did you do some singing into the microphone?</p> <p>P9: Um. We did that singing in the microphone.</p> <p>Interviewer: Yeah. Yeah. Apparently you've written a song.</p> <p>P9: Yeah. I know we've written a song.</p> <p>Interviewer: And you've been banging drums, and you had something where somebody was banging a drum and somebody else had to shout out.</p> <p>P9: Yeah. Yeah.</p> <p>Interviewer: How did you find that one? Can you remember that one? Were you ever the one that shouted out?</p> <p>P9: Can't remember.</p> <p>Interviewer: Can't remember? OK. So, we'll move on to the next question. Was there anything about the music therapy that you think could have been improved? Just from the bits that you can remember were there areas that you think you wish you'd done more of that side of it or less of the other?</p> <p>P9: Can't remember. I can't.</p> <p>Interviewer: That's fine, [participant 9]. Don't worry.</p> <p>P9: There's a lot down there which I can't remember doing it. I can't.</p> <p>Interviewer: Ah. But, maybe you would do if we sort of talked through it and maybe if Jonathan was here and you were there you would remember as you were doing it you would probably remembered having doing it before. Sat in a room with bits of paper, it doesn't mean the same, does it really. So...we're done today. So you can go back to...is it break time?</p>	<p><i>Remembered recording the song</i></p>
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## Transcript and analysis of participant 10's responses

	<b>Participant 10</b>	
	<p>Interviewer: OK. So, I'm going to jot a few things down as we go along if that's OK. Just to remind me to come back to during the interview.</p> <p>P10: Yes. Of course.</p> <p>Interviewer: So, the first question. We're going to just chat about the music therapy, how things have gone. So, be as honest as you like. Don't hold back. The first question is since your brain injury what have been your greatest needs?</p> <p>P10: Oh. That is such a difficult question. My greatest needs. Right. Well, basically what I really want and maybe I don't know if it's my greatest need but it's what I really want or what I would like to get back what I aspire to is to get back to my normal self.</p> <p>Interviewer: OK. And, in which areas do you feel are preventing you from doing that, are the most difficult.</p> <p>P10: Area. I don't know what the question. It's a strange question.</p> <p>Interviewer: So, getting back to your normal self. What would that mean?</p> <p>P10: What does that mean? It's a good question. What is my normal self? I haven't got a clue. Well, I'm quite an intellectual sort of person. I've got a very good brain. I used to have a very good brain. Now, I haven't anymore.</p> <p>Interviewer: OK.</p> <p>P10: So, I miss it. So, getting back to my normal self would mean to be quick and with it, constantly able to make the right connections with a lot of things in my head. I see my head as a network of wires and they now don't seem to make any electricity. They don't seem to have the ability to link up to each other anymore. So, that's being my greatest need would be to be that sort of person.</p> <p>Interviewer: To build those connections again.</p>	
<i>To regain former self before ABI</i>		<i>Need to recover former self</i>
<i>Lack of sense of self</i>		<i>Lack of sense of self</i>
<i>Loss of cognitive functioning</i>		<i>Cognitive needs</i>
<i>Thinking is slower</i>		

<p><i>Loss of ease and fluency of thought</i></p> <p><i>Loss of creativity</i></p>	<p>P10: Working easily and almost without prompting. Just looking at something I expect my brain to think of things. I've also got quite a lot of imagination and I think I have lost out on that. I haven't got the imagination I used to have because imagination requires the ability to make lots of linkages and that seems to have got lost.</p> <p>Interviewer: Sort of creative thinking. Yeah?</p> <p>P10: Ooh. I'm getting hot.</p> <p>Interviewer: Do you want me to open the window? Anything else at all? So, being able to think quicker and have those connections...</p>	<p><i>Impact on creativity</i></p> <p><i>Impact on creativity</i></p>
<p><i>Loss of creative thinking</i></p>	<p>P10: And creatively.</p> <p>Interviewer: Creatively. That you think are your greatest needs. Anything else at all?</p>	<p><i>Impact on creativity</i></p>
<p><i>Loss of memory</i></p> <p><i>Impact of memory on creative thinking</i></p>	<p>P10: Um. I think so, yes. My memory is also the thing that...because memory is also important for those linkages. It seemed to have...I lost my memory in my brain injury and therefore because memory has such a great role to play with those flash of "Oh, yes. This reminds me of..." Well, it doesn't work anymore.</p> <p>Interviewer: So, your memory really is a big part of...</p>	<p><i>Loss of memory</i></p>
<p><i>Creativity requires memory</i></p> <p><i>Memory needed to make links between thoughts</i></p>	<p>P10: It's my big problem. It's a big part of my creativity as well because I don't believe that anyone is creative in absolute. I mean creativity doesn't exist from blank sheet of paper.</p> <p>Interviewer: Yeah.</p> <p>P10: Creativity starts from even a tiny dot on a piece of paper and from that dot you can sort of make linkages and see pictures and think in pictures...but I'm talking about pictures not because it's pictures necessarily that I'm missing. It's this ability to go from one thought to another and that's what I've lost with my brain injury.</p> <p>Interviewer: OK. So, bearing all that in mind, and thank you for being so open. Has music therapy been any benefit in those areas or any difficulties?</p>	<p><i>Impact on creativity</i></p>
<p><i>Music therapy is effective</i></p>	<p>P10: I think music therapy is definitely the way to go. I've enjoyed extremely very much and it has given me</p>	<p><i>Effectiveness of music therapy</i></p>

<i>Music therapy as fun</i>	the opportunity to feel these connections again.	<i>Stimulating creative thinking</i>
<i>Treatment as enabling creative thinking</i>	Interviewer: Really?	
<i>Recognising loss</i>	P10: Yes. And also given me, you know how when you taste something and you think "Oh, yeah. That's exactly what it is that I am missing" and so it's frustrating in the sense that you realise how much you have missed and you are keep missing. So, it's like...did you understand what I meant?	<i>Recognising loss</i>
	Interviewer: Absolutely, yeah.	
<i>Recognising loss</i>	P10: If you are given to taste again something that you haven't tasted for a long time. You feel "Oh, dear. Where is it all gone?"	<i>Recognising loss</i>
	Interviewer: If you didn't know something then you can't miss it. But if you....Yeah.	
<i>Facing the pain of loss</i>	P10: But then, when you're reminded of what it is you're missing, then it suddenly really strikes you as being really such a painful experience.	<i>Facing the pain of loss</i>
	Interviewer: So, in that way would you say that the music therapy is it a benefit having been reminded...?	
<i>Recognition of loss as useful</i>	P10: It is. Yeah, definitely.	<i>Recognition of loss as useful</i>
	Interviewer: or does it cause you more difficulties?	
<i>Facing pain and loss are part of recovery</i>	P10: No. No. No. No. Because I believe, and that's my personal belief, maybe I'm wrong. I believe that you cannot get...it's the same with any kind of ailment...you cannot get better unless you know exactly what's wrong. So, I think the music therapy by opening up my awareness of what it is that I have lost has allowed me somehow to regain a little bit of that.	<i>Facing pain and loss are part of recovery</i>
<i>Music therapy facilitates recovery through improving self-awareness</i>	Interviewer: So, there were different aspects of the music therapy that you had. Here's a list of them. OK. Here. So, playing music, singing, talking, etcetera, etcetera. Can you say which of them you found the most useful out of those, an which the least useful? And maybe we can talk about each one if you like and see...	<i>Music therapy facilitates recovery through improving self-awareness</i>
<i>Group discussion was useful</i>	P10: I think it's always very valuable to be able to talk. So, I very much appreciated the opportunity that was given to us because we do a lot of things in Headway	<i>Group discussion was useful</i>
<i>Unique opportunity</i>		<i>Music therapy</i>



<p><i>to express pain and thoughts</i>  <i>Music therapy helped participant recognise what was lost</i></p>	<p>but we don't seem to have this space where we can express ourselves or express what it is that is hurting us. But music therapy was also very valuable in it allowing me to notice what it is...the links that I have lost...the ability to make links.</p> <p>Interviewer: And do you think that was through...was it mainly through talking that that was reached?</p> <p>P10: Yes. Definitely. Yes.</p> <p>Interviewer: So, you'd say that really the talking was the most...</p>	<p><i>enabled expression of pain</i>  <i>Value of music therapy</i></p>
<p><i>Playing music is fun</i>  <i>A need to be a trained musician to get more out of playing music</i>  <i>Singing was fun</i></p>	<p>P10: I think the talking was extremely valuable. Yeah. Playing music is nice but I'm not a musician so it wouldn't really do much for me and I'm not much of a singer either. It's fun. I enjoy singing but it's fun for me.</p> <p>Interviewer: And the attention exercise. When someone was heckling.</p>	<p><i>Playing music requires musicianship</i>  <i>Singing was fun</i></p>
<p><i>Attention exercise was useful</i></p>	<p>P10: Oh. Yeah. That was very useful. It was very useful to be able to realise how in a situation where there is a lot going on and how to keep the thread in spite of all the breakages to manage to keep the thread that was I think very useful. Because in a family, for example, it's a constant thread which is constantly broken. So, being able to keep it in mind in your hand almost to keep the analogy of the thread. If you can keep it in hand, then you may be able to reach backwards and forwards following the same thread. I don't know if I'm expressing myself very clearly.</p>	<p><i>Attention exercise was useful</i></p>
<p><i>Relating value of treatment to family life</i></p>	<p>Interviewer: You are expressing yourself beautifully. Yeah. Fantastic.</p> <p>P10: I feel I am probably over-wordy.</p> <p>Interviewer: I don't think so [participant 10]. I think you're explaining it in a very eloquent way which enables people to have a picture of how you're feeling and how you solve problems and...</p>	<p><i>Impact of treatment on family life</i></p>
<p><i>Group discussion – recognised as a useful psychological intervention</i>  <i>Enabled free</i></p>	<p>P10: Thank you. So, I believe that the talking was very...in terms of music therapy...the talking was very valuable. It was almost like it gave us the opportunity to almost be like in the psychiatrist's chair. Well, not in the chair of the psychiatrist but on the couch. In order</p>	<p><i>Group discussion – a useful psychological intervention</i>  <i>Enabled free</i></p>

<p><i>expression of difficult thoughts</i></p> <p><i>Expressing repressed feelings</i></p> <p><i>Facilitated openness</i> <i>Fulfilled an unmet need</i></p>	<p>to express oneself freely and even find it in your own head what it is that you want to express because sometimes you have things inside you but you just cannot find the way round and the expressing it and I think Headway doesn't allow for this to happen. So, when we were given the opportunity to do music therapy it just gave us in my view for me anyway gave me the opportunity to open up and say things that I wasn't given the chance to say anywhere else. So, I think it was extremely valuable in any case for me.</p> <p>Interviewer: And, how about the writing of the song?</p> <p>P10: Oh. That was fun. But, I'm not a writer and for me it's very difficult for me to sort of open up in a group and come up with fascinating...because I have very high standards, I find it difficult to just throw a couple of words here and there and think "Yeah. Here you are. I've done my bit." No. I need time to come up with the right sort of...well, maybe not John Lennon. I certainly will never be a John Lennon. I have never been given the opportunity to actually.... And I think somebody did write something and that was good. She obviously had the chance to think through it so in the class it was great to do it together with...but I don't think my contribution was any particularly brilliant or anything because I need time. So, I don't know what else to say about it. It was lovely in any case. I think I very much enjoyed it. I'm very hot. So, sorry about that. I'm using your...</p> <p>Interviewer: We're nearly done. Use my questions (as a fan). And the homework exercises. Did you do any of the homework exercises?</p> <p>P10: Yes. I did them all.</p> <p>Interviewer: Yeah? And did you find them useful?</p> <p>P10: Yeah. Very much so.</p> <p>Interviewer: In what way in particular?</p> <p>P10: In what way in particular. You are grilling me aren't you.</p> <p>Interviewer: I am grilling you.</p> <p>P10: It's hard work this. In what way did I find them useful?</p>	<p><i>expression of difficult thoughts</i></p> <p><i>Expressing repressed feelings</i></p> <p><i>Facilitated openness</i> <i>Fulfilled an unmet need</i></p> <p><i>Songwriting was fun</i></p> <p><i>Songwriting was challenging</i></p>
<p><i>Homework was useful</i></p>		

<p><i>Unsure about doing homework</i></p>	<p>Interviewer: You don't have to if you don't want to.</p> <p>P10: It's not that I don't want to.</p> <p>Interviewer: Was it watching the clips on the news? Or was it?</p> <p>P10: I can't remember. You know I probably didn't do my homework much.</p> <p>Interviewer: [Participant 10]</p> <p>P10: I'm a very naughty girl. I'm a teacher.</p> <p>Interviewer: Yes.</p> <p>P10: So, teachers are all naughty pupils. They have always been naughty pupils. And that's why they become teachers...naughty pupils because they want to sit on the...have the authority...</p> <p>Interviewer: Without doing the work. And just the final thing on this point. Which was the least useful out of these? You said the playing music and the singing...you enjoyed it but it wasn't sort of so much. The group memory exercise where you had to repeat back rhythms.</p>	<p><i>Difficulty with motivation to practice at home</i></p>
<p><i>Group memory exercise was useful</i></p>	<p>P10: Oh Yeah. That was very good. I enjoyed that and I thought that was very useful.</p> <p>Interviewer: So, maybe the homework exercises if you didn't do them.</p> <p>P10: I can't remember what they were. I honestly can't remember them.</p> <p>Interviewer: OK. Well, I'll move on to the next question. So, you had sixteen sessions of music therapy over the last four months and what do you think about the number of sessions that you received? So, was it just the right amount, would you have liked more or less?</p>	<p><i>Group memory exercise was useful</i></p>
<p><i>Wanted more sessions Need time to get used to it</i></p>	<p>P10: I think it would have been nice to have a few more because by the time we got the hang of it, it was almost already finished. I thought: "Oh. Well. Nevermind." Maybe we'll have it next time. Next time round I will try harder to be on the ball from the</p>	<p><i>Familiarity with treatment</i></p>

<p><i>Wanted more sessions More visual aids needed</i></p> <p><i>Excellent overall</i></p> <p><i>Need explanations of what she is doing and why she is doing it</i></p>	<p>beginning.</p> <p>Interviewer: From the beginning. It's gone very quickly, hasn't it.</p> <p>P10: Very fast.</p> <p>Interviewer: OK. And then the final question is how could the music therapy have been improved? Is there something that you would have wanted more of, something that you would have liked less.</p> <p>P10: Yes. I think it would have been nice to have more of it and maybe have a more visible structure to it so that one can...because I'm made like that. That's probably nothing to do with music therapy itself. I think because I'm made in this manner I like to have structure and I like to know the structure. So, maybe a little more time spent explaining the structure would have for me only made a difference. That doesn't mean the way it was done wasn't good. It was actually excellent. I enjoyed it thoroughly.</p> <p>Interviewer: But for you.</p> <p>P10: I am just a pain. I always like structure. I mean in the morning, for example, every morning now I have a white board on which I explain what my day is going to be about. So, I know exactly one minute to the next but that's maybe a professional...</p> <p>Interviewer: Throwback.</p> <p>P10: Throwback. Yeah. And I like to know where I am going, what I am doing and why I am doing it. So, that's what I am saying. It's not a criticism at all.</p> <p>Interviewer: Was there anything that you would have liked less of?</p> <p>P10: No. No. Everything was perfect. As I say maybe I would have liked more of, more structure.</p> <p>Interviewer: More structure and maybe a few more sessions.</p> <p>P10: Maybe because I am a virgo. I like structure. I am terrible.</p> <p>Interviewer: OK. That's it.</p>	<p><i>More needed</i></p> <p><i>More visual aids needed</i></p> <p><i>Excellent overall</i></p> <p><i>Need for explanations of the process and purpose of the task</i></p>
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	<p>P10: Thank you.</p> <p>Interviewer: Thank you.</p>	
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**APPENDIX 9**

**MASTER TABLES OF THEMES FROM THE IPA OF THE**

**SEMI-STRUCTURED INTERVIEWS**

Table A9.1: IPA of participant responses to question 1

Superordinate themes, themes, and sub-themes	Extract identifiers for each participant							
	1	2	3	6	7	8	9	10
<b>Cognition</b> Cognitive difficulties and needs <ul style="list-style-type: none"> <li>- <i>Cognitive deficits</i></li> <li>- <i>Loss of memory</i></li> <li>- <i>Impact on orientation</i></li> <li>- <i>Impact on daily living</i></li> <li>- <i>Impact on creativity</i></li> <li>- <i>Impact on engagement</i></li> </ul> Music therapy and cognitive rehabilitation <ul style="list-style-type: none"> <li>- <i>Stimulating creative thinking</i></li> <li>- <i>Improved learning capacity</i></li> <li>- <i>Improved memory</i></li> </ul>	1.14					2.1 1.9 2.14	1.31 3.4	1.24 2.18  2.1 2.23  3.1
<b>Communication</b> Communication difficulties and needs <ul style="list-style-type: none"> <li>- <i>Aphasia</i></li> <li>- <i>Dysarthria</i></li> <li>- <i>Dysphagia</i></li> <li>- <i>Difficulty with semantics</i></li> <li>- <i>A need for self-expression</i></li> </ul> Music therapy and communication rehabilitation <ul style="list-style-type: none"> <li>- <i>Satisfaction through non-verbal expression in music</i></li> <li>- <i>Reduced aphasia during musical tasks</i></li> </ul>	1.21 3.29 4.11  4.33 2.5 7.34	9.7 12.19  12.21 12.12	3.7		5.29			
<b>Emotional needs</b> Emotional problems and needs after ABI <ul style="list-style-type: none"> <li>- <i>Anger</i></li> <li>- <i>Anxiety</i></li> <li>- <i>Depressed</i></li> <li>- <i>Confusion</i></li> <li>- <i>Loneliness</i></li> <li>- <i>Powerlessness</i></li> <li>- <i>Shame</i></li> </ul> Music therapy and emotional problems and needs <ul style="list-style-type: none"> <li>- <i>Impact on anxiety and stress</i></li> <li>- <i>Emotional adjustment</i></li> </ul>	1.20 3.13	1.11 10.14	2.29	4.30  2.28		4.3  4.15 5.32	2.4 2.6	3.4

Superordinate themes, themes, and sub-themes	Extract identifiers for each participant							
	1	2	3	6	7	8	9	10
<b>Sense of self/self-evaluation</b>								
Loss of sense of self/self-evaluation								
- <i>Loss of sense of self</i>								1.21
- <i>Loss of self-worth</i>	2.24	1.28 6.30					1.6	
- <i>Need to recover former self</i>				1.7				1.14
- <i>Response to altered sense of self</i>				2.9		3.28		
- <i>Self-evaluation difficulties</i>	6.17		5.16					
Music therapy and sense of self/self evaluation								
- <i>Impact on self-awareness</i>			8.32					3.27
- <i>Self-evaluation during sessions</i>	7.13		8.24					
<b>Relationships</b>								
Relationship problems and needs								
- <i>Social isolation</i>	3.4	3.26						
- <i>Need for relationships</i>					1.3 1.24			
- <i>Need for support from others</i>			1.11 2.27 3.1			2.21		
- <i>Difficulty trusting others</i>						3.2		
Relationships in music therapy								
- <i>Developing relationships</i>				3.13				
- <i>Group support</i>	17.8			3.16		5.20		
- <i>Shared experiences</i>	7.27							
- <i>A therapeutic space for group discussion</i>	8.3							
- <i>Group discussion was beneficial</i>	8.5							
<b>Independence and quality of life</b>								
Loss of independence and quality of life								
- <i>Loss of independence</i>	2.18							
- <i>A need to be independent</i>				2.23	1.10			
- <i>A need to socialise independently</i>	2.28			2.17				
- <i>A need for freedom</i>	2.30			1.27	2.1			
- <i>Being dependent</i>		4.22		1.15	2.19			
Independence and quality of life in music therapy								
- <i>Independence</i>				5.27				



Table A9.2: IPA of participant responses to question 2

Superordinate themes, themes, and sub-themes	Extract identifiers for each participant							
	1	2	3	6	7	8	9	10
<b>General evaluation</b>								
Effectiveness of music therapy	9.10	5.1			6.22	5.17		2.37
Value of music therapy	17.13		17.30					4.4
Therapist was helpful	7.23	5.33 8.32						
<b>Homework exercises</b>								
Homework exercises were useful					5.11	8.11		
Homework exercises were least useful	10.8		11.12					
Difficulty remembering to practice	10.13							
Required self-motivation			11.15 12.10	6.19				6.6
Interests and motivation								
Dependence on others for practice	10.27	9.28						
<b>Playing musical instruments</b>								
Playing music was most useful	11.17							
Playing music was useful		6.16						
Playing music was least useful		10.8						
Playing music was enjoyable/fun				4.4				
Self-expression through playing music	11.23							
Impact on memory							4.6	
Musical ability								4.13
<b>Group attention exercise</b>								
Group attention exercise was useful	12.9							4.19
Group attention exercise was least useful					4.18			
Group attention exercise was enjoyable/fun		6.3		3.28 5.7				
Group attention exercise was challenging						7.20		
<b>Group memory exercise</b>								
Group memory exercise was most useful					4.10			
Group memory exercise was useful	12.11	8.17		5.17	4.1			6.21
Group memory exercise was enjoyable/fun		6.7		3.32				
Group memory exercise was challenging		7.17						
Impact on memory					4.12			
<b>Group discussion</b>								
Group discussion was most useful		6.20						
Group discussion was useful	8.5 13.16	5.33	10.33 13.33	4.16	3.34	7.27		3.37
A therapeutic space	7.35	6.27						4.2 4.37
Shared experiences, thoughts and understanding	7.27		13.34					
Supporting each other					5.16			
<b>Singing the original song</b>								
Singing was useful	13.13	6.16						
Singing was essential		13.28						
Singing was least useful			12.21					
Singing was fun								
Singing was challenging		13.21			5.32			4.15
Anxiety about singing			12.21		6.1			

Superordinate themes, themes, and <i>sub-themes</i>	Extract identifiers for each participant							
	1	2	3	6	7	8	9	10
<b>Songwriting</b> Songwriting was most useful Songwriting was useful Songwriting was enjoyable/fun Self-expression and reflection Sequencing and planning Supporting and valuing each other Songwriting was challenging Impact on memory		7.20	10.16		5.29	7.5		5.13
		7.30	10.19 10.20	4.10	6.4			
	14.5	8.2						5.13
							4.18 5.7	

Table A9.3: IPA of participant responses to question 3

Superordinate themes, themes, and <i>sub-themes</i>	Extract identifiers for each participant							
	1	2	3	6	7	8	9	10
<b>Satisfaction of length of treatment</b> Satisfied More needed Minimum length 6 months	16.5	11.12	14.25	6.34	6.20	8.22		7.10
		11.21	15.4					
<b>Factors influencing length of treatment</b> Timing and fatigue Need for a break Familiarity with treatment Relationships Anxiety Absence	15.6 15.2	11.16 11.16 11.24 11.17	14.25 14.30 14.36					6.34

Table A9.4: IPA of participant responses to question 4

Superordinate themes, themes, and sub-themes	Extract identifiers for each participant							
	1	2	3	6	7	8	9	10
<b>General Comments</b>								
Could not be improved	16.30				7.3	9.7		
Excellent overall								7.18
<b>Support</b>								
Visual support								
- <i>Visual aids as prompts</i>			16.28					
- <i>Visual aids for orientation</i>			17.1					7.11
- <i>Different learning styles</i>			17.14					7.13
Guidance with tasks								
- <i>Explanations</i>								7.21
- <i>Consolidation and planning</i>			15.22					
- <i>Chunking when rehearsing lyrics</i>			16.32					
<b>Personal preferences</b>								
Flexibility			16.1					
Variety of instruments		12.28						
Familiar songs				7.1				
Individual music preferences		13.6						
Music listening to escape		14.7						

# APPENDIX 10

## SONG TRANSCRIPTS

### Song 1: Life in our shoes

Life in our shoes  
Is hard to explain  
Everything seems  
Difficult to do  
There are so many  
Kinds of pain  
We'll get by  
We still have you

Brain never stops  
Liquid won't settle  
Machine in your head  
Constantly running  
We were lost  
We were scared  
Hard to come to terms  
With this new life  
We were weary  
Disconnected  
Something was wrong  
They looked at me funny  
Funny

Life in our shoes  
Is hard to explain  
Everything seems  
Difficult to do  
There are so many  
Kinds of pain  
We'll get by  
We still have you

Looking for help  
Felt alone  
Where to start  
Point the way  
Lost in a grey world  
Didn't fit anywhere  
Couldn't find  
The light  
We were frustrated,  
We were angry  
And frightened  
Frightened

Life in our shoes  
Is hard to explain  
Everything seems  
Difficult to do  
There are so many  
Kinds of pain  
We'll get by  
We still have you

And then  
We found headway  
A team with warmth  
And understanding  
No explanation needed  
At last we know  
That we fit  
We fit somewhere

With true friends  
We are comfortable  
In our own shoes  
Sometimes we cry  
And sometimes we laugh together  
There is love in our shoes  
There is life in our shoes  
At headway  
There is light

Life in our shoes  
Is hard to explain  
Everything seems  
Difficult to do  
There are so many  
Kinds of pain  
We'll get by  
We still have you

Life in our shoes  
Is hard to explain  
Everything seems  
Difficult to do  
There are so many  
Kinds of pain  
We'll get by  
We still have you

## Song 2: Our Time

### Dis-connected

What on Earth has happened to me?  
Where is the old me?  
I feel lost, bewildered and so alone.

Loneliness and inability

Who is going to help me?  
I am a child  
Being told what to do and how to behave.

Loneliness and inability

Most days I start to slip down this slippery slope of depression and have to try to crawl  
back up as best I can.  
Not in control of my life.  
It is a play of which I am not a protagonist.  
It happens around me.

Loneliness and inability

How can I get back to being a protagonist?  
You don't know what you've got until it's gone.

Loneliness and inability

### Connected

At last I find happiness  
And that ever-elusive hope.  
I feel more connected  
A real person, and not just a case.

Taking it easy  
Not doing things with haste,  
But join in with others  
And get more things right.

That way, we can unite.  
For sure a good purpose  
To feel more connected,  
And in no way you are objected.

Not just a good purpose  
Unto Heaven but here on Earth too.  
You don't have to apologise,  
You are doing well like others here do.

## APPENDIX 11

### THEMATIC ANALYSIS OF SONG TRANSCRIPTS

#### Song 1: Life in our shoes

Data extract	Coding	Potential themes
<u>Title: Life in our shoes</u>	Telling <i>their</i> story; the need to be understood	Need to communicate thoughts and feelings to others
<Chorus>		
Life in our shoes Is hard to explain	Personal experience of ABI survivors is not understood	Need to communicate thoughts and feelings to others
Everything seems Difficult to do	Loss of ability; acquired disability	Loss of ability
There are so many Kinds of pain	Overwhelming loss and suffering in a multitude of ways	Loss
We'll get by We still have you	Need for social support	Need for support: social
<Verse 1>		
Brain never stops	Continuous anxiety	Negative mood state
Liquid won't settle	Continuous state of unrest	Fatigue
Machine in your head	Disintegration of mind and body; loss of control, awareness, and sense of self	Disintegration of self
Constantly running	Continuous state of unrest	Fatigue
We were lost	Disorientation	Disorientation
We were scared	Fear	Negative mood state

Hard to come to terms With this new life	Difficulty with emotional adjustment	Difficulty coping
We were weary	Fatigue	Fatigue
Disconnected	Social isolation	Social isolation
Something was wrong	Limited self awareness	Limited self awareness
They looked at me funny Funny	Reliant on responses of others to evaluate functioning	Limited self awareness
<Chorus>		
<Verse 2>		
Looking for help	Need for support	Need for support
Felt alone	Social isolation	Social isolation
Where to start	Overwhelmed by challenges	Problems
Point the way	Need for guidance	Need for support: information
Lost in a grey world	Surrounded by uncertainty	Confusion
Didn't fit anywhere	Lack of sense of belonging	Lack of sense of belonging
Couldn't find The light	Difficulty in finding help	Hard to find support
We were frustrated, We were angry And frightened Frightened	Frustrated, angry, fear (negative mood states)	Negative mood state
<Chorus>		
<Verse 3>		
And then We found headway	Help available	Support available
A team with warmth And understanding	Importance of feeling cared for	Supportive relationships



No explanation needed	Being understood	Being understood
At last we know That we fit We fit somewhere	Regaining a sense of self and belonging	Regaining a sense of belonging
<Verse 4>		
With true friends We are comfortable In our own shoes	Finding value in friendship and support to adjust emotionally	Supportive relationships
Sometimes we cry And sometimes we laugh together	Importance of sharing a range of different emotions in a group	Shared experiences, feelings, and thoughts
There is love in our shoes	Realisation of the capacity to maintain relationships	Maintaining relationships
There is life in our shoes	Realisation of the capacity to live with ABI	Positive mental state
At headway There is light	Through support it is possible to overcome the challenges presented by brain injury	Coping with changes through support
<Chorus>		
<Chorus> end		

The lyrics are structured into a chorus and four verses. The chorus provides a message combining the difficulties and losses of ABI with a positive comment on the value of group support to manage them. Each verse describes the process of coping with the challenges of ABI in a chronological sequence consisting of the experience of acquiring brain injury (Verse 1), looking for support (Verse 2), finding support (Verse 3), and achieving emotional adjustment through relationships (Verse 4).

Song 2: Our time

Data extract	Coded for	Potential themes	
<u>Title: Our time</u>	Communicating the value of, and need for, ownership and independence	Independence and ownership	
Part 1			
<Disconnected>	Disintegration of self into parts, social isolation	Disintegration of self	Social isolation
What on earth has happened to me?	Feeling confused and traumatised	Confusion	
Where is the old me?	Loss of identity	Loss of identity	
I feel lost, bewildered and so alone.	Feeling disorientated, confused, and isolated	Disorientation	
Loneliness and inability	Leitmotif: Feelings of isolation and being disabled	Social isolation	Loss of ability
Who is going to help me?	A cry for help	Hard to find support	
I am a child;	Seeing themselves as helpless and needing support in many areas of their lives	Helplessness	
Being told what to do and how to behave.	Lack of sense of agency, control, independence; needing others to help regulate behaviour appropriately	Helplessness	
Loneliness and inability	Leitmotif: Feelings of isolation and being disabled	Social isolation	Loss of ability
Most days I start to slip down this slippery slope of depression	Continuous state of depression	Negative mood state	


And have to try to crawl back up as best I can.	Continuous struggle to cope with negative mood states	Difficulty coping	
Not in control of my life.	Lack of sense of agency	Helplessness	
It is a play of which I am not a protagonist.	Lack of self-worth, value in one's own life	Helplessness	
It happens around me.	Events occur beyond individuals' control; disconnected from life's events	Helplessness	
Loneliness and inability	Leitmotif: Feelings of isolation and being disabled	Social isolation	Loss of ability
How can I get back to being a protagonist?	Need to feel valued, gain self-esteem, and sense of agency	Helplessness	
You don't know what you've got until it's gone.	Loss in many areas of life and functioning	Loss	
Loneliness and inability	Leitmotif: Feelings of isolation and being disabled	Social isolation	Loss of ability
Part 2			
<Connected>	Sense of whole self; social inclusion	Reintegration of self	Social inclusion
At last I find happiness	Improved mood state; reduced anxiety and depression	Improved mood state	
And that ever-elusive hope.	Overcoming depression	Improved mood state	
I feel more connected	Gaining a feeling of belonging; more secure sense of self	Reintegration of self	
A real person and not just	Feeling valued; improved	Reintegration of self	

a case.	self-esteem	
Taking it easy	More relaxed	Coping better
Not doing things with haste,	Lower anxiety in tasks	Coping better
But join in with others	Belonging to a group; social inclusion	Regaining a sense of belonging
And get more things right.	Perceiving gains and successes	Perceived benefits
That way, we can unite.	Support through being part of a group	Mutual support
For sure a good purpose	Perceived benefits through the group	Perceived benefits
To feel more connected,	Sense of social inclusion and belonging	Regaining a sense of belonging
And in no way you are objected.	Acceptance by others; not being judged; development of trust	Being understood
Not just a good purpose Unto heaven but here on earth too.	A realistic and achievable goal	Perceived benefits
You don't have to apologise,	Being understood and not having to feel shame	Being understood
You are doing well like others here do.	Mutual support; finding others with similar difficulties; peer group support	Mutual support

The structure of the song is in two parts: social isolation (Verse 1) and belonging (Verse 2). These are two ways of relating to others, and the feelings associated with them, that describe the experience of ABI.

# APPENDIX 12

## ETHICAL APPROVAL



**Anglia Ruskin University**  
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26 May 2010

Dear Jonathan

*Project Number: RESC045*  
*Project Title: Time-Limited Music Therapy to Address Functional Gains and Emotional Needs of People with Acquired Brain Injury*  
*Principal Investigator: Jonathan Pool*


Thank you for supplying revisions to your ethics application in consultation with your Sponsor Julie Scott.

The Chair of Research Ethics Sub-Committee (RESC), acting on behalf of the Committee, has now agreed to grant ethical approval for your research. Under the terms of Anglia Ruskin University's *Policy and Code of Practice for the Conduct of Research with Human Participants* approval is for a period of three years from 26 May 2010.


It is your responsibility to ensure that you comply with Anglia Ruskin University's Policy and Code of Practice for Research with Human Participants and specifically:

- The procedure for submitting substantial amendments to the committee, should there be any changes to your research. You cannot implement these changes until you have received approval from RESC for them.
- The procedure for reporting adverse events and incidents.
- The Data Protection Act (1998) and any other legislation relevant to your research. You must also ensure that you are aware of any emerging legislation relating to your research and make any changes to your study (which you will need to obtain ethical approval for) to comply with this.
- Obtaining any further ethical approval required from the organisation or country (if not carrying out research in the UK) where you will be carrying the research out. Please ensure that you send the RESC Secretary copies of this documentation.
- Any laws of the country where you are carrying the research out (if these conflict with any aspects of the ethical approval given, please notify RESC prior to starting the research).
- Any professional codes of conduct relating to research or research or requirements from your funding body (please note that for externally funded research, a project risk assessment must have been carried out prior to starting the research).
- Notifying the RESC Secretary when your study has ended.

Information about the above can be obtained on our website at:



INVESTOR IN PEOPLE



POSITIVE ABOUT  
DISABLED PEOPLE



<http://web.anglia.ac.uk/anet/rdcs/ethics/index.phtml>

Please also note that your research may be subject to random monitoring by the committee.

Please be advised that, if your research has not been completed within three years, you will need to apply to our Research Ethics Sub-Committee for an extension of ethics approval prior to the date your approval expires. The procedure for this can also be found on the above website.

Should you have any queries, please do not hesitate to contact me. May I wish you the best of luck with your research.

Yours sincerely



Beverley Pascoe  
Executive Secretary, Research Ethics Sub-Committee

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cc Julie Scott  
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Prof Tony Wigram  
Lorraine Shotliff  
Helen Jones