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Hooper, Jeff

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**THE DEVELOPMENT OF CRITERIA FOR DEFINING SEDATIVE MUSIC,
AND ITS IMPACT ON ADULTS WITH MILD, MODERATE,
AND SEVERE INTELLECTUAL DISABILITY
AND CHALLENGING BEHAVIOUR**

By Jeff Hooper

**A thesis submitted in fulfilment of the requirements for the degree of PhD at
Aalborg University**

**Declaration: This thesis, in part or in its entirety, has not previously been
submitted for assessment with a view to being awarded a degree or prize at any
institution of higher education in Denmark or abroad.**

Signed:

Date:

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I am indebted to all those who participated in the six experiments that are reported in this thesis.

Finally, I want to thank Kathryn, my wife, for patiently supporting and encouraging me throughout my research journey.

ABSTRACT

A person with an intellectual disability is limited intellectually, and s/he experiences differing degrees of cognitive, language, motor and social impairments. Intellectual disability is also associated with unusual behaviours: aggression, destructiveness, self-injury and stereotyped mannerisms. Currently they are collectively known as 'challenging' behaviour. The intellectual disability population is also pre-disposed towards mental illness, and therefore, challenging behaviour may also be driven by maladaptive ways of dealing with anxiety.

This thesis discusses characteristics of challenging behaviour, and current interventions linked both to a clinician's view of the aetiology of challenging behaviour, and the theoretical approach s/he adopts when attempting to understand human behaviour. Psychodynamic, behaviourist, cognitive, humanistic and psychopharmacological interventions are reviewed; and, although there is evidence supporting the efficacy of each intervention, arguments are presented for the use of background music as an alternative cost-effective and labour free intervention.

Current and previous literature on music and intellectual disability is reviewed, and it distinguishes between an active and a receptive approach. There is discussion of receptive research that uses background music as a contingent, contingent interrupted and non-contingent stimulus. The non-contingent stimulus section not only draws attention to the paucity of research completed with the intellectual disability population using this type of intervention, it also reaches the conclusion that great care needs to be taken selecting an appropriate stimulus.

A tool was devised (Predictable Factors in Sedative Music (PFSM)) to determine the most appropriate stimulus. The PFSM was developed after a literature review (Review of the sedative music literature (1996-2008)) demonstrated that research teams had not based their choice of sedative music on specific and consistent statements about a complete range of musical factors. The PFSM quantifies sedative music by categorising six different musical factors as either predictable or unpredictable (one factor (melody) is divided into five subsections).

There are six experiments in this thesis. Experiments 1 and 2 validate the PFSM. Experiments 3 and 4 choose sedative music for clinical research with adults from the intellectual disability population. Finally, experiments 5 and 6 use the

sedative stimulus defined by the PFSM. Experiment 5 (a Chief Scientists Office (CSO) funded pilot study) has three dependent measures and a staff questionnaire. It tests the hypothesis that sedative music will help alleviate mealtime stress, affect the disruptive behaviours displayed by adults with an intellectual disability during this daily care activity, and address nutritional problems by increasing the amount of food they consume. Experiment 6 (the main investigation) has one dependent measure (a behaviour inventory). It delivers the sedative stimulus via an MP3 player and tests a single hypothesis; namely, that sedative music will help alleviate mealtime stress, and affect the disruptive mealtime behaviours of adults with an intellectual disability.

The outcomes of the studies in this thesis are discussed with respect to previous literature and the potential clinical applicability of the findings. The limitations of the various experiments are identified, along with the clinical relevance of the PFSM, and the value of a dichotomous, pictorial, instrument devised for experiment 4. This thesis will inform those caring for the intellectual disability population, those practising music therapy, and those wishing to develop and pursue new areas of research.

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Chapter 1

Introduction

“The primary mission of music therapy is to help clients to achieve health through music. To limit the goals of music therapy practice to either overt or covert goals, physical or social realities, or objective or subjective phenomena is essentially a violation of the rights of our clients to comprehensive treatment, and thus to complete health. Similarly, to conceive music, the essence of our practice, only in terms of its quantifiable and observable facets, or only in terms of its ineffable qualities, is largely to miss the point of using it for therapeutic purposes. We must be prepared to use all facets of music to the advantage of the client” (Bruscia, 1995, pp. 72-73).

1.1 Problem formulation

The literature is replete with investigations that examine how participants are affected by music, and the review of sedative music literature (1996-2008) that follows in chapter 5 of this thesis is just a fraction of the work carried out in this field. One of the first requirements of any investigation that uses music in this way is to arrive at a selection suited to the individual, their situation and the purpose it is to be used for, and it falls on the investigator to determine the most appropriate stimulus. The studies in this thesis originate from the intention to base that choice on three things.

First, it is based on a better understanding of how people experience and understand music as having a sedative or stimulative effect. Second, it examines how research can be better informed with a reliable tool to define the intended effect of music. Third, the issue of choice has become increasingly critical in research involving music. Preference can play a crucial role determining how people are effected by music, and favourite music is often more influential. The studies in this thesis meet the challenge to balance this factor with the awareness, drawn from long clinical experience with adults with intellectual disability, that they often cannot make choices, and they also have to cope with environmental stimuli they appear to find difficult and intrusive.

Therefore, the main problem formulation for this thesis is to examine how the effect of music can be defined and applied as sedative or stimulatory, and to investigate how a tool can be developed by testing both clinical and non-clinical participants to find common factors in stimulatory and sedative music. The second area of enquiry concerns the applied use of sedative music with a population of people who have intellectual disability. It considers the wide range of existing research on that population, together with research into the use of music and music therapy. The empirical part of this part of the thesis needs to find an ethical situation in which people with intellectual disability are already subject to a stressful environment for which the application of sedative music can alleviate anxiety and distress.

1.2 Personal motivation

During postgraduate training I was struck by the way music therapy changed behaviour. On my first placement in a large psychiatric hospital I noted how people

often became more relaxed and less agitated as they listened to music. At the time, I wrote this about Mark.

“Mark was on an admission ward, he was about twenty-years-old and amazingly tense – like a coiled spring in fact. Nevertheless, it was encouraging to see him relax as the therapist played Bach’s ‘Jesu Joy of Man’s Desiring’ on the piano. His hands, that had been rigid, curved naturally. All the tension left his face and with his eyes closed he moved from side to side in time with the music”.

Subsequent training placements found me in a special needs school, and a large institution for mentally handicapped adults (St. Lawrences). On each occasion I became aware that music engaged withdrawn and unmotivated people. I also became aware that both singing and playing an instrument provided ways of developing non-musical skills that enhanced social, communicative and physical abilities. At the time, I wrote this about Christine.

“Christine had been a patient in St. Lawrences for over twenty years, and lacking stimulation from and effect on her environment she had become unmotivated and withdrawn. In music therapy I found that she responded to nursery songs and sang with me as I played on the piano. She had suffered a road traffic accident at six years of age which accounted for this response. It was interesting to observe how her behaviour changed when given a microphone to increase the volume of the sound she produced. Suddenly aware that she was having some affect and success in this situation a volte-face occurred – she became very motivated and less withdrawn”.

My final essay as a student “Music Therapy: A behavioural science” gave expression to these emerging impressions, and placed me on the road to quantitative research. “Music and the musical environment” I contended “exercises a strong influence over the human organism, and consequently over behaviour”. The emphasis in psychology, medicine and the behavioural sciences is on outcome measures that can be quantified (Bunt & Hoskyns, 2002).

However, that afternoon with Mark made the greatest impression. I was convinced that receptive, listening, music therapy was a valuable intervention. I wanted to examine the impact it had on my clients.

1.3 Clinical setting

In my job as a music therapist I work with adults who have an intellectual disability. During the twenty-five years I have spent in this post they have moved from institutional to community-based living. However, their care has remained in the hands of the medical and nursing professions who work within the medical model. These professions tackle difficult behaviours by looking for social or physical causes. They are reluctant to explore and address possible underlying emotional issues. Although I appreciated that there was a psychoanalytical component to music therapy with this client group, I was happy to work and undertake research within the boundaries of that model, and to do this by using quantitative methodology. I was conscious that the close and spontaneous relationship I shared with the clients who would become research subjects indicated a qualitative approach to research. However, it was a consideration that was more than outweighed by my growing awareness of the informational needs of my nursing and medical colleagues.

In the early days of my music therapy practice, I was frequently asked by nursing staff “Did s/he behave today?” By implication it meant ... was s/he motivated to play today, as s/he has been very withdrawn all day? Or, did s/he remain calm and able to concentrate on making music, as s/he was aggressive and hyperactive before your session? The nursing and medical staff were apparently not so interested in the details of a client’s musical response; the moments when s/he had perhaps introduced a new rhythm to an improvisation or begun to vocalise. They wanted evidence that music therapy was influencing behaviour. They wanted evidence that music therapy was making a positive contribution outside the confines of the music therapy room. This situation remains unchanged. The climate of Evidence Based Practice is still placing a strong external pressure on clinicians to evaluate the impact and effect of their interventions. They are being asked to show that these interventions are up-to-date, appropriate and clinically effective. A carefully planned and executed qualitative investigation could also provide that type of information, but an introduction to single-participant design, and a practical personality that was ill at ease with visualisation and anything intangible and esoteric, pushed me firmly towards quantitative methodology.

It is against this background that I formulated research questions and devised experiments to test those suppositions. I have already, as Bruscia suggested, used all facets of music with the intellectual disability population. I have looked at the impact

of an active playing approach (Hooper, 1991, 1993, 2001b, 2002b; Hooper & Lindsay, 1991; Hooper, Lindsay, & Richardson, 1991; Hooper, McManus, & McIntyre, 2004), and at the use of receptive, listening, interventions (Hooper, 2001a, 2002a; Hooper & Lindsay, 1990, 1997) (some of these investigations are discussed in chapter 4). In this thesis I recall Mark's reaction as he listened to the piano and examine receptive music therapy.

1.4 The purpose of the thesis

I had already examined how one receptive intervention, Vibroacoustic Therapy (VAT), affected two people with an intellectual disability (Hooper & Lindsay, 1997) (VAT is explained in chapter 4, section 4.4), and I began this thesis with the belief that researchers who used sedative music, another receptive intervention, often overlooked careful selection of that stimulus. Furthermore, I thought that music therapists working with the intellectual disability population rarely evaluated the impact they had on people out with the treatment room. Both suppositions were confirmed by separate cursory literature reviews, (the thesis reports the detailed searches that followed), and consequently the purpose of this thesis is two-fold:

1. To devise a way of selecting sedative music that pays due attention to the form, tempo, volume, texture, melodic content and harmony of music.
2. To take music therapy out of the treatment room, and look at how a receptive intervention, determined by the new sedative music criteria, affects the intellectual disability population in an everyday situation.

A tool was developed in this thesis to select sedative music in a way that took account of all the principal factors of a musical composition. The theoretical basis for that tool is outlined in chapter 5. The tool itself is also presented in chapter 5 and it is evaluated in chapter 6. The background to the everyday situation chosen for this thesis (mealtimes), and the research questions generated by the two investigations that pursued the second line of enquiry are presented in detail in chapter 7 (sections 7.3.1 and 7.4). The other constituent parts of this thesis are summarised in the overview that follows (1.6).

1.5 The qualitative/quantitative debate

Two books, *A Comprehensive Guide to Music Therapy* (Wigram, Pedersen, & Bonde, 2002) and the *Handbook of Music Therapy* (Bunt & Hoskyns, 2002) were published to coincide with the World Music Therapy Congress in 2002. The latter described how music therapy research was developing and highlighted the on-going qualitative/quantitative debate. Bunt & Hoskyns (2002) observed that the number of qualitatively based investigations was making up ground on quantitative research; nevertheless, they commented on this turn of events by suggesting “there is room in music therapy for a wide variety of research approaches” (p. 270).

Other practitioners share this opinion. They also believe that there is a place for each paradigm, the quantitative and the qualitative, within music therapy research. *A Comprehensive Guide to Music Therapy* (pp. 224-225) poses two questions that powerfully illustrate how both methods are essential for the future understanding of music therapy.

- 1) What is the point of producing a study which shows that an intervention is effective if you can't explain how to administer the intervention or what components or elements there are within the intervention that cause it to be effective? It is like administering a medication without listing the chemical properties of the pills involved.
- 2) Likewise, what is the point of exploring, defining and describing a process of therapy in great detail if there is no analysis of the outcome of that intervention? This can be likened to saying, ‘This is a way of doing music therapy...but there is no guarantee it will work!’

Furthermore, following on from the passage quoted at the start of this chapter, Bruscia (1995) describes the two paradigms as “not two ends or directions on the same road ... (but as) different roads altogether” (p. 73). He goes on to suggest that “one road is not better than the other, it all depends where one is going and how one wants to get there” (p. 73).

A variety of factors usually combine to determine the ‘road’ a researcher decides to take and the research strategy s/he pursues. *The Handbook of Music Therapy* offers a list that includes the personal motivation of the therapist, the clinical

setting and the purpose of the research, and clearly the background to this thesis is no different.

1.6 Overview of thesis

Chapter 2 introduces the concepts of intellectual disability, challenging behaviour and mental illness. It gives a clinical definition of intellectual disability. It describes the incidence, natural history and complex aetiology of challenging behaviour. It presents evidence of biological (an association with specific syndromes), physiological (pain, discomfort, sensory impairment), psychological (frustration of the need for self expression, and self-esteem) and social factors (rejection, isolation) that can combine to cause challenging behaviour. Furthermore, chapter 2 argues that because an additional co-morbid mental illness may also be present, challenging behaviour is often driven by maladaptive ways of dealing with anxiety, as much as by underlying pathology.

Chapter 3 looks at different ways of managing challenging behaviour. It examines the theoretical basis behind five approaches, and the interventions associated with each approach (identified in parenthesis): psychodynamic (psychotherapy), behaviourist (reinforcement schedules), cognitive (cognitive behaviour therapy), humanistic (gentle teaching) and psychopharmacological (anti-psychotics, anti-depressants, hypnotics and anti-manics). Chapter 3 evaluates each intervention. It concludes that none is 100% effective, and suggests that there appears to be room for a low-tech, easily used alternative: something that makes few cognitive demands and does not have harmful side effects.

Chapter 4 is a wide-ranging review of music and intellectual disability literature (1943-2008). It looks at descriptive, philosophical and experimental published material. While the review describes the positive social, cognitive, physical, emotional and psychological outcomes of engaging people with an intellectual disability in music therapy, it demonstrates that researchers are reluctant to consider whether music therapy exerts an influence in areas of daily life away from the treatment room. Consequently, although a handful of experimental studies have looked at how music therapy affects challenging behaviour, the investigations carried out with the intellectual disability population in chapter 7 of this thesis are unique. Furthermore, chapter 4 suggests that non-contingent sedative music (hereafter referred to as sedative music) is an undemanding and 'safe' intervention that can be added to

established ways of dealing with challenging behaviour, and it identifies the ethical issues that need to be considered when such a stimulus is introduced to the intellectual disability population. The participants in this thesis cannot choose the music they prefer, and chapter 4 suggests that careful attention ought to be paid to the selection of appropriate music.

Chapter 5 begins by discussing three disciplines from within the field of musicology: music psychology, ethnomusicology and sociology of music. A tool is being devised to assist the selection of appropriate sedative music, and chapter 5 highlights aspects of the musicology literature that relate to the development of that tool. This is followed by a review of research, published between 1996 and 2008, in which sedative music was used. It demonstrates that individual researchers or research teams often disregard scientific expectations and practices when they report the choice of music, and when they outline the criteria and degree of consensus they use to select sedative music for their investigations. Chapter 5 makes a case for devising a tool that provides a very specific set of criteria for choosing sedative music. Chapter 5 concludes by introducing that tool (Predictable Factors in Sedative Music (PFSM)), by describing how it was devised, and by demonstrating how it might be used to identify an appropriate selection of music.

Chapter 6 reports the results from four connected experimental studies. The first two experiments evaluate and confirm the intrinsic validity of the PFSM (i.e. it evaluates the designated trait). Experiments 3 and 4 use 272 people to select an appropriate sedative stimulus (224 without and intellectual disability (experiment 3) and 48 with an intellectual disability (experiment 4)).

There is experimental work in chapter 7 with adults who have an intellectual disability, and this work puts into practice the outcomes of experiments in chapter 6 which defined and provided selection criteria for sedative music. The choice of music generated by the PFSM, and verified in experiments 3 and 4 by 272 people, is used in a Chief Scientists Office (CSO) funded pilot study (experiment 5) and the main study (experiment 6). Both experiments examine whether background sedative music affects the disruptive mealtime behaviours of adults with an intellectual disability. Chapter 8 discusses the main findings of all the experiments, identifies limitations and considers the clinical relevance of the PFSM. It also makes suggestions for future research, and concludes with a comment for music therapists working with the intellectual disability population.

This thesis represents a long journey for me, as I was employed full-time in a large institution for people with Intellectual and Developmental Disability at the same time as undertaking this research training. I began the PhD journey as a registered student in the Department of Healthcare Sciences at Abertay University, Dundee in 2002, and in 2003 I was transferred to the Department of Psychology. Finally, in 2009, I transferred for the final writing up stage to Aalborg University.

I have had a succession of supervisors, who have seen the requirement for the content of the thesis from different perspectives. Certainly, the demands of the psychology department called for a more detailed explanation of the population under investigation, and for basic information about the intervention of music therapy not normally found in a music therapy doctoral thesis. The lengthy literature reviews and reviews of challenging behaviour in chapters 2 and 3, as well as the review of music and music therapy in chapter 4, are therefore more comprehensive than they might have been if this was a more focused music therapy doctoral thesis.

This level of reporting is something I neither regret doing nor apologise for. It provides some very necessary contexts and detailed background information about the intellectual disability population. Furthermore, a review of receptive methods was valuable for me and extremely pertinent to this thesis. It has identified and explicated issues relating to current and previous investigations, and placed the empirical work documented in this thesis within an ongoing chain of research. These comprehensive reviews also provide a wealth of cited and referenced research studies, reviews and clinical reports which offer an extensive bibliography of over forty pages.

Throughout the process, Professor Tony Wigram has been involved as a consultant, and in this final phase as a supervisor. We did discuss whether or not to modify the thesis in any way; in particular, cutting what may be superfluous material for a music therapy thesis. We decided to leave the content as it stands, and to provide this explanation that the final thesis reflects a multi-disciplinary perspective of the health science, nursing, psychology and music therapy doctoral research departments from which the content and empirical approach has derived.

Two compact discs accompany this thesis. They contain pieces of music from experiment 1 (Experiment 1: Music Selections), and from experiment 2 and experiment 3 (Compact Disc 1). The referencing in this thesis follows a summary of guidelines from the sixth edition of the American Psychological Association (2009) available at <http://owl.english.purdue.edu/owl/resource/560/03/>.

Chapter 2

Intellectual disability, challenging behaviour and mental illness

"Over 1,000,000 people across Europe, North America and Australasia have a severe intellectual disability and also show additional problematic or challenging behaviours. These include such behaviours as aggression, self-injury, destructiveness, over-activity, inappropriate social or sexual conduct, bizarre mannerisms and eating of inappropriate objects. The combination of intellectual and behavioural disabilities can blight the lives of those affected and place the health, safety and welfare of those who cared for them in jeopardy. They also represent a significant challenge to agencies involved in the purchase or provision of education, health and welfare services" (Emerson, 2001, p. 1).

2.1 Introduction

This thesis addresses the needs of a specific population. In order to contextualise it and establish its clinical relevance, this chapter will provide current definitions of both the clinical sub-group who will participate in the main investigations, and the wider clinical population they belong to. It will focus on the diagnostic criteria of the wider clinical population (people with an intellectual disability), and will then examine the prevalence and natural history of the clinical sub-group (people with an intellectual disability who display challenging behaviour). When it goes on to discuss the aetiology of challenging behaviour, it will pay special attention to a possible overlay of mental illness. The chapter commences by outlining reasons for selecting the term ‘intellectual disability’ to refer to the wider clinical population under study.

2.2 Intellectual disability

2.2.1 Background

In 1996, Stephen Dorrell, the then Secretary of State for Health spoke to Mencap, and England replaced the term ‘mental handicap’ with ‘learning disability’. (Mencap is the UK’s leading ‘learning disability’ charity). The term ‘learning disability’ is now widely used throughout the UK in health and social care settings. However, many people with a ‘learning disability’ would rather be referred to as having ‘learning difficulties’ (National electronic Library for Health, 2003), and this has led to some confusion: in education legislation, ‘learning difficulty’ denotes a specific education problem (e.g. dyslexia), or a disability that prevents access to education facilities (UK Parliament, 2000). In the UK, the confusion over terminology is further compounded by people with a learning disability being described as ‘defective’ within the Criminal Justice System, and ‘mentally impaired’ in mental health legislation and the Benefits System (Northfield, 2004).

Outside the UK, in the United States people with a learning disability are referred to as having a ‘developmental disability’ (learning disability and learning difficulty are both used to denote specific education problems), and the stigmatising term ‘mental retardation’ still persists in the definition and classification of the condition. Australasia, on the other hand, has adopted ‘intellectual disability’; it is the term used by the World Health Organisation (WHO) (McConkey, 2003).

This thesis will use Australasian terminology to refer to the wider clinical population under study. It reflects the emergence of intellectual disability as the preferred terminology within the international scientific community. It will avoid the uncertainty that arises when some terms (e.g. learning disability) have very different meanings in different countries, and it will eschew others (e.g. mental handicap, mental retardation) that have disparaging connotations. The reader should regard intellectual disability as synonymous with the UK term learning disability, and with mental retardation in the US.

2.2.2 Clinical definition of intellectual disability

There are three commonly used clinical definitions of intellectual disability. These are provided by the WHO in the International Classification of Diseases (ICD), the American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Disorders (DSM), and by the American Association on Mental Retardation (AAMR). Table 1 outlines the diagnostic criteria set forward by each in ICD10 (World Health Organisation, 1992), DSM-IV-TR (American Psychiatric Association, 2000), and the 10th edition of AAMR's manual (American Association on Mental Retardation [AAMR], 2002).

Table 1: Diagnostic criteria for intellectual disability

	ICD10	DSM-IV-TR	AAMR (10 th edition)
A condition characterised by...	“arrested or incomplete development of the mind”	“significantly sub-average intellectual functioning”	“significant limitations in intellectual functioning”
with concurrent impairment ...	of cognitive, language, motor and social skills	in 2 of 11 listed areas of adaptive functioning ¹	“in conceptual, social and practical adaptive skills”
Onset	“during the developmental period”	“before age 18 years”	“before age 18”
Associated Conditions	“with or without ... mental or physical”		
Type of assessment	Statistical	Statistical	Functional
Assessment tool	IQ test social adaptation scales	IQ test	Supports Intensity Scale (SIS)
Degrees of intellectual disability	Mild: IQ 50-69 Moderate: IQ 35-49 Severe: IQ 20-34 Profound: IQ under 20	Mild: IQ 50-55 to 70 Moderate: IQ 35-40 to 50-55 Severe: IQ 20-25 to 35-40 Profound: IQ under 20 or 25	Level of support: - intermittent - limited - extensive - pervasive

¹communication, self-care, home living, social/interpersonal skills, use of community services, self-direction, functional academic skills, work, leisure, health, safety.

The first three rows in table 1 show the key elements of the condition. First, people with an intellectual disability are limited intellectually; this means they have difficulty understanding, learning and remembering new things, and they have problems generalising any learning to new situations. Second, they experience cognitive, language, motor and social impairments. DSM-IV-TR lists the particular adaptive functions that may be affected. Finally, onset depends on biological factors that occur before or during birth, or socio-developmental factors associated with childhood. The biological factors are either genetic (e.g. Down syndrome), or the result of ante-natal infection (e.g. rubella), pre-mature birth, or anoxia during birth. (Anoxia is the damage incurred when a baby is starved of an adequate supply of oxygen to the tissues). Socio-developmental factors include accident, illness, or neglect (Hallas, Fraser, & MacGillivray, 1982).

The final three rows ('Types of assessment', 'Assessment tool' and 'Degrees of intellectual disability') show that opinion is currently divided about the best way to measure an intellectual disability. The 9th edition of the AAMR manual, shifted the emphasis from an individual's level of disability, and used functional and environmental needs (Wen, 1997). The Supports Intensity Scale (SIS) abandoned terms that linked degrees of intellectual disability to IQ scores (i.e. mild, moderate, severe, and profound), and replaced them with classifications based on level of support (i.e. intermittent, limited, extensive, and pervasive). The person who, for example, was classified as 'intermittent' required help on an 'as needed' basis. While, at the other end of the scale, the lack of 'pervasive' support could be life threatening (AAMR, 1992).

The impact of a functional, rather than a statistical, type of assessment is beginning to be felt both locally and nationally in the UK. An internet search identified health authorities that defined intellectual disability as high, moderate, or low need (Dorset County Council, 2004; Islington Learning Disabilities Partnership, 2001; The London Borough of Havering, 2002). The policy initiative on intellectual disability services in Scotland, *The Same as You? A review of services for people with learning disabilities* (The Scottish Executive, 2000), adapted the SIS and defined the degree of intellectual disability as requiring occasional and short-term, time-limited, regular long-term, or constant and highly-intensive support. The four different levels (i.e. mild, moderate, severe, and profound) continue to be the favoured way of measuring an individual's intellectual disability, and this thesis will use ICD10 and DSM-IV-TR terminology, rather than the SIS, when it describes the people with intellectual disability participating in experiments 4, 5 and 6.

2.2.3 Prevalence of intellectual disability and consequences of the condition

It is unclear how many people in the UK have an intellectual disability. Reports estimated that there were 120,000 cases in Scotland (The Scottish Executive, 2000), and about 985,000 in England (The Foundation for People With Learning Disabilities, n.d.).

The consequences of intellectual disability depend on the severity of the condition. "This group has wide extremes of physical ability, language development, social functioning, and emotional development. While some participate in competitive sports, others are profoundly physically handicapped. While some communicate

conventionally, others may still only be babbling or may rely on makaton or communication aids to make their needs known. While some are learning and developing skills that allow them to live independently, others require total nursing care. While some are emotionally balanced and happy, others express their frustration and anxiety in violent or disturbed behavior against themselves or others” (Hooper & Lindsay, 1997, p. 170). (Makaton was first developed in the UK in the 1970’s by a speech and language therapist. It is now an internationally recognised communication programme, used in more than 40 countries worldwide. It was devised to help people with an intellectual disability. Makaton uses speech, facial expression, gestures, signs and symbols to convey information (Howlin, 1998)).

The National electronic Library for Health (2003) indicates that those with a mild intellectual disability, approximately 75% of the group, “function similarly to the rest of the population in most respects”. They have achieved basic levels of literacy, live and work independently, and may actively participate in sport and leisure activities. In contrast, 10%, who have severe and profound intellectual disability, often experience physical disability as well. They may not be able to talk clearly, or may rely on signing or communication aids to make their needs known. They may have incontinence, pressure sores and skin rashes, feeding and respiration difficulties, and each require total nursing care (The Pharmacy Community Care Liaison Group, 1999).

2.3 Challenging behaviour

2.3.1 Background

Intellectual disability is associated with unusual behaviours. They fall into four broad categories: aggression, destructiveness, self-injury and stereotyped mannerisms. Prevalence studies identify the behaviours in each category. For example, Harris (1993) reported on the nature and extent of aggression among people with an intellectual disability in a south west region of the United Kingdom, and indicated that aggressive behaviours included punching, slapping, pushing or pulling, kicking, pinching, scratching, pulling hair, biting, head-butting, using weapons and choking. Oliver, Murphy and Corbett (1987) surveyed the South East Thames Health region. They identified a variety of self-injurious behaviours among 596 adults and children with an intellectual disability that included: skin picking and pinching, self-

biting, head punching/slapping, head-to-object banging, body-to-object banging, hair removal, eye-poking, lip-chewing and teeth banging.

Stereotyped mannerisms may sound more innocuous than the behaviours listed above. However, the hand-wringing prevalent in Rett Syndrome, or the rocking displayed by people who have autism, are 'unusual' because they are resistant behaviours that obstruct communication and interaction with peers and carers. (Rett Syndrome is a neurodevelopmental disorder that only affects girls (Hallas et al., 1982)).

For more than a decade, the term 'challenging behaviour' has been used to describe these unusual behaviours. It replaced labels like abnormal, aberrant, disordered, disturbed, dysfunctional, maladaptive and problem (Emerson, 2001).

The term challenging behaviour will be used throughout the remainder of this thesis. It is preferred to the other labels as it is free from any connotation about how the behaviour is organised (e.g. disordered), or about the relationship between the behaviour and ongoing events (e.g. dysfunctional). (When chapter 3 considers behaviour modification it will discuss literature indicating that challenging behaviour may be both orderly and adaptive).

Challenging behaviour is also the preferred term as it conveys the notion that factors other than the actual behaviour itself determine its unacceptability. First, it is a reminder that behaviours are not problems that people with an intellectual disability carry around with them; instead, they are 'challenges' to services. Second, it suggests that much depends on whether other people meet the 'challenge' to tolerate and manage the behaviour (Blunden & Allen, 1987).

There is evidence that when people find certain behaviours more challenging than others their perception is based on difficulties they experience rather than on how the behaviour affects development. Emerson et al. (1988) asked service agencies in SE England to identify two or three individuals with an intellectual disability who presented the greatest challenge to services in their area. Kiernan and Kiernan (1994) asked much the same question when they surveyed special schools for pupils with severe intellectual disabilities. The greatest challenges the respondents faced were physical aggression (Emerson et al., 1988), and social disruption (Kiernan & Kiernan, 1994).

2.3.2 Definition of challenging behaviour

Emerson (1995) provides one of the most commonly cited definitions of challenging behaviour. He describes it as “culturally abnormal behaviour(s) of such an intensity, frequency and duration that the physical safety of the person or others is likely to be placed in serious jeopardy, or behaviour which is likely to seriously limit use of, or result in the person being denied access to, ordinary community facilities” (p. 12).

Although this definition clearly emphasises the impact of challenging behaviour, Baker, LaVigna and Willis (1998) went one step further. They suggested that when the social response resulted in or involved exclusion from ordinary community facilities, the impact on the person and on others should also include quality-of-life issues. They proposed that quality of life might include: physical and emotional well being, acquisition and maintenance of skills, the development of relationships, the power to make and act upon decisions regarding oneself, receiving the respect of others, and living in and using ordinary community facilities.

Therefore, in common with Baker et al. (1998, p. 220), and for the purposes of this thesis, challenging behaviour will be defined as “behaviour which has a negative impact on the quality of life of that individual or individuals with whom they share their environments”.

2.3.3 Prevalence of challenging behaviour

Prevalence is the total number of cases of the disease, or condition, in the population under study at a given point in time, or the total number of cases in the population divided by the number of individuals in the population (Bowling, 1997b).

It is not clear how many people with an intellectual disability display challenging behaviour. Baker et al. (1998), for example, highlighted the discrepancy between prevalence figures of 51%-61% (J. Jacobson, 1982), and 1.5% (Kushlick, Blunden, & Cox, 1973). In these instances, they were the number of cases among those living at home and in community facilities (J. Jacobson, 1982), and an estimate for adults and children (Kushlick et al., 1973).

Emerson (2001) also found different rates when he looked at prevalence by geographical area. Emerson (2001) combined three studies carried out in the north-west of England (Emerson & Bromley, 1995; Emerson et al., 2001; Qureshi & Alborz, 1992), and compared the resulting rate (7.3%) with that found by Borthwick-

Duffy (1994) who examined 91164 people with intellectual disabilities served by the California Department of Developmental Services (14%).

There are several reasons for this inconsistency. First, different populations were sampled. Baker et al. (1998) compared a specialist and a more general population. Emerson (2001) looked at the UK and USA. Both cultural populations ought to share common characteristics in the type of behaviours that arise; however, the American study included a category ('frequent self-injurious behavior') with no equivalent in the UK studies, and identified people who may not have been added to the UK figures.

Second, context and role expectations influence how a carer assesses behaviour (Emerson, 2001). Identical behaviours are judged according to where they take place, and whether there is a discrepancy between performance and cultural expectation. So, to borrow an illustration from Baker et al. (1998), sitting on a bench and shouting advice to an authority figure dressed in black would be considered acceptable at a football match, but unacceptable at a church service. At a football match the same behaviour may be regarded as more deviant when shown by a woman than by a man. It is not the behaviour expected from a woman. Clearly the situation is not static or clear-cut, as the social acceptability of behaviour constantly changes over time, as well as within and across culture.

Finally, people with an intellectual disability are often cast in abnormal social roles that modify how rules are applied to them. For example, when they are viewed as 'eternal children' there is the tendency to be more tolerant, and not attribute personal responsibility to challenging behaviour.

Overall, a carer's assessment will be influenced by the context, by their perception of what constitutes a difficult experience, and by the personal values and standards against which s/he judges the challenging behaviour and the person who is displaying it. (This chapter has already discussed that a carer's experience influences these judgements, rather than the impact behaviours have on the progress and development of the individual with an intellectual disability). Consequently, the different decisions made along each of these lines will ultimately affect prevalence rates of challenging behaviour.

2.3.4 Natural history of challenging behaviour and individuals most at risk

Epidemiological studies have helped determine the natural history of challenging behaviour, and identified the personal characteristics of those most at risk.

Challenging behaviour is likely to begin in childhood (Emerson, 2001). A series of retrospective studies found that, on average, it commenced at either 5 years (M.J. Schneider, Bijam-Schulte, Jansen, & Stolk, 1995), 7 years (G.H. Murphy et al., 1993), or 9.6 years of age (Emerson et al., 1988). It reached a peak between 15 and 34 years. (Kiernan & Kiernan, 1994; Oliver et al., 1987; Rojahn, 1994).

Although it may then decline, challenging behaviour is highly persistent. Reid and Ballinger (1995) used a carer rating scale and a modified interview schedule to follow abnormal behaviour symptoms and patterns. The same two consultant psychiatrists reviewed a cohort of 100 adults with intellectual disability in 1975, 1981 and 1992. They discovered that the social withdrawal and stereotypy of 67 people with severe intellectual disability remained highly stable over a 16 to 18 year period. Foxx (1990) and Jensen and Heidorn (1993) found that ten years after introducing an intervention for severe self-injury the participants still displayed the challenging behaviour, albeit in a different form and at a lower rate. Foxx (1990) treated a 32-year-old man with a multi-phased programme. The programme included a) reinforcement with physical restraint for increasingly longer periods of non-injury, and timeout from restraint for self injurious behaviour, b) fading restraint, c) substituting appropriate forms of restraint, d) token reinforcement for adaptive behaviour, and e) parent and vocational training. Jensen and Heidorn (1993) worked with a 27-year-old man with severe intellectual disability, and used a intervention that combined differential reinforcement of other behaviours (DRO), escape extinction and stimulus fading. (Some of these techniques will be explained when chapter 3 discusses behaviour modification).

In general, challenging behaviour is more likely to be displayed by boys and men, than by girls and women (Di Terlizzi, Cambridge, & Maras, 1999). This relationship seems to be more pronounced for aggressive and destructive behaviour (Borthwick-Duffy, 1994; Oliver et al., 1987; Rojahn, 1994), and within an institutional setting (Qureshi, 1994).

Overall, challenging behaviour is positively correlated with the restrictions imposed by the living environment, and with the level of intellectual disability. The

Borthwick-Duffy (1994) survey, referred to earlier, indicated that 3% living independently, 8% with their families, 9% in smaller (1-6 place) community facilities, 24% in larger community-based facilities and 49% in institutions displayed challenging behaviour. In the same survey, challenging behaviour occurred among 7% with mild intellectual disability, 14% with moderate intellectual disability, 22% with severe intellectual disability and 33% with profound intellectual disability.

Finally, individuals with more severe intellectual disability often displayed more than one challenging behaviour. G.H. Murphy et al. (1993) found people in south-east England who were physically aggressive and destructive. Oliver et al. (1987) indicated that in 57% of the cases individuals displayed multiple forms of self-injury.

It is dangerous to make generalisations about people with an intellectual disability. The evidence presented above may suggest that someone with profound intellectual disability who lives in an institution may be more pre-disposed towards displays of challenging behaviour, or may fall into a clinical group where there is a higher statistical probability that challenging behaviour will occur. However, the positive correlations identified above will not apply to every person. There are many with a profound intellectual disability living in institutions that do not display challenging behaviour, and conversely there are those with mild intellectual disability living in a less restricted environment that do.

2.3.5 Aetiology of challenging behaviour

Challenging behaviour has complex origins. It is not the result of a single aetiology: biological, physiological, psychological and social factors interact with each other, and cause it to occur (Olley, 1999).

2.3.5.1 Biological factors

Several biological factors exert an influence. First, some forms of challenging behaviour are associated with specific syndromes that affect people with an intellectual disability. For example, self-injury occurs among all people who have Lesch-Nyhan syndrome (Lesch-Nyhan syndrome is a metabolic disorder that is only found among the male half of the intellectual disability population (Hallas et al., 1982)), and there is a very high prevalence of self-injurious hand wringing in Rett syndrome (Emerson, 2001).

Second, there is evidence of a link between epilepsy and challenging behaviour. Kiernan and Kiernan (1994) completed a postal survey that examined the prevalence of challenging behaviour among 1029 day-school pupils with severe intellectual disability. Although the figure was not statistically significant, it emerged that “nearly one-fifth (19.4%) of those who were said to suffer from epilepsy showed an increase in challenging behaviour on the day or days prior to or following seizures” (p. 192). McGrother et al. (2006) interviewed carers listed in a local register. They also found that those with reported epilepsy were significantly more likely to have a severe behaviour problem, and that attention seeking and uncooperative behaviours were specifically associated with the condition.

Finally, two bio-chemical mechanisms (the release of endorphins and neurotransmitters) could explain self-injurious behaviour (Sandman & Hedrick, 1995; Thompson, Symons, Delaney, & England, 1995). (The release of endorphins will be considered in more detail when chapter 3 discusses some of the neurobiological theories that have influenced the use of psychopharmacology with people who have an intellectual disability and challenging behaviour).

2.3.5.2 Physiological and sensorial factors

Pain, discomfort and additional visual and hearing impairments are physiological and sensory factors that may cause challenging behaviour (McCue, 1993). When intellectual disability affects an individual’s ability to communicate, challenging behaviour often occurs not just in response to the pain and/or impairment, but also because they cannot explain what is happening.

As well as sensory impairment, people with an intellectual disability are thought to experience difficulty modulating sensory input. Sensory modulation is the nervous system’s ability to filter and inhibit non-essential incoming sensory information (Spitzer, Roley, Clark, & Parham, 1996). A person with sensory modulation problems either under-reacts to a stimulus (hypo-reactivity) and fails to notice sensory inputs (sensory dormancy), or they over-react (hyper-reactivity) (Hooper, McManus, & McIntyre, 2004). Some people with an intellectual disability may engage in stereotyped movement and perseveration to help modulate hypo-reactive sensory systems (Baranek, Foster, & Berkson, 1997), or if they have a hyper-reactive system they may withdraw to block-out stimulation (Greenspan & Wieder, 1997). Self-stimulation and self-injury are viewed as attempts to obtain sensory

stimulation (Wells & Smith, 1983). Individuals who scream or display temper tantrums may be doing so because they are overwhelmed by sensory input. This behaviour may be an expression of the feelings that arise when the most common of sensations are confusing and frightening, and it is difficult to comprehend and communicate this experience (Gorman, 1997).

Finally, medication may have side effects that prompt challenging behaviour. Gualtieri (1989), for example, writes that “as a general rule [sedative anticonvulsants and neuroleptics] can cause or aggravate self-injurious behaviour” (p. 358). However, this may not always be the case. Bodfish et al. (1995) studied 210 adults with an intellectual disability and found that the prevalence and co-morbidity of compulsion with stereotypy and self-injury were the same for participants who had received medication, and for those in a medication-free sub-group.

2.3.5.3 Psychological and cognitive factors

Baroff (1999) uses the three integrated dimensions of the needs driven personality model to explain psychological and cognitive factors that influence the emergence of challenging behaviour. The three dimensions are (1) capacities or abilities (resources), (2) the forces or drives that give direction or intention to behaviour (needs), and (3) the things considered important (values). Human *resources* are directed towards activities that are *valued* because they meet one biological *need* (the need to survive), and three psychological *needs* (the need for structure, self-expression, and self-esteem).

The personality model gives special attention to self-esteem. Self-esteem has three elements: the need to receive and give love and nurturing (intimacy), the sense of accomplishment that comes with tackling and coping with challenges (success) and the opportunity to exercise control over your life (autonomy). Self-esteem is regarded as a core dimension in the personality model as it is the principal motivator of behaviour, and essential to mental health.

Theorists agree that behaviour is governed by the desire to terminate unpleasant states and seek pleasurable ones. In the personality model, a person experiences pleasant feelings of comfort, pleasure and well-being if his/her needs are met, and unpleasant states like tension, anger, sadness and fear if they are unmet.

According to Baroff (1999), people with an intellectual disability have the same biological and psychological needs as those who are not intellectually disabled.

However, their disability is likely to affect each psychological need. Cognitive impairment limits the ability to transfer information from one situation to another, and intensifies the need for structure. A narrowed range of possible leisure pursuits restricts the opportunity for self-expression. Intellectual disability also has an impact on the three elements of self-esteem. It may affect how a person bonds with parents, siblings and peers, and this threatens intimacy by distancing the person with an intellectual disability from society. The common response to over protect a person with an intellectual disability denies them opportunities to exercise choice and control, and limits their degree of autonomy. Finally, the need for success is constantly undermined by failure experiences.

However, it is not the threats to each psychological need that causes challenging behaviour. It is the inability to cope with their feelings of frustration.

People either use a problem-focused, or an emotion-focused, approach to cope with a frustrating situation (Lazarus & Folkman, 1984). When a person uses a problem-focused approach s/he defines the problem, generates alternative solutions, weighs up their costs and benefits, picks one, and then implements it (Atkinson, Atkinson, Smith, & Bem, 1990). In an emotion-focused approach the individual can either choose a cognitive or a behavioural strategy. The cognitive strategy redefines a problem to lessen its impact (e.g. deciding that the important examination that has not been studied for is not worth worrying about). In the same situation, the behavioural form of emotion-focused coping may involve either seeking comfort from friends or alcohol (Vernon, 1997). The opportunity to talk through problems (Zeimer, 1982), and the notion of personal control are also “inextricably woven into that of coping” (McHaffie, 1992, p. 936).

The coping mechanisms of the intellectual disability population are often compromised by cognitive deficits, by the communication difficulties they experience and by restricted autonomy. Consequently, theorists who apply the needs driven personality model believe that challenging behaviour is an immature way of dealing with the frustration of basic needs.

2.3.5.4 Social and environmental factors

The social factors that may contribute to challenging behaviour include rejection by society, difficulty establishing relationships and limited opportunities for interaction (McCue, 1993). When Duncan, Matson, Bamburg, Cherry and Buckley

(1999) monitored 203 people with a severe or profound intellectual disability they found that poor social skills increased the prevalence of challenging behaviour. Individuals rated as aggressive, self-injurious, or both, displayed a restricted range of social behaviours compared to controls who did not have an intellectual disability. Murphy et al. (2005) assessed the skills, social impairments and challenging behaviours of children (n=166) under fifteen with severe intellectual disability and/or autism (time 1), and then reassessed nearly all the sample (n=141) twelve years later (time 2). They discovered that challenging behaviours at time 2 were predicated on poor social interaction at time 1.

The absence of stimuli appears to play a part in the emergence of challenging behaviour. The behavioural treatment of challenging behaviour will be discussed in greater detail in chapter 3 of this thesis. Research carried out to evaluate this approach has demonstrated that introducing materials into barren environments, or enriching the environment by increasing interaction with materials lowers the rate at which challenging behaviour occurs.

Challenging behaviour was reduced when visual stimulation (Forehand & Baumeister, 1970) and toys (Favell, McGimsey, & Schell, 1982; Lindauer, DeLeon, & Fisher, 1999) were added to barren environments. Forehand and Baumeister (1970) placed eight males with a profound intellectual disability and a high rate of rocking in an experimental chamber. Each participant was observed during baseline, picture presentation, a return to baseline and finally white light sessions. Forehand and Baumeister (1970) counted the number of body rocks, and used a motion detector to record general activity. They found that projecting pictures and white light onto the wall of the chamber decreased body rocking and general activity.

Favell et al. (1982) decreased the self-injurious behaviour (pica, hand-mouthing, and eye-poking) of six individuals with severe intellectual disability, as “they all automatically switched to self-stimulation with the toys. In each case, the self-stimulation was topographically identical to the previous self-injury; people who engaged in pica and hand-mouthing began chewing on toys, (and) those who eye-poked were visually stimulated by the striking visual properties of brightly coloured trucks, a string of beads, a mirror, and translucent shapes” (p. 83). Finally, Lindauer et al. (1999) extinguished self-injurious behaviour by making a tape player, stacking clowns, a ball and a pom-pom available to a 23-year-old woman with severe intellectual disability.

2.4 Intellectual disability and mental illness

2.4.1 Diagnostic classifications of mental illness

Mental illness is classified into psychotic, neurotic, mood, and eating disorders (Gross, 1996). Schizophrenia is a psychotic disorder. The affected individual loses contact with reality, and experiences thought disturbances, auditory hallucinations and primary delusions (F. Schneider, 1959).

The person who experiences a neurotic disorder remains in contact with reality and has insight into their problem (Gross, 1996). The neurotic disorders are (1) generalised anxiety disorders, (2) phobic anxiety disorders, (3) panic disorder, and (4) obsessive-compulsive disorder (OCD).

A generalised anxiety disorder is sometimes called free-floating anxiety, as the affected person cannot pinpoint its source. The problem is not focused on a particular object or situation, and they feel anxious and worried for weeks at a time with an irrational concern that disaster is about to strike (Gross, 1996).

Phobia is an intense and irrational fear of an object or situation that is not likely to pose a danger. Although people usually realise their fears are groundless, a phobia may cause avoidance behaviour that interferes with daily life (Gross, 1996).

Panic disorders and panic reactions are extreme, irrational feelings of fear and anxiety that seem to come without warning. The bodily reaction is often so intense that sufferers believe they are in danger of dying from, for example, a heart attack (Gross, 1996).

Anxiety is at the root of OCD. The persistent, upsetting and unwanted thoughts of OCD motivate repetitive behaviours. Those repetitive behaviours are performed to avoid a dreaded outcome, or to reduce the anxiety associated with the obsessions (Bernstein, Penner, Clarke-Stewart, & Roy, 2003).

Mood disorders are equated with extremes. Individuals with mania have a sense of intense elation and a great deal of energy. The person who has a depressive disorder loses energy and enthusiasm for life. Someone who swings between the two extremes is diagnosed with a bipolar affective disorder (Gross, 1996).

Finally, eating disorders have become widespread in Western industrialised societies in the past thirty years or so. Anorexia nervosa (literally, 'nervous lack of appetite') is an intense fear of gaining weight or becoming fat. Bulimia nervosa may be precipitated by stressful events. The sufferer tries to avoid gaining weight by binge

eating and inappropriate compensatory behaviour (e.g. self-induced vomiting) (Gross, 1996).

2.4.2 The impact of mental illness on people with an intellectual disability

People with an intellectual disability can experience the full range of mental illnesses described above (Cooper, Smiley, Morrison, Williamson, & Allan, 2007; Dawson & Morgan, 1997; Vanstraelen, Holt, & Bouras, 2003; Weisblatt, 1994; White, Chant, Edwards, Townsend, & Waghorn, 2005). However, some of the disorders characterised by cognitive distortion (e.g. eating disorders) may not be found in people with profound intellectual disability (Dawson & Morgan, 1997), and the severity of intellectual disability affects presentation (Vanstraelen et al., 2003). For example, visual hallucinations, increased dependency and irritability, and a worsening of existing behavioural problems are more common clinical features of depression when someone has severe forms of intellectual disability (Vanstraelen et al., 2003).

Biological and psychodynamic factors, and environmental stresses and abnormalities, predispose the intellectual disability population towards mental illness. Lund (1985), for example, examined the prevalence of psychiatric morbidity in adults with an intellectual disability, and suggested that central nervous system impairment (a biological factor) made them more vulnerable. Russell (1991) wrote about the presentation of mental illness in people with an intellectual disability, and presented three 'burdens' that encapsulate the psychodynamic factors and environmental stresses. They can be summarised as:

- (1) A lack of skill to be able to adapt to the world of work and the social demands of other people.
- (2) The burden of living in a society that does not provide adequate resources and whose attitudes encourage rejection, segregation and isolation.
- (3) The burden of being aware of having an intellectual disability and the self-doubt this can generate.

Beacock (2003) focused on environmental abnormalities. He suggested that institutionalisation, the system of care based upon mass and congregate living, disempowered generations of people with intellectual disability, and promoted the development of mental illness. It was an impressive argument. It proposed that the

real effect of institutionalisation was about more than just bricks and mortar. It had to do with the lack of choice, and the way people had to adapt their lifestyle to the routine and convenience of the institution.

The defining characteristics of intellectual disability also make the intellectually disabled population susceptible to mental illness. People with intellectual disability are often unable to identify emotions from facial expressions (Rojahn, Rabold, & Schneider, 1995). This type of cognitive deficit might effect how they evaluate and understand the irrational feelings associated with mental illness. Lindsay and Olley (1998), believed that a restricted and overprotected upbringing, either with their family, or in an institution or a community setting, limited opportunities to develop the type of skills that would help them deal with emotion. They did not have a range of valued social positions or achievements (psychological complexity). Consequently, they found it difficult to compensate for low levels of social support, and for the poor social, interpersonal and recreational skills that impaired relationships and predisposed them to mental illness.

As well as the deficits associated with cognitive impairment, and an over protective upbringing, Wayment and Zetlin (1989) demonstrated that people with intellectual disabilities adopted submissive coping styles. Wayment and Zetlin (1989) used a sentence completion task to explore the coping styles of adolescents with (n=30) and without (n=30) a mild intellectual disability. The participants responded to five sentence-completion stems. One stem elicited sources of everyday stress, and four stems elicited methods of coping with problem situations. Content analysis identified four major categories of stress: frustrated efforts, direct conflict, social injustices and performance issues. It revealed that non-disabled young people provided more active solutions; whereas, those with mild intellectual disability tended to give passive and emotive responses that reflected their general sense of powerlessness. The difference was especially noticeable “in response to stems that placed them in a position of hypothetical victim (“When I am not treated right”), or wrongful doer (“When someone gets upset with me”)” (p. 315). The response of the non-disabled hypothetical victim was hostile (“I retaliate”), whereas the young person with mild intellectual disability felt “bad”, “hurt” or “depressed”. The non-disabled hypothetical wrongdoer tried to figure out and then remedy the situation, whereas the young person with mild intellectual disability got “mad” or “upset”.

Lindsay, Neilson and Lawrenson (1997) believed that cognitive impairment, an overprotective upbringing and submissive coping styles caused people with an intellectual disability to have a different and more powerful experience of mental illness than the general population. The way they often responded to generalised and phobic anxiety disorders suggested that maladaptive ways of dealing with anxiety, as much as underlying pathology, was driving their challenging behaviour. When Stack, Haldipur and Thompson (1987) compared intellectually disabled (n=19) and non intellectually disabled (n=19) admissions to a state psychiatric hospital, fewer people with an intellectual disability showed signs of intrapsychic disturbance like depression or changes in sleeping patterns (37% v 89%), and greater numbers were aggressive towards themselves and others (58% v 26%). Levine and Langness (1983) looked at an intellectually disabled and a non-intellectually disabled basketball team. The teams were matched in age, playing experience and general skill level. They used two self-report measures: a mood adjective checklist and State-Trait Anxiety Inventory, and discovered significantly higher levels of performance-related anxiety among players with a mild intellectual disability. Finally, people with an intellectual disability often express phobic anxiety as blind panic because they cannot control irrational fear in the same way as a non-handicapped person. As Lindsay and Olley (1998) observe, the person with an intellectual disability who is frightened by escalators may not possess the same fear of social embarrassment, or physical harm, that should stop them jumping over the side and off a moving escalator.

2.4.3 Prevalence of mental illness in intellectual disability

There is statistical evidence that the various factors, just discussed, increase the likelihood of someone with an intellectual disability experiencing mental illness. Although the prevalence of anxiety disorder (27%) matches the level detected in the general population (Stavrakaki & Mintsoulis, 1997), there have been higher incidences of schizophrenia, bi-polar affective disorder and psychosis. The established prevalence of schizophrenia was 3% (Fraser & Nolan, 1994) compared with 0.4% in the general population (Meltzer, Gill, Petticrew, & Hinds, 1995). Bi-polar affective disorder was diagnosed in 4% of those with an intellectual disability (Deb & Hunter, 1991) compared to only 1% of those without (Weissman, et al., 1988). Psychotic people were more common place in the intellectual disability (6.3%) (Lund, 1985) than in the general population (0.3%) (Bland, Newman, & Orn,

1988). Finally, psychiatric disorder occurred around four times more among adolescents with an intellectual disability than their non-disabled peers (Rutter & Graham, 1970).

2.4.4 Dual diagnosis and variables complicating differential diagnosis

Challenging behaviour is one of the most common reasons for referring people with an intellectual disability to a psychiatrist. In the UK, Day (1985) carried out a retrospective survey of psychiatric disorder. He studied 357 long-stay and 215 in-patients, and found that it “accounted for over half of the presentations by the long-stay residents, and a third of admissions ...to the psychiatric unit” (p. 664). A similar trend was noted in New York State, USA. When Jacobson (1998) investigated the relationship between the use of mental health services and the severity of challenging behaviour, 63.3% of the participants (n= 45810) received services in the course of a year, and those rated with the most challenging behaviour accounted for the highest proportion (43.5%) of contacts.

Both these studies asked clinicians to decide whether a person with an intellectual disability who displayed challenging behaviour had a mental illness, and it is estimated that the dual diagnosis of intellectual disability and mental illness applies to anywhere from 10% to 80% of the intellectual disability population (Dawson & Morgan, 1997). (The concept of a ‘dual diagnosis’ has emerged as an alternative to ‘primary’ and ‘secondary’ handicaps (Reiss, 1994). The concept has been welcomed because it suggests that instead of trying to guess whether the primary problem is emotional or intellectual, both conditions require support and resources, and should receive equal concern).

There are several reasons why the number of people diagnosed with intellectual disability and mental illness varies so widely. First, the estimates used different populations (e.g. institutionalised versus non-institutionalised, people with varying degrees of intellectual disability) (Dawson & Morgan, 1997), different inclusion and exclusion criteria (McNally, 1991) and vague definitions of intellectual disability and mental illness (Moss & Lee, 2001).

Second, clinicians either under diagnosed (Reiss, 1990), overlooked psychiatric disorders (Reiss, 1994), or allowed the presence of intellectual disability to decrease the diagnostic significance of an accompanying behaviour (the final oversight is known as diagnostic overshadowing). Although the concept of dual

diagnosis suggests that clinicians should identify both intellectual and emotional handicaps as primary needs, Reiss, Levitan and Szyszko (1982), and Reiss and Szyszko (1983), showed that they tended to underestimate the importance of emotional handicaps. Reiss et al. (1982), for example, presented a case description of a debilitating fear to two groups of psychologists. Group 1 was told that the individual had an IQ of 60, and Group 2 that it was 102. When asked to diagnose the fear, and recommend an appropriate intervention, Reiss et al. (1982) found that the presence of an intellectual disability (i.e. an IQ of 60) overshadowed the accompanying behaviour, and the psychologists in Group 1 were less likely to diagnose the fear as a phobia.

Third, several factors complicated a differential diagnosis, and made it tricky for clinicians to decide whether challenging behaviour was a symptom of mental illness.

A degree of uncertainty surrounded definitions. Although intellectual disability is a description of a developmental state, characterised by functioning below a certain arbitrarily defined level, it is listed as a mental disorder. Furthermore, the definitions of intellectual disability and mental illness overlap. They are both recognised by their behavioural symptoms even though, in general terms, the former (intellectual disability) affects the *level* of functioning, and the latter (mental illness) affects the *quality* of functioning (Szymanski, 1994).

It became more difficult to recognise a co-morbid mental illness in a person whose level of functioning was already compromised by an intellectual disability (Weisblatt, 1994). The presence of an intellectual disability, that decreased intellect and impaired language ability, affected the individual's capacity to understand and then express their emotions and internal mood (Dawson & Morgan, 1997). Sovner (1986) called this 'intellectual distortion', and suggested that it decreased the diagnostic value of a clinical interview.

Sovner (1986) suggested that diagnosing mental illness was also confounded by cognitive disintegration and psychosocial masking. Cognitive disintegration referred to the lowered threshold before anxiety overwhelmed and disorganised cognitive function. Psychosocial masking described the impoverished social skills and life experiences which were typical of people with an intellectual disability, and that lessened the impact of a symptom in comparison to a person without an intellectual disability. It was often possible to detect behavioural (e.g. self-injury,

aggression, agitation and crying) and biological signs of mental illness (e.g. changes in sleep, appetite and weight), but intellectual distortion, cognitive disintegration and psychosocial masking made it more demanding to identify psychotic and cognitive symptoms. It was difficult to diagnose breaks in reality when the individual could not communicate their view of reality, and it was difficult to obtain cognitive baselines when cognition was distorted or impaired (Weisblatt, 1994).

There were also problems differentiating between the symptoms of mental illness and intellectual disability (Dawson & Morgan, 1997). Lethargy (a lack of motivation), for example, is a symptom of an intellectual disability and of depression. In one case it may be misinterpreted as a feature of the individual's intellectual disability even though it is a symptom of depression, and in another case it may be misinterpreted as depression even though it is the outcome of a sensory impairment.

Finally, Emerson, Moss and Kiernan (1999) identified a tautological relationship between challenging behaviour and mental illness; something that could confuse a differential diagnosis. They suggested that mental illness might partly express itself in terms of a challenging behaviour, or, alternatively, that challenging behaviour might either be exacerbated by a co-existing mental illness and represent an atypical presentation or a secondary feature of that illness.

Reiss and Rojahn (1993) evaluated the relationship between aggression and depression in 528 participants, and provided evidence of mental illness expressing itself as challenging behaviour. Classroom teachers rated a random selection of adults, adolescents and children with an intellectual disability who attended community-based day programmes in Chicago, Illinois, or Wisconsin. They evaluated an alphabetical list of psychopathological symptoms as either no problem, a problem, or a major problem in their life. The participants were considered to have met the criterion for aggression and depression if they were at, or above, a cut-off score. When four times as many aggressive as non-aggressive participants suffered from depression, the study revealed a statistically significant association between depression and aggression.

A study by Bodfish et al. (1995) showed how a co-existing mental illness might exacerbate challenging behaviour. Bodfish et al. (1995) developed a simple assessment screening instrument for stereotypy and self-injury, and used a compulsive behaviour checklist (CBC) to examine the prevalence of compulsions, stereotypic behaviour and self-injurious behaviour in adults with severe or profound

intellectual disability. They found that some forms of stereotypy and self-injury might be atypical presentations of obsessive-compulsive disorder. This study lent a degree of empirical support to King's (1993) compulsive behaviour model of self-injury. King (1993) had hypothesised that the self-injury manifested by people with an intellectual disability was in part compulsive behaviour that "shared with similarly compulsive disorders the features of being largely involuntary, exacerbated by anxiety and not motivated by consequences" (p. 105).

Some steps have been taken to improve differential diagnosis. Fraser (1998) and Weisblatt (1994) both stressed the importance, not only of detecting the presence of mental illnesses, but also of recognising factors that made the person vulnerable to them. They advocated diagnosis based on careful consideration of an individual's early and current medical history, comprehensive biopsychosocial assessments and accurate observation from a number of different environments. Weisblatt (1994) gave an example of the confusion that could arise, and urged clinicians to gather thorough medical histories. Carers had assumed that the agitation of a young woman was behavioural, whereas it stemmed from her inability to inform them of the discomfort a urinary tract infection was causing her.

Reiss (1992) only diagnosed mental illness when there was a deterioration in behaviour from the pre-morbid state, and when a pattern of symptoms and not just a single symptom of the condition emerged. Fraser and Nolan (1994) used computer assisted communicative patterns analysis to reveal when the person with an intellectual disability had broken rules of language or used inappropriate language. This technique helped them diagnose schizophrenia, mania, or other causes of inappropriate communication. Finally, Vlaskamp (2005) advocated an interdisciplinary assessment, and Mikkelsen, Charlot and Langa (2005) used a more systematic approach that took account of the evolution of the diagnosis over time.

2.5 Summary

This chapter provided the first stage of context for this thesis. It introduced some terminology, and in particular it defined and discussed intellectual disability, challenging behaviour and mental illness.

The discussion of intellectual disability focused on diagnostic criteria, and, although the participants in this thesis are not categorised in this way, it highlighted the move towards a functional assessment of the condition.

An examination of the challenging behaviour displayed by people with an intellectual disability considered issues relating to its prevalence, natural history and aetiology. It emphasised how context, individual perceptions and personal expectations all affected whether or not behaviour was perceived as ‘challenging’, and ultimately had an impact on prevalence figures.

This chapter identified the biological, physiological, psychological and social factors that contributed to challenging behaviour. Although it was often difficult to accurately diagnose, evidence of mental illness suggested that mental state as much as anything else was driving challenging behaviour. For example, studies were reviewed that indicated a relationship between mental illness and self-injury, mental illness and stereotypy, and mental illness and aggression.

Chapter 3 considers the range of treatments developed because challenging behaviour may originate from a mixture of factors, and a co-morbid mental illness.

Chapter 3:

Psychodynamic, behaviourist, cognitive, humanistic and psychopharmacologic treatments for challenging behaviour

“Different psychologists make different assumptions about what particular aspects of a person are worthy of study, and this helps to determine an underlying model or image of what people are like. In turn, this model or image determines a view of psychological normality, the nature of development, preferred methods of study, the major cause(s) of abnormality, and the preferred methods and goals of treatment” (Gross, 2000, p. 12).

3.1 Introduction

The previous chapter introduced the concepts of intellectual disability, challenging behaviour and mental illness. It described the incidence, natural history and complex aetiology of challenging behaviour, and presented evidence that any combination of physiological, psychological and environmental-sociocultural factors can cause challenging behaviour. Furthermore, the presence of an additional comorbid mental illness suggested that challenging behaviour might be driven by maladaptive ways of dealing with anxiety, as much as by underlying pathology.

This thesis examines how a particular music therapy intervention (the playing of relaxing background music) affects challenging behaviour. Chapter 4 sets the context for that intervention by considering how different theoretical approaches influence music therapy. This chapter introduces each approach in turn. It looks at how interventions used to manage and treat challenging behaviour are closely linked both to a clinician's view of the aetiology of challenging behaviour, and the theoretical approach s/he adopts when attempting to understand human behaviour. (A theoretical approach provides a set of limits against which normality, the nature of development, the major cause(s) of abnormality and preferred methods or goals of treatment can be understood. All major approaches include theories that share common principles and assumptions. These theories give each approach its own distinct identity (Gross, 2000)).

There are several major approaches in the field of psychology. Each approach makes different assumptions about the particular aspects of a person worthy of study. This chapter will focus on four: psychodynamic, behaviourist, cognitive and humanistic, and it will also look at psychopharmacology. It will discuss the theorists who contributed to their development, and then go on to describe and evaluate the role each has played in the treatment of challenging behaviour. It will argue that, although a range of established interventions are already available, there is room for another one that uses music.

3.2 Psychodynamic approach

Chapter 2 demonstrated that the intellectual disability population experience mental illness, and suggested that mental state as much as anything else might be driving challenging behaviour. This underlying cause prompted clinicians to develop

and carry out interventions grounded in the ideas of psychoanalytic and psychodynamic theorists (Moss & Lee, 2001).

3.2.1 Psychodynamic theorists

The term psychology is derived from the Greek *psyche* (mind, soul or spirit) and *logos* (discourse or study), and literally means ‘study of the mind’ (Gross, 2000). Wilhelm Wundt is generally attributed with the emergence of psychology (Gross, 2000). He did not discuss ‘the mind’, as philosophers had done for thousands of years, he investigated it through introspection (i.e. by observing and analysing its contents and processes). Wundt and his colleagues recognised the importance of measurement and control. They used the same physical surroundings, stimuli and verbal instructions, and identified subject characteristics necessary for optimum introspective observation (unbiased, alert, free from distractions, healthy, fresh and free from fatigue and interested in the experience under study). Wundt in Germany, and Edward Bradford Titchener in America, used introspection to examine a range of psychological processes including memory, learning, thinking, problem solving, dream analysis and perception (Adam-Terem, 2001).

After Wundt’s early brand of psychology, the psychodynamic approach was the ‘first force’ of modern psychology (Maslow, 1968). The term ‘psychodynamic’ retains the emphasis on introspection associated with Wundt and Titchener. It indicates that active mental or emotional forces within the personality motivate behaviour (Gross, 2000).

Sigmund Freud put forward the original psychodynamic theory. This section of the chapter will not consider other contemporary theories, except to acknowledge that despite rejecting some of Sigmund Freud’s fundamental principles and assumptions Adler (1927), Anna Freud (Freud’s daughter) (1936), Erikson (1950), Klein (1950), Winnicott (1958), Jung (1964) and Bowlby (1969) all reflected his influence.

Freud stressed certain key principles. He believed that the personality was made up of three parts: the *id*, *ego* and *superego*. The *id* contained everything inherited and present at birth. The *ego* was the part of the *id* modified by the direct influence of the external world (S. Freud, 1923). The *superego* was the internalisation of parental and social moral values, and it observed and judged the *ego* (S. Freud,

1933). Freud believed conflict within the personality was unavoidable because the id and the superego were pulling the ego in two opposing directions.

The ego used three unconscious forms of compromise (*defence mechanisms, dreams and neuroses*) to deal with conflict (Gross, 2000). Repression (forcing a threatening memory out of consciousness, and making it unconscious), denial (refusing to acknowledge some aspect of reality) and displacement (transferring feelings from their true target onto a harmless substitute) were short-term *defence mechanisms*. They gave breathing space to either come to terms with conflict, or find alternative ways of coping. *Dreams* were the compromise between forbidden urges and their repression, and they were the disguised fulfilment of a repressed wish (S. Freud, 1900). *Neuroses* were 'physical' symptoms, usually acquired during early childhood, that deflected attention away from the underlying 'mental' cause (i.e. deep-seated, unresolved and unconscious conflicts that stemmed from childhood feelings, memories, wishes and experiences) (Gross, 2000).

Freud believed that most behaviour had some conscious, and some unconscious, causes. He called this 'overdetermination'. By definition, individuals were only aware of conscious causes. The unconscious thoughts were either not accessible at that moment (pre-conscious) or were totally inaccessible (unconscious). The ego, together with some parts of the superego, represented the conscious part of the mind. The unconscious part was the id, all repressed material, the part of the ego involved in dream work, neurotic symptoms and defence mechanisms, and part of the superego (Gross, 2000). The basic goal of Freud's psychoanalysis was to make the unconscious part of the mind conscious (Winnicott, 1958). The analyst might use dream interpretation, free association (the client says whatever comes to mind, no matter how silly, irrelevant, or embarrassing), or transference (the client talks, and projects repressed feelings on to the analyst) to achieve that goal.

3.2.2 Psychodynamic psychotherapy and intellectual disability

When Sigmund Freud suggested that a certain measure of natural intelligence was a prerequisite for analysis, the intellectual disability population were denied any opportunity to talk about and deal with emotional conflict, and all too often challenging behaviours were not ascribed to emotional state. For example, Oliver, Murphy and Corbett (1987) found that in one UK health region only one out of 596 self-injuring children and adults with intellectual disability received psychodynamic

psychotherapy. (Psychodynamic psychotherapy draws on Freudian based psychoanalysis, and uses a therapist/patient relationship, rather than pharmacological or social methods, to change cognition, feelings and behaviour (Holmes & Lindley, 1989)).

Today, there is a growing sense that individuals who have an intellectual disability can benefit from psychodynamic psychotherapy. Mason (2007), for example, has observed “a slow but marked turning of the tide” signalled by a fresh wave of opinion that “psychological therapy can be helpful with this (the intellectual disability) population” (p. 247). However, with a degree of scepticism that is possibly still justified, first Nezu and Nezu (1994), and then Sturmey (2005), have questioned whether there was empirical evidence to support this type of claim. Nezu and Nezu (1994) observed that psychodynamic psychotherapy suffered from a “serious empirical void” (p. 38). Sturmey (2005) that psychodynamic psychotherapy was not the preferred treatment option for people with an intellectual disability as “well conducted research...(had) still not been conducted” (p. 56).

In some instances (Beail & Warden, 1996; Beail, Warden, Morsley, & Newman, 2005), the written material did demonstrate that psychodynamic psychotherapy reduced psychological distress and increased self-esteem. Beail and Warden (1996) used a symptom checklist and a self-esteem scale to monitor ten people. Beail et al. (2005) answered repeated calls for research on the efficacy and effectiveness of psychotherapy, and conducted an open trial examining individual sessions provided in routine clinical practice. However, both studies, although robust, did not have a control group.

A further general observation ought to be made about psychodynamic psychotherapy literature. Instead of evaluating the intervention, authors often described outcomes, or focused on changes that were needed to match the intervention to the abilities of the intellectual disability population. When Frankish (1989), for example, discussed how psychodynamic psychotherapy reduced the challenging behaviours of seven young people (5 to 24 years) by guiding them through the stages that led to emotional separation and individuation, she did not support her claims with empirical evidence.

When Hollins, Sinason and Thompson (1994) described a family therapy group, they provided helpful information about how to set up and start a group, they offered assessment guidelines, they detailed some of the positive outcomes (e.g.

reconsidering negative roles assigned to the person with an intellectual disability), but instead of examining therapeutic effectiveness, they documented technical modifications and adaptations. DesNoyers Hurley (1989) has analysed the literature and identified the four principal ways therapists have adapted traditional psychotherapy techniques to accommodate people with an intellectual disability.

- (1) Matching technique to cognitive and developmental level (e.g. altering standard progressive relaxation instructions by using concrete language and consistently checking if the patient understood; using play therapy and relationship building techniques common in child psychotherapy; using non-verbal techniques, like reflecting the patient's body language and behaviour, to build a relationship).
- (2) Using a directive approach (i.e. structuring a session by taking time to identify the reason for referral, and outlining in concrete terms what therapy is, how often it will happen and what will be discussed).
- (3) Showing flexibility conducting therapy (i.e. shortening the length of the traditional therapeutic hour to as little as five minutes, and introducing alternative techniques).
- (4) Involving family and staff (to accommodate clients who often depended on them to make decisions).

3.3 Behaviourist approach

In contrast to psychodynamic psychotherapy, behavioural management (a behaviourist approach) has been a more common and typical method of addressing challenging behaviour in both children and adults with mild to severe intellectual disability. Current understanding of the usefulness of a behavioural approach in modifying the challenging behaviour of the intellectual disability population (as well as to some degree in the apparently normal population) is grounded in the behaviourists who conducted experiments in the first half of the 20th century.

The origins of the behaviourist approach lie with Watson's (1913) "behaviourist manifesto". The manifesto questioned the validity of introspection, and proposed that psychologists should only study behaviour that could be observed and measured by more than one person. Watson transformed the subject matter of

psychology from 'mind' to 'behaviour'. He stressed the importance of using empirical methods, especially the experiment, to collect data that could be quantified and analysed.

If Watson was responsible for empiricism, the driving force of the behaviourist approach, another four psychologists were inextricably linked with its development. The first pair, Pavlov (1927) and Skinner (1938) provided the orthodox theories that give the behaviourist approach its own identity. The second pair, Tolman (1948) (cognitive behaviourism) and Bandura (1971) (social learning theories) modified the orthodox ideas.

The behaviourist, or S-R (stimulus-response), approach explored the relationship between learning and behaviour. Psychologists usually define learning as a permanent change in behaviour that occurs as a result of past experience (Anderson, 1995; Coon, 1983). One orthodox theory stated that learning either took the form of *classical conditioning* when the stimulus triggered the response in a predictable, automatic way (Pavlov, 1927). The other orthodox theory, *operant conditioning*, stated that nearly all behaviour, and with it learning, was less predictable because it was controlled by consequences and whether they were reinforcing or punishing (Skinner, 1938). Tolman's cognitive behaviourism advanced the idea of *latent learning* (Tolman, 1948) when people developed internal representations of what was happening to help them decide how to act. Finally, social learning theories (Bandura, 1971) were based on the principle of *observational learning*; something that either occurred spontaneously by watching the behaviour of another person or model, or vicariously by seeing another person being praised for their actions.

3.3.1 Operant theory of challenging behaviour

When operant theory is used, challenging behaviour it is not disorderly and maladaptive. It is either motivated by something internal (e.g. rocking to help modulate a hypo-reactive sensory system), or shaped by how the person interacts with their physical and social world. It is a functional, adaptive, response maintained by its consequences. For example, food can become a potentially reinforcing stimulus when someone is in the right motivational state (i.e. when they feel hungry). Challenging behaviour is reinforced if the person who is feeling hungry meets a staff

member holding a sandwich, the staff member guesses that s/he is communicating their wish to eat and hands over the food (Emerson, 2001).

A range of behaviour modification techniques are available to clinicians who apply operant theory to challenging behaviour, and work within the behaviourist tradition.

(1) *reinforcement* - strengthening behaviour by presenting desirable outcomes or by removing undesirable ones, weakening behaviour by presenting undesirable outcomes or by removing desirable ones.

(2) *skill teaching* - physical, gestural and/or verbal prompting, teaching components of a behaviour one step at a time (chaining), teaching the desired behaviour in an artificially created situation (role-play), modelling the desired behaviour.

(3) *self-management* - the individual regulates his/her own behaviour by having responsibility for the monitoring, modifying, evaluating and rewarding steps in the process.

3.3.2 Applied behaviour analysis and intellectual disability

Although psychologists had used behaviour modification to deal with challenging behaviour since the late 1940s, Tate and Baroff (1966) completed the seminal investigation that culminated in the development of an intervention (Applied Behaviour Analysis) and a supporting journal (Journal of Applied Behaviour Analysis) (Emerson, 2001). Tate and Baroff (1966) worked with a nine-year-old boy who was autistic (Sam). Sam participated in an ABAB study (A=control session; B=experimental session): twenty sessions carried out at the same time of the day. During the control sessions, Sam walked between two female research assistants for twenty minutes. Each research assistant held one of Sam's hands, ignored his self-injurious responses, and chatted with him and with one another. The experimental sessions were identical, except that, when Sam hit himself, the research assistants jerked their hands free, and withdrew social contact for 3 seconds (i.e. punishment). The intervention reduced Sam's self-injury from one incident every 9 seconds to one every 10 minutes.

When the first issue of the Journal of Applied Behaviour Analysis was published in 1968, it stated that Allied Behaviour Analysis (ABA) studies should (1) be interested in what people actually did, (2) change behaviour in socially significant

ways, (3) describe the techniques used so that they could be replicated, and (4) use functional analysis.

Functional analysis has become the bedrock of ABA (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982). It is a technique that uses analogue studies, interview and/or observation to determine (1) the context in which a challenging behaviour is more likely to occur, (2) the relationship (contingency) between a behaviour, its antecedent personal and environmental stimuli and its consequences, and (3) the neutral stimulus (establishing operation) that may activate or abolish those contingencies (Emerson, 2001). (An analogue study evaluates behaviour when environmental conditions are manipulated (e.g. the individual may be observed when no consequences are delivered for his/her behaviour (McCue, 2000)). In this way, functional analysis provides the information needed to choose between an *antecedent*, *contingency*, or *constructional* approach.

An *antecedent approach* modifies the circumstances that contribute to the onset of challenging behaviour (McCue, 2000). It might address challenging behaviour by...

1. Reallocating staff (Touchette, McDonald, & Langer, 1985).
2. Rescheduling an individual's weekly timetable (Touchette et al., 1985).
3. Offering access to preferred activities (Dyer, Dunlap, & Winterling, 1990).
4. Increasing social contact (Mace & Knight, 1986).
5. Introducing toys (Favell, McGimsey, & Schell, 1982), visual stimuli (Forehand & Baumeister, 1970), and music (Mace, Yankanich, & West, 1989) into a barren environment.
6. Moving individuals from institutional to community-based settings (Emerson & Hatton, 1994; Young, Sigafos, Suttie, Ashman, & Grevell, 1998).

A *contingency approach* tackles the consequences of challenging behaviour. It may alter or remove the sensory outcomes (sensory extinction), block the attempts to escape that may be maintaining challenging behaviour (escape extinction), or although debate surrounds their acceptability employ punishment based methods (e.g. timeout) (McCue, 2000). Alberto, Heflin and Andrews (2002) demonstrated that

timeout extinguished the target behaviours of two students who had a moderate intellectual disability.

A *constructional approach* **displaces** challenging behaviour. It does so by using differential reinforcement (DR). It delivers reinforcement contingent on the non-occurrence of the targeted challenging behaviour (DR), on the occurrence of a specified alternative behaviour (DRA), or on the occurrence of a physically incompatible behaviour (DRI) (McCue, 2000). DR is not particularly effective. Carr, Robinson, Taylor and Carlson (1990) reviewed outcomes associated with the procedure. Although they reported a few complete successes (Luiselli, Myles, Evans, & Boyce, 1985; Russo, Cataldo, & Cushing, 1981), by and large there was either only moderate improvement, or an increased rate of challenging behaviour.

A *constructional approach* also **supplants** behavioural difficulties with skills and competencies (Goldiamond, 1974). Koegel and Koegel (1990), for example, used a self-management package to extinguish challenging behaviour. They trained four autistic children to tell challenging behaviour apart from appropriate behaviour, and to record whether or not it had occurred during a 15-20min period. Carr and Durand (1985) believed that some individuals used challenging behaviour to communicate needs. They developed a process called Functional Communication Training to help them state their needs. They taught assistance-seeking and attention-getting phrases to three boys (9 to 12 years old) with moderate or severe intellectual disability, and reduced the mean rate of challenging behaviour. Furthermore, follow-up observations revealed a long-term effect: “the reductions in challenging behaviour, and the increases in the communicative responses taught, transferred across teachers and classrooms” (Durand & Carr, 1991, p. 261).

3.3.3 Evaluation

A number of criticisms have been levelled at behaviour modification. McCue (2000) was concerned that it evaluated a restricted range of outcomes, and that by only targeting a single behaviour it ignored contributing biopsychosocial factors (McCue, 2000). Lindsay and Sturmey (2007) raised practical issues: behaviour modification was often tied to inpatient settings, and it was too dependent on trained personnel (Lindsay & Sturmey, 2007).

However, after a careful look at the literature it appears that these criticisms were unfounded. Michie, Lindsay, Smith and Todman (1998), for example, carried

out a controlled study that targeted more than one behaviour. Fifty-seven adults with mild to moderate intellectual disability took part in a community living skills training programme. The experimental group (n=29) were trained using a package of skill teaching methods. Thirteen participants, who were taught in a classroom, watched and discussed slides and videotapes of people in community living situations. Finally, a control group (n=15) received no formal training over and above the normal ward and hostel routines. A range of community living skills (e.g. using a cafeteria, using a pedestrian crossing, making a phone call) and adaptive behaviours (e.g. paying compliments, interrupting a conversation) were assessed before training and at intervals of up to two years after training. The package of skill teaching methods was the most effective way of teaching as many as nine different community living skills, and ten different adaptive behaviours.

Graff, Green and Libby (1998) demonstrated that behavioural interventions could affect factors that contributed to challenging behaviour. They developed the nonverbal communication of a destructive and autistic four-year-old boy with severe intellectual disability as well as reducing his challenging behaviour. Bissell, Phillips and Kroese (2005) found that, while it was not the main objective, “stabilization of sleep...was a positive side-effect” (p. 171) when an antecedent approach (environmental modifications) was used to manage the challenging behaviour of a 55 year-old man with severe intellectual disability. Although the data could not clarify the causal nature, there appeared to be some sort of a relationship between challenging behaviour and sleep disturbance.

Finally, Whitaker (2002) reviewed the literature and demonstrated that behavioural interventions did not rely exclusively on trained behaviour analysts, or inpatient settings. They also took place in workshops, family homes, community placements and group homes. Ozomoff and Cathcart (1998), for example, evaluated a home programme that taught a parent how to work with their autistic child, and how to focus on cognitive, academic and social skills. The parent was gradually given increasing freedom and responsibility so that towards the end of the programme s/he had taken over control from the trained therapist who had initially demonstrated and modelled tasks and teaching skills. Although progress was three to four times greater in the treatment than in the control group, the participants were not randomly allocated and the results cannot be generalised. It was possible that the first families, who were placed in the treatment group, were more eager for treatment and more

likely to effect change than those who responded later to the announcement and were assigned to the control group.

Lindsay and Sturmey (2007) claimed behaviour modification was superior to any other therapy. They presented two pieces of evidence. First, when Rush and Frances (2000) invited fifty-six behavioural, and fifty-one pharmacological, experts to rate assessment methods and interventions used to treat psychiatric and behavioural problems, ABA emerged as a first rank treatment that was significantly more effective than other methods. Second, a meta-analysis (Campbell, 2003) provided strong evidence that behavioural interventions reduced challenging behaviour in people with autism. Perhaps they ought to be a little more circumspect. Carr et al. (2000) were only modestly optimistic that skill teaching methods had an impact on target behaviours, and they were even more cautious about the social validity, generalisation and maintenance of the target behaviour reduction. Furthermore, when only nine articles matched their meta-analysis criteria, Horner, Carr, Strain, Todd and Reed (2002) voiced a commonly expressed concern: research did not reflect clinical practice because only studies that demonstrated an effect were likely to be published.

3.4 Cognitive approach

Clinicians who believe that perceptual distortion is the primary determinant of challenging behaviour have developed and carried out interventions grounded in the ideas of cognitive theorists, and influenced by cognitive theory.

3.4.1 Cognitive theorists

In the 1950s, there was growing dissatisfaction with the behaviourist and psychodynamic traditions. There was concern that the behaviourist approach concentrated on observable, external events. Psychoanalysis was criticised for its introspection and the emphasis it placed on instincts and unconscious desires at the expense of thoughts and feelings (Turnbull, 2000). These feelings of unease with the behaviourist approach and psychoanalysis culminated in a series of events known as the 'cognitive revolution' when attention turned to internal cognitive processes (Eysenck & Keane, 1990).

The cognitive approach does not have a clearly established identity, a unifying theory, or a specific figure central to its development (Wade & Travis, 1990).

However, it does have several contemporary forms, and each form has its own theories and research programmes. One example is the cognitive-behaviour therapies.

The cognitive-behaviour therapies were shaped by Kelly's construct theory (Nye, 2000). Kelly believed that each person used everyday experiences to develop a unique set of blueprints, or constructs. The property developer, farmer and artist would all pay attention to something different as they looked over a series of valleys from the top of a hill (Turnbull, 2000). Behaviour was an experiment, and people were 'scientists' who used their constructs to predict future events (hypotheses). They tested these hypotheses when they behaved, and modified them if something did not match a prediction (Fransella, 1981). This process helped them (1) understand their behaviour and how other people behaved, (2) comprehend what had happened in the past, and (3) predict what would happen in the future (Gross, 2000). Kelly's model started a cognitive revolution in psychotherapy (Rorer, 1998) that led to the emergence of three cognitive behaviour therapies: *rational emotive behaviour therapy (REBT)* (Ellis, 1962), *cognitive-behaviour therapy (CBT)* (Beck, 1976), and *self-instructional therapy (SIT)* (Meichenbaum & Goodman, 1971). In each case, they were psychotherapy techniques with a 'cognitive tilt' (Nye, 2000)

Ellis believed that people were disturbed by their perception of an event, and *REBT* encouraged them to replace irrational beliefs with rational ones. Beck (1976) worked with depressed clients. He thought they distorted or misinterpreted events. *CBT* helped them challenge and modify their interpretation. It enabled them to develop a more flexible way of thinking about the situation that had prompted their depression.

Both *REBT* and *CBT* focused on the actual content of thoughts and assumptions. Cognitive dysfunction was a distortion that had to be made explicit by the client, and questioned by the therapist. The client had to be able to distinguish between an event (a friend crosses the street without saying hello), an associated inferential thought (he is ignoring me) and an emotional consequence (sadness). A client would only let go of irrational beliefs if s/he realised that the emotional response was caused by the inferential thought, and not by the event (Kendall, 1985).

In contrast, *SIT* regarded cognition as a process, and cognitive dysfunction as a deficit. Meichenbaum (1977) believed that neurotic behaviour was partly due to faulty internal dialogues. He made his clients aware of their maladaptive self-statements, and then helped them develop coping ones. He encouraged them to

internalise a set of self-instructions, and to replace maladaptive thoughts by rote learning. So, before doing it 'for real', a client anxious about asking someone to dance might write down a strategy for dealing with that particular social interaction, and then role play it with a commentary of self-statements (Gross, 2000).

3.4.2 CBT and intellectual disability

People with an intellectual disability experience more extreme forms of depression, generalised anxiety disorder and anger, and cope with them in a less adaptive way than non-disabled people (Lindsay, Neilson, & Lawrenson, 1997) (chapter 2 identified higher levels of performance-related anxiety and aggression). Depression is exacerbated by negative social attitudes and a lack of social support, and aggression is fuelled by difficulty telling one emotion from another (Reed, 1997). Consequently, challenging behaviour often becomes an outlet for unresolved anger (Black, Cullen, & Novaco, 1997), and a way of exerting some control over the way in which they live (Blunden & Allen, 1987).

CBT emerged as a way of addressing challenging behaviour in the late 1970s and early 1980s. Traditional behavioural approaches had become less acceptable as dignity, status, self-determination and choice were key issues for people with an intellectual disability, and clinicians wanted to create a collaborative client/therapist relationship rather than an authoritarian one (Kroese, 1997). Although people with an intellectual disability often find it difficult to comprehend and express abstract concepts, research teams found that those with (Oathamshaw & Haddock (2006)), and without psychosis (Dagnan, Chadwick, & Proudlove (2000) Joyce, Globe, & Moody (2006)), could link events, thoughts and emotions; a prerequisite for restructuring cognitive distortion and taking part in cognitive-behaviour therapies.

CBT has three main elements: *relaxation training* to reduce arousal; *an interview* to identify maladaptive thinking and appreciate the consequences of 'distorted', maladaptive thinking; and *behavioural techniques* (e.g. self-instructional therapy (SIT), role-play and video-based work) to practice and develop undistorted, adaptive thoughts (Lindsay et al., 1997). It asks people to express abstract concepts, and to change their thought patterns. It relies on verbal skills, the ability to self-report thoughts and feelings, and the motivation to weigh up and then act on the evidence obtained during cognitive restructuring (Lindsay & Sturmey, 2007). It also requires

the ability to comprehend and express abstract concepts, and asks each person to set goals and regulate their performance (Kroese, 1997).

Chapter 2 identified the cognitive limitations of the intellectual disability population, and some of these techniques have been modified to match people who are approximately the lowest 1% of the population in terms of measured IQ (Lindsay & Sturmey, 2007). Dagnan and Sandhu (1999), and Kellett, Beail, Newman and Hawes (2004) adapted assessment tools (e.g. Rosenberg Self-Esteem Scale, Beck Depression Inventory, and Zung Self-Rating Depression Scale). Lindsay, Overend, Allen, Williams and Black (1998), Lindsay et al. (1997) and Creswell (2001) used soap opera excerpts and cartoon representations of emotions to aid understanding and memory. Before interviews, Jahoda, Markova and Cattermole (1988) spent about 12 hours gaining each client's confidence, and reducing their anxiety and incomprehension. During interviews, Finlay and Lyons (2001) and Dagnan and Lindsay (2004) overcame acquiescence by providing a "don't know" option, and checked understanding by following up an answer with open-ended questions. (Acquiescence is saying yes to a question regardless of its content (Block, 1965)). In other instances, CBT programmes involved caregivers, used simple language and set homework (Whitehouse, Tudway, Look, & Kroese, 2006).

3.4.3 Evaluation

There is evidence that with these minor changes CBT has taught members of the intellectual disability population to manage their anger (Howells, Rogers, & Wilcock, 2000; Oathamshaw, 2007), anxiety (Dagnan & Jahoda, 2006; Douglass, Palmer, & O'Connor, 2007; Lindsay et al., 1997) and depression (Lindsay, Howells, & Pitcaithly, 1993).

The five studies that provide the most robust data compare group cognitive-behavioural anger management sessions with waiting-list controls (Lindsay et al., 2004; Rose, West, & Clifford, 2000; Taylor, Novaco, Gillmer, & Thorne, 2002; Taylor, Novaco, Guinan, & Street, 2004; Willner, Jones, Tams, & Green, 2002). Taylor et al. (2002), for example, used a provocation inventory (PI) and a two-part anger rating scale (ARS) to evaluate the response of male offenders with mild intellectual disability (mean age 29.2 years). The participants used the PI to report the intensity of their anger in potentially provocative situations. A ward staff member who knew the patient used the ARS to judge the participant's behaviour during the

previous week. There was a statistically significant decrease in the mean PI and ARS scores of the anger treatment group. The control group PI and ARS scores increased. Rose et al. (2000) evaluated the response of 44 individuals with an intellectual disability (20 to 62 years). The between and within-group comparisons suggested that cognitive-behavioural anger treatment reduced levels of expressed anger and depression, and increased self-concept. The improvements in anger and self-concept were maintained at 6 months and 12 months follow up.

However, doubts need to be raised about generalising these results. First, the CBT treatment packages included classic behavioural methods such as self-monitoring, relaxation training, self-instruction, problem solving, role-play and skill rehearsal (Sturmey, 2006). The outcome studies were confounded by these procedures, as they could not make it clear which component was responsible for change. As part of a recent debate, Sturmey (2006) suggested that because “some studies have found that relaxation training alone may reduce aggressive behaviour in people with intellectual disabilities, in the absence of component analyses of these CBT treatment packages, it may be more parsimonious to attribute change to behavioural components that have already been evaluated” (p. 114) “than to cognitive components of undemonstrated efficacy” (p. 109).

Second, the CBT sessions relied heavily on communication, and they were at least one hour (Taylor et al., 2002), and often two hours long (Rose et al., 2000; Willner et al., 2002). People with intellectual disability who have higher IQs, and good receptive vocabulary, “may more easily understand the cognitive model” as they “were more likely to be able to identify different emotions, and to discriminate among thoughts, feelings, and behaviours” (Sams, Collins, & Reynolds, 2006, p. 25). However, by and large CBT may be too demanding for people with profound, severe and even moderate levels of intellectual disability.

3.5 Humanistic approach

Psychodynamic psychotherapy tackled mental illness, cognitive-behaviour therapies focused on perceptual distortion, and this chapter will conclude by discussing an intervention that isolated bio-chemical and neurobiological imbalances (psychopharmacology). However, instead of concentrating in this way on a particular ‘symptom’, or set of symptoms, clinicians who are influenced by humanism take a

more holistic view and meet the human needs of an individual who displays challenging behaviour.

3.5.1 Humanists

The term 'humanist' was coined by a British psychologist (Cohen, 1958), and the humanistic approach, which is synonymous with Carl Rogers (1951) and Abraham Maslow (1954), emerged mainly in the USA.

Turning first to Maslow, his hierarchy of needs (Maslow, 1954) is the cornerstone of the humanistic approach. The hierarchy has seven levels. It is commonly referred to as the 'psychology of being' because a person only arrives at self-actualisation (level 7), and realises their full potential, when all the other needs (psychological, safety, love and belongingness, esteem, cognitive and aesthetic) have been met (Gross, 2000).

On the other hand, Rogers' (1951) approach has been called the 'psychology of becoming'. Rogers (1959), like Maslow, stressed the importance of understanding the whole person, and viewed the 'self' as a gestalt. (The term gestalt is borrowed from work carried out on perceptual organisation by Koffka (1935) and Köhler (1947). It implies a complete, organised and consistent set of perceptions and beliefs). The 'self' had a strong influence as most human behaviour was as an attempt to maintain consistency (congruence) between what an individual would most like (their ideal self-concept), and their actual behaviour (their current self-concept). A person experienced threat, anxiety, or depression when there was a lack of congruence (incongruence) between their actual behaviour and their ideal self-concept (Gross, 2000). The denial and distortion s/he used as a defence against those unpleasant feelings created a vicious circle. It increased the person's sense of incongruence about their subjective world, and this in turn added to their anxiety and need for defences (Gross, 2000).

Rogers developed person-centred therapy, originally called client-centred therapy, to help reduce incongruence (Gross, 2000). As the term 'person-centred' implies, each individual was encouraged to direct the therapeutic process, and to achieve self-actualisation by interpreting and reorganising his/her subjective experience. The therapist's main task was to offer a warm, non-evaluative and understanding relationship. These three attitudes, more usually labelled *genuineness*, *unconditional positive regard* and *empathic understanding*, were fundamental to

person-centred therapy, and to the creation of a therapeutic atmosphere in which an individual could change him/herself. The individual had to feel that the therapist cared for them in a non-judgemental way (*unconditional positive regard*), and the therapist achieved this by becoming involved emotionally (*genuineness*), and by listening intently and clarifying the emotional significance of what the individual said (*empathic understanding*) (Graham, 1986).

Person-centred therapy opened up psychotherapy to psychologists and non-medically qualified therapists. When psychiatrists objected to this turn of events, Rogers used the term ‘counselling’ to silence them, and it led to the evolution of a counselling profession (Gross, 2000).

3.5.2 Gentle teaching (GT) and intellectual disability

This chapter will not discuss humanistic interventions like counselling, or the different creative arts therapies. (Music therapy will be the subject of the next chapter). It will concentrate instead on gentle teaching (GT).

Menolascino and McGee (1983) developed GT to deal with severe challenging behaviour (O'Rourke & Wray, 2000). It emerged at a time when normalisation, disability rights and advocacy were key issues for the intellectual disability population. It answered Wolfenberger's (1972) call not to devalue and oppress people with an intellectual disability, and responded to criticisms levelled at the behaviourist approach for focusing on behaviour at the expense of the person (O'Rourke & Wray, 2000).

GT has much in common with the humanistic approach. Its philosophy rests on the values of *respect*, *equity* and *mutual change*, and echoes person-centred therapy. GT advocates unconditional valuing. It assumes that each person's value is inherent and exists simply in being human (*respect*). GT reaches out to people with an intellectual disability who are alienated from others by challenging behaviour. Carers accord equal value to the contribution someone with an intellectual disability makes to a relationship (*equity*) (O'Rourke & Wray, 2000). The warmth and shared value of this type of relationship negates the authoritarian, over-protective and distant postures that restrict shared growth, and GT “strives for human solidarity” (McGee, Menolascino, Hobbs, & Menousek, 1987, p. 11) that will encourage reciprocal and shared learning (*mutual change*) (O'Rourke & Wray, 2000).

McGee et al. (1987) believed GT broke the vicious circle of distress, blocked participation and relationship difficulties that caused challenging behaviour. It did so by teaching bonding. GT was “a pedagogical process...(that focused) on teaching the value inherent in human presence, human interactions, and human reward” (McGee et al., 1987, p. 11). It encouraged positive social and functional changes. The social outcomes could range from just welcoming and seeking human presence to developing a series of valued relationships. The functional outcomes might start with the individual taking an interest in an activity, and culminate in him/her talking about the activity and choosing it from a schedule (O'Rourke & Wray, 2000).

GT started with carers gathering information. They observed how each person participated, communicated and related to others. Instead of concentrating on their deeds, they focused on them as a whole, and gained a real sense of who the person was by noticing posture, body language, facial expression and emotional state (O'Rourke & Wray, 2000). The next step was to use simple ordinary day activities (e.g. folding towels or washing up) to initiate shared participation, and to generate opportunities for respect, equity and mutual change. The practitioner used his/her understanding of the person with an intellectual disability and their challenging behaviour(s), to guide the choice of activity, to inform how the activity was organised, and to determine how they invited and then directed participation (O'Rourke & Wray, 2000). As people with an intellectual disability often felt threatened by interactive activities, the carer helped them feel safe and secure by carefully structuring the activity, letting them know what it involved and telling them the length of time it would take (O'Rourke & Wray, 2000).

When there was challenging behaviour during an activity, the ‘defusion’ response maintained shared participation. The GT practitioner (teacher) first reduced, or removed, the demands being placed on the person. The teacher then allowed them a little time to relax and take stock, and reassured the person that they appreciated how new and difficult the situation was for them. Next, the teacher recommenced the activity shifting the person’s focus away from the intense emotion they were feeling to the predictable safety of what they were doing. Finally, the teacher praised them for their continued participation (O'Rourke & Wray, 2000).

3.5.3 Evaluation

Both McGee et al. (1987), and McGee and Menolascino (1992), claimed that GT reduced challenging behaviours to near zero. However, the methodology of these studies has been questioned, and furthermore it seems that like most interventions GT was only effective for some individuals. Jordan, Singh and Repp (1989), for example, enrolled three male subjects with profound intellectual disability (7 to 28 years old) and compared GT and visual screening. (Visual screening is a behavioural technique. An individual's eyes are covered to block his/her vision each time challenging behaviour occurs. The individual is released for visual screening after 5-15 seconds have elapsed without challenging behaviour). When GT increased the stereotypy of one of the subjects, Jordan et al. (1989) stated that it might "not be the universal treatment of choice for stereotypy its proponents suggest(ed)" (p. 9).

Other criticisms have been levelled at GT. After Barrera and Teodoro (1990) observed an individual with an intellectual disability attempt to terminate a GT session, Emerson (1990) suggested that it might be "highly aversive" (p. 94) when challenging behaviour was motivated by a desire to escape from others. Linscheid, Meinhold and Mulick (1990) questioned its reliance on behavioural techniques: they commented that it was "essentially no more than a set of behaviourist principles packaged with a dose of old time patent-medicine showmanship". Barrera and Teodoro (1990) were especially critical when the intervention increased challenging behaviour. They suggested the tandem assumptions that GT led to bonding, and bonding in turn produced the reduction or disappearance of challenging behaviour, were both flawed. They went on to observe that instead of being a treatment it was "an approach aimed at re-educating carers" (p. 212).

McGee responded to his critics by insisting that GT had a different focus and purpose from behaviourism. GT concentrated on the whole person and on establishing a client/carer relationship, and as such it was not appropriate to ask whether it had reduced challenging behaviour because reducing behavioural difficulties was considered a bonus (McGee, 1992). However, despite these comments there is still no conclusive evidence that GT works. When Cullen and Mappin (1998) compared GT with Individual Educational Programming, and Gates, Newell and Wray (2001) compared GT with behaviour modification, it did not have a discernable effect. In addition, although a recent autism treatment survey identified

GT as one of the top five strategies used, Hess, Morrier, Heflin and Ivey (2008) discovered that it “lack(ed) a scientific basis for implementation” (p. 961).

3.6 Psychopharmacology and intellectual disability

Psychopharmacology is “the most common form of treatment received by people with severe intellectual disabilities and challenging behaviour” (Emerson, 2001, p. 135). Research carried out in both the UK and North America suggests that medication is prescribed in one out of every two cases (Kiernan, Reeves, & Alborz, 1995; Molyneux, Emerson, & Caine, 1999; Rinck, 1998).

Psychopharmacology is underscored by neurobiological theories that explain the part endogenous neurotransmitters (the chemical messengers of the central nervous system) play in the onset of challenging behaviour. Recent studies focused on three classes of neurotransmitters: dopamine (Aman & Madrid, 1999), serotonin (Aman, Arnold, & Armstrong, 1999) and opioid peptides (Sandman, Spence, & Smith, 1999). Individuals who have an intellectual disability and challenging behaviour have been prescribed anti-psychotic and hypnotic medications to suppress the dopaminergic and opioid peptide systems respectively, and anti-depressant medication to stimulate the serotonergic system.

3.6.1 Dopamine and anti-psychotic medication

Dopamine is closely linked with the regulation of motor activity (Smith, 1993), and although more commonly used to treat schizophrenia, hypomania and dementia, anti-psychotic medication has been prescribed because of its tranquillising effects (Crabbe, 1994). Capone, Goyal, Grados, Smith and Kammann (2008), for example, used risperidone (a dopamine antagonist) to target the aggression, disruptiveness, self-injury, stereotypy and social withdrawal of children with Down syndrome, severe intellectual disability and co-morbid autism spectrum disorders (ASD).

A degree of controversy surrounds the use of anti-psychotics. First, there are serious side effects (e.g. sedation, nausea, weight gain, grand mal seizures and Parkinson’s disease), and equally damaging withdrawal symptoms when long-term treatment is discontinued (e.g. restlessness, anxiety and increased severity and frequency of maladaptive behaviour) (Emerson, 2001). Second, some forms of self-injurious behaviour are caused by lowered dopaminergic integrity. Bresse et al.

(1995) increased the self-injurious behaviour of rats by destroying their dopamine pathways. Lloyd et al. (1981) demonstrated that three people with intellectual disability people and Lesch-Nyhan syndrome (a condition associated with the self-mutilation of oral structures and fingers) had abnormally low levels of dopamine. Third, anti-psychotic and hypnotic medications suppress the dopaminergic system; consequently, while anti-psychotic medication is likely to have an effect on stereotyped behaviour, it is unlikely to have any specific effects on aggression or self-injurious behaviour (Emerson, 2001). Baumeister, Sevin and King (1998) and Brylewski and Duggan (1999) carried out research reviews, and failed to find evidence that anti-psychotics were an effective treatment for challenging behaviour. Crabbe (1994) recommended that anti-psychotic medicine should only be the first line of treatment when an individual clearly demonstrated psychotic features.

3.6.2 Serotonin and anti-depressant medication

Serotonin affects arousal, appetite control, anxiety and depression (Smith, 1993). A review of neurochemical mechanisms and challenging behaviour found a negative correlation between levels of serotonin and aggression: levels of aggression are raised by inhibiting the composition of serotonin, and lowered by increasing its composition (Baumeister & Sevin, 1990). This suggested that anti-depressant medication might reduce the aggression and self-injurious behaviour of people with an intellectual disability. Anti-depressant medication acted as a serotonin agonist and either stimulated cell receptor activity (e.g. buspirone), or restricted serotonergic reabsorption (e.g. fluoxetine).

Some evidence has accumulated that anti-depressant medication had the anticipated effect (e.g. Bodfish & Madison, 1993; Kirkpatrick-Sanchez, Williams, Gualtieri, & Raichman, 1998; Verhoeven et al., 1999). Bodfish and Madison (1993) enrolled sixteen adults with mild to profound intellectual disability in an A-B open trial, and a daily dosage of fluoxetine significantly reduced self-injury and aggression. Branford, Bhaumik and Naik (1998) found that fluoxetine reduced challenging behaviour in 13 out of 37 retrospectively analysed cases. Verhoeven and Tuinier (2005) discovered that anti-depressant medication was widely used with the intellectual disability population.

3.6.3 Opioid peptides and hypnotics

People with an intellectual disability were prescribed hypnotics after Sandman, Barron, Chicz-DeMet and DeMet (1990) used the addiction hypothesis model to explain the elevated β -endorphin plasma levels they discovered among self-injurious patients. Individuals had become dependent on the analgesic and euphoria-inducing properties of the β -endorphin released by self-injurious behaviour. Hypnotics removed the 'rush' of self-injury. They neutralised β -endorphin activity, and produced insensibility or stupor (Dorland, 1994).

There are encouraging signs that hypnotics reduce self-injurious behaviour. Crews, Rhodes, Bonaventura, Rowe and Goering (1999), for example, used the endorphin antagonist naltrexone hydrochloride to treat a 28-year-old black woman with profound intellectual disability. A quantitative synthesis of 27 research papers, published from 1983-2003, found that 80% of the participants ($n=86$) improved relative to baseline during naltrexone administration, and self-injury was reduced by at least a half in 47% of the cases (Symons, Thompson, & Rodriguez, 2004).

3.6.4 Anti-manics

Psychiatrists also used anti-manics (e.g. lithium carbonate, valproic acid) to reduce challenging behaviour. Ruedrich, Swales, Fossaecca, Toliver and Rutkowski (1999) completed a retrospective study and found that Divalproex, a derivative of valproic acid, reduced the aggression and self-injury of 28 adults with mild to profound intellectual disability. Hollander, Soorya, Wasserman, Esposito and Anagnostou (2006) used it to treat stereotypy. Thirteen individuals with ASD participated in an eight-week, double blind, placebo-controlled trial of divalproex sodium. There was a significant group difference and a large effect size ($d=1.616$).

3.6.5 Summary

Psychiatrists find it difficult to prescribe psychotropic agents for challenging behaviour. They are faced with an enigmatic condition that has a complex aetiology, and they often observe one person respond to buspirone, another to naltrexone hydrochloride, or yet another to carbamazepine, and so on. Consequently, to borrow from Crabbe (1994), psychopharmacology in intellectual disability remains more "art than a science" (p. 187).

3.7 Conclusion

This chapter introduced five different ways of treating challenging behaviour often displayed by the intellectual disability population. It explained the theoretical basis for each, and described how they were implemented. It identified three issues that relate to the application of these interventions.

First, evaluations failed to provide convincing evidence that the different interventions were effective. Psychopharmacology is still more “art than science” (Crabbe, 1994, p. 187). Some clinicians wondered whether GT actually addressed challenging behaviour. Nezu and Nezu (1994) expressed reservations about psychodynamic psychotherapy when they asserted that psychodynamic psychotherapy suffered from a “serious empirical void” (p. 38). The research that demonstrated the efficacy of behavioural treatments was criticised for publication bias. The positive evaluations of CBT were confounded by the multi-component structures of these packages.

Second, this chapter identified ethical concerns about two of the interventions. There were concerns about the side effects, withdrawal effects and suppression of dopaminergic integrity associated with psychopharmacology. Emerson (1990) wondered if GT might have an aversive quality when challenging behaviour was motivated by a desire to escape from others.

Third, some of the interventions were underpinned by complex assessment and treatment procedures. For example, behaviour modification terminology and functional analysis techniques required advanced levels of expertise and training. The impact of behavioural treatments was considerably diminished when staff were less skilled (Carr et al., 2000; Ozomoff & Cathcart, 1998). A GT practitioner needed sensitivity and experience to assess an individual with an intellectual disability from their posture, body language, facial expression and emotional state, and to use the ‘defusion’ technique to respond to challenging behaviour.

This chapter also described how psychodynamic psychotherapy was adapted to match the cognitive and developmental level of the intellectual disability population. Furthermore, the discussion of CBT introduced an intervention that demanded comprehension, motivation, expression, verbal skills, self-report and self-regulation. It described the lengthy treatment and pre-treatment programmes, and discussed how difficult it was to use interviews and self-report questionnaires. Intellectual disability has varying degrees of severity, and it may be that

psychodynamic psychotherapy and CBT rely on cognitive responses to such a degree that they are not appropriate interventions for people with severe or profound intellectual disability.

Some interventions were shown to be costly in terms of time and money, ethical doubts were raised about others, and some were too cognitively demanding. It seems that there may be room for a low-tech, easily used alternative that raises few ethical concerns, and that is dependent on a low level of attention more akin to an unconcentrated openness rather than anything intellectual. Certainly, those using music for pain management agree that it meets all these criteria, and that the general benefits of music listening are its universal appeal (McCaffery, 1972), easy availability (Zimmerman, Pozehl, Duncan, & Schmitz, 1989), low cost (Miakowski, 1996) and lack of side effects (McCaffery, 1972).

Moray's (1959) work on attention to speech lead to the notion that the perceptual system incorporates a single, limited capacity attentional 'channel' through which only a small part of sensory experience can pass at any one time. However, there is an alternative explanation; namely, that processes may take place simultaneously provided that they do not use the same kinds of cognitive mechanisms (Colman, 2001). This explanation suggests that rather than intruding completely and preventing people from doing other things at the same time, or not being heard at all in any meaningful sense of the word, background music can operate as a treatment modality on low levels of attention.

Gear, Gates and Wray (2000) concluded a discussion of challenging behaviour by summarising the choices a clinician made, and by identifying some of the factors that influenced the kind of intervention s/he selected.

“We may choose to offer people tools, skills and choices or we can choose to intervene in more or less controlling ways. We can condition or ‘shape’ or we can enable development and change (or both) in differing degrees. How we have been taught, or choose to view people and their behaviour will affect how we behave in return, the kinds of interventions (if any) we are likely to make and how successful some interventions are likely to be (p. 28).”

This thesis investigates the use of commercially recorded non-contingent sedative music. It does so after people with an intellectual disability were observed becoming more relaxed and less agitated, as they listened to music. It examines how this type of

intervention affects challenging behaviour at mealtimes. Although most people know how to access and play commercially recorded music, great care is needed when it is used as a treatment; especially, when the recipients have a condition that affects their ability to select an appropriate stimulus. Chapter 6 describes how people with and without an intellectual disability were involved in the choice of sedative music. Chapter 4, which follows, looks at the different interventions music therapists use with the intellectual disability population, and places the particular intervention investigated in this thesis within the music therapy and intellectual disability field as a whole.

Chapter 4

Music therapy and intellectual disability

“Music therapists have always been convinced of the efficacy of their work with this client group (intellectual disability). Pioneers of the profession documented their work in journals and newsletters...(and) a recent proliferation of books published in the area of the arts therapies has produced some useful literature concerning music therapy in the field of (intellectual disability)” (Watson, 2002, pp. 99-100).

4.1 Introduction

The previous two chapters introduced the client group participating in the clinical investigations in this thesis. These chapters established the complex aetiology of challenging behaviour associated with intellectual disability. They reviewed five different ways of managing challenging behaviour, and argued that there was room for another intervention that used music. This chapter turns its attention to that intervention, and discusses intellectual disability and music therapy. After the opening sections define music therapy, and introduce different approaches, models and techniques, the main part of this chapter is a wide-ranging literature review that covers material written between 1943 and 2008. It sets the context for the empirical work reported in chapter 7 of this thesis.

4.2 Music therapy

Music has been used to alleviate illness and distress for a long time (Bunt, 2001). The historical records of different cultures describe its curative powers (e.g. the Bible, Egyptian medical papyri). The theories of ancient, medieval and Renaissance writers (Plato, Boethius and Ficino respectively) established a connection between music and medicine, and there are ancient healing rituals (e.g. shamanism), that still survive today (Wigram, Pedersen, & Bonde, 2002).

The end of World War II proved to be a “watershed for the development of a more clinical approach” (Bunt, 2001, p. 539), and for the emergence of music therapy. Music was used in rehabilitation programmes for returning combatants. In Britain and North America this resulted in the formation of academic courses, and the establishment of national associations promoting music therapy. In Britain, for example, The British Society for Music Therapy was founded in 1958, and the first post-graduate music therapy course started in 1968 (Bunt, 2001).

Music therapy is currently practiced in over 30 countries. In some, it has developed into a professional discipline accepted alongside other paramedical professions. In others, it is still not recognised as an independent profession, and a music therapist must be qualified as a medical practitioner to practice in the public health system (Wigram et al., 2002).

Kenneth Bruscia, a leading music therapist, defined music therapy as “A systematic process of intervention wherein the therapist helps to promote health, using music experiences and the relationships that develop through them as dynamic forces of change (Bruscia, 1998, p. 20).”

A music therapist does not develop music or musical skills (though this may be an unintentional by-product). It is a misconception that might be implied by analogy with physiotherapy or speech and language therapy, which put simply address physical and communication needs (Bunt, 2001). Instead, a music therapist uses the relationships that develop through music with the purposeful intent “to promote health”. Many music therapists define their practice as meeting the healthcare, or personal, needs of their clients, and they focus on needs arising from pathological difficulties and characteristics.

A music therapist’s theoretical approach, and the influence this has on his/her understanding of a client’s needs, determines the basis of the therapeutic relationship, the methods used and the goal(s) of therapy. Two contrasting examples from the intellectual disability field will clarify this. A practitioner who, on the one hand, aligns him/herself with a psychotherapeutic approach uses musical experiences to develop a relationship that promotes health by resolving an individual’s physical, emotional and psychological difficulties. On the other hand, although the approach used in this thesis still develops a musical relationship and promotes health, the basis of that relationship, the methods used, and the direction and goal(s) of therapy are different. In this case, the music therapy approach develops a musical relationship through the conditioning use of music. It promotes health by providing music as a stimulus to reduce or eliminate inappropriate behaviours that tend to be considered an ‘unhealthy’ and unwanted aspect of an individual; and by using music to increase positive, appropriate and ‘healthy’ behaviour. The approach used in this thesis is in line with Bruscia’s definition of *Behavioural Music Therapy* (BMT).

“In Behavioural Music Therapy, the therapist uses music to increase or modify adaptive (or appropriate) behaviours and to extinguish maladaptive (or inappropriate) behaviours. Music may be used as a positive or negative reinforcement, a group contingency, a

conditioner of other reinforcers, or a behavioural antecedent or cue for other behaviours” (Bruscia, 1998, p. 184).

4.3 Music therapy models

BMT is based on Skinner’s behaviourist theory. There are also humanistic and psychodynamic music therapy models. *Creative Music Therapy* (Nordoff & Robbins, 1977), for example, incorporated aspects of humanistic theory (Gold, Voracek, & Wigram, 2004). Nordoff and Robbins (1977) related therapeutic goals to Maslow’s humanistic concepts by “including in their framework the aspiration towards self-actualisation, peak experiences and developing special creative talents” (Wigram et al., 2002, p. 126). Creative music therapists work in pairs (one establishes a musical relationship, while the other engages the client and facilitates his/her responses), and they absorb each client in music making from the moment s/he enters the room to the moment s/he leaves it (Wigram et al., 2002).

The most prominent music therapy models with a psychoanalytic orientation are *Analytical Music Therapy* (AMT) (Priestley, 1975, 1994) and *Guided Imagery and Music* (GIM) (Bonny, 1975; Bonny & Savary, 1973). Although both encourage the client to be aware of inner moods, images and associations, AMT is an active, music making, technique, and GIM a receptive, listening, one. AMT uses improvisation, whereas, during GIM a supine client listens to specifically programmed classical music (Wigram et al., 2002).

4.4 Active and receptive music therapy techniques

The distinction between active and receptive music therapy techniques, more than anything else, underpins “the differences within and across countries as to what specifically constitutes music therapy” (Bunt, 2001, p. 535). This chapter has already introduced two receptive techniques (GIM and BMT), and two active techniques (Creative Music Therapy and AMT); it will identify another active technique (Music Activity Therapy) and two other receptive techniques (Music Therapy in Medicine, Vibroacoustic Therapy).

Whereas music evolves in improvisation-based active music therapy, in *Music Activity Therapy* (MAT) predetermined activities are “selected so that participation in them requires the client to learn or practice a targeted competence” (Bruscia, 1998, p.

185). The “primary focus of MAT is to improve adaptive behaviour” (Bruscia, 1998, p. 186). It is not an insight-orientated approach that hopes to resolve psychological conflict. MAT accommodates and augments the goals and treatment plans of other disciplines, such as physical, occupational and speech therapies, and focuses on the acquisition of sensorimotor, perceptual, cognitive, emotional, or social skills (Bruscia, 1998). For example, a client might be encouraged to walk in time to recorded music as it requires co-ordinated gross body movements, and supports physiotherapy goals (Oldfield & Peirson 1985). The music therapist believes there is a tautological relationship between musical skills and functional abilities so that any developments in a client’s musical response are related to improvements in adaptive behaviour, and conversely improved adaptive behaviour is dependent on increasing musical ability.

The first receptive technique (*Music Therapy in Medicine*) assumes listening to music elicits a psychological response that influences mood, and produces a physiological response that lowers heart or pulse rate and alters arousal levels. (In certain circumstances music might be manipulated to raise heart or pulse rate, elevate mood and increase attention). Dileo-Maranto (1993) places Music Therapy in Medicine on a continuum that moves from supporting medical treatment (e.g. music listening during kidney dialysis), to being an equal partner (e.g. singing in conjunction with medication as a treatment for respiratory disorders), to acting as the primary intervention for a medical condition (e.g. music listening to directly suppress pain). Furthermore, surgeons often play background music in the operating theatre. There is some evidence that what Spintge (1993) calls ‘anxiolytic music’ not only provides a relaxing and conducive atmosphere for the medical team, but also improves compliance during the preparation phase of a surgical procedure, and reduces the distress, anxiety and pain suffered by patients who are conscious during treatment (Spintge, 1982, 1988, 1993; Spintge & Droh, 1982).

The second receptive technique, *Vibroacoustic Therapy* (VAT), uses music as a physical treatment (Wigram et al., 2002). Clients recline on a chair, mattress, or bed, and music played to them through built-in speakers is also experienced as audio generated vibrations. A review of VAT (Hooper, 2001a, 2002) found instances when it had a positive effect on pain (Burke, 1997b), pulmonary disorders like asthma and emphysema (Wigram, 1995b), psychological states including insomnia and anxiety

(Hooper & Lindsay, 1997) and muscular conditions associated with cerebral palsy (Wigram & Weekes, 1985).

There is one significant difference between improvised music and the music used in receptive techniques. Improvised music can be made with voice, body, or instruments, and it can be very free. In comparison, a music therapist who uses a receptive intervention selects music from the array of CD recordings available, and applies the properties of that music to achieve development, growth and improvement (Wigram et al., 2002). In Music Therapy in Medicine, and during VAT, music therapists typically use calming music. In BMT, music therapists use both live performance and recorded music. These stimuli either hold the necessary properties to reinforce desired behaviour (usually related to individual preference), or the 'reward' of getting some form of 'music experience' is contingent reinforcement for good behaviour (Madsen, Cotter, & Madsen, 1968).

4.5 Music therapy and intellectual disability

Music therapists have always believed that they can meet the needs, and develop the potential of the intellectual disability population (Watson, 2002). For example, Juliette Alvin (1959), widely considered the mother of music therapy in Great Britain, outlined how 24 children (6 to 16 years) with mild to severe intellectual disability responded when they attended six short concerts that also included contact with the performer (the author) and her instrument (a cello). She described their vocal and physical reactions ("some made noises as if trying to sing or whistled softly; others moved their hands or feet, beat time with their fingers" (p. 991)). She identified changes in their level of engagement ("immediate curiosity became interest, and their desire to participate was more than mere imitation" (p. 991)). She noted how their "self control and confidence developed" as they "came forward to play a note on the cello" (p. 992).

4.5.1 Literature search

A systematic computerised, and manual, literature search was carried out that looked at databases for the terms 'music' and 'music therap\$', crossed with 'retard\$', 'mental retard\$', 'disabilit\$', 'development\$ delay\$', 'special needs', 'special

education', 'EMR', 'Down's syndrome', 'autism', 'Rett syndrome', 'cerebral palsy', and other synonyms of these.

The databases searched were: AMED (Allied and Complementary Medicine 1985-), British Nursing Index Archive (1985-1996), British Nursing Index (1994-) CINAHL – Cumulative Index to Nursing and Allied Health Literature (1982-), EMBASE (1980-), ERIC (1965-), Ovid MEDLINE (R) (1950-), PsycINFO (1806-) and Social Work Abstracts (1977-). The hand-searched journals, accessed physically, via the internet (www.musictherapyworld.de), or on CD-ROM (Music Therapy Research: Quantitative and Qualitative Foundations CD-ROM 1 1964-1998) were: Journal of Music Therapy (1964-), Music Therapy Perspectives (1982-), Music Therapy (1981-1996), Journal of British Music Therapy (1987-1996), British Journal of Music Therapy (1997-), Nordic Journal of Music Therapy (1992-), Canadian Journal of Music Therapy (1973-1979 and 1993-), New Zealand Society for Music Therapy Annual Journal (1987-), The Australian Journal of Music Therapy (1990-), Music Therapy Today (online www.musictherapytoday.com 2001-2007) and Voices: A World Forum for Music Therapy (online www.voices.no 2001-). The reference lists of papers identified in this way were checked for additional material. Finally two published registers of music therapy studies, with 170 and 148 citations respectively, helped pinpoint relevant literature from 1921-1959 (Sears & Sears, 1964), and references to research with disabled children and youth from 1975-1999 (Jellison, 2000).

In total, 636 documents written between 1943 and 2008 were identified. They included published review articles, books, chapters, or theses, and some of the “grey literature” that is not controlled by commercial publishers. The research reports and conferences papers cited in ERIC were considered, but the dissertation abstracts in PsycINFO were not. The writers were mainly from North America (n=385), and the UK and Ireland (n=183). The remaining 11% originated from Europe (n=32), the Middle East (n=8), Africa (n=2), South America (n=3), Australasia (n=19) and the Far East (n=4).

The intellectually disabled individuals discussed in these documents ranged in age from 14 months (Witt & Steele, 1984) to 77 years (Wigram, 1992a), in cognitive ability from mild (Byrnes, 1997) to severe intellectual ability (Darnley-Smith & Patey, 2003) and had related conditions including Rett Syndrome (Hadsell &

Coleman, 1988), autism (Graham, 2006; Heal & O'Hara, 1993), Down's syndrome (Rapp, 2004) and Williams syndrome (Udwin & Yule, 1991).

4.5.2 Literature review

This review provides a context for the research undertaken in this thesis. It organises the literature into three broad categories: 'descriptive' (surveys, reports, case studies, literature reviews/meta-analyses), 'philosophical' (speculation, criticism, indicators for research) and 'experimental' (i.e. either controlled research carried out within or between subjects, comparing interventions, or recording pre- and post-intervention responses). It is arranged in this way, to highlight social and cognitive, physical, and emotional and psychological outcomes, and to consider the strengths and weaknesses of music therapy research in this clinical area.

Hooper, Wigram, Carson and Lindsay's publications (2008a) (2008b) are detailed accounts of this material (see appendices 1 and 2). They describe many of the studies referenced in this chapter more fully, and the second paper, a review of the experimental literature, begins with an in depth discussion of research and theories that pertain to the musical aptitude of the intellectual disability population.

4.5.2.1 Descriptive

The descriptive literature (n=308) discusses active and to a lesser extent receptive music therapy techniques. (These citations include one historical paper, twelve literature reviews and three meta-analyses. Some of these papers will be considered later rather than in this section of the chapter).

4.5.2.1.1 Surveys

There were seventeen surveys. They looked at (1) methodology (n=3), (2) provision (n=7), and (3) client responses (n=7). They collected data from music therapists (Chase, 2004; DiGiammarino, 1994), health and education professionals (Bracefield, Kirk-Smith, Slevin, Sutton, & Thompson, 2000; Evers, 1992; Jackson, 2007; Ockelford, Welch, & Zimmermann, 2002) and parents and carers (Hughes & Fullwood, 1985; Kaplan & Steele, 2005; Saul, 2007).

The first group examined and informed music therapy methodology. Chase (2004) carried out a survey that *examined* methodology. Chase (2004) gathered

responses from 95 music therapists working with children with an intellectual disability, and identified that motor, communication, social, cognitive and music were the five most frequently assessed major skills areas. On the other hand, Wasserman, Plutchik, Deutsch and Taketomo (1973) and DiGiammarino (1994) completed surveys that *informed* methodology. Wasserman et al. (1973) assisted the planning of music therapy. They invited families to complete a questionnaire, and gathered information about the musical preferences and aptitudes of 16 adults with an intellectual disability. DiGiammarino (1994) helped leisure programming by asking 222 music therapists to categorise 45 functional music listening skills and 19 functional performance skills into two levels of difficulty.

The second group of surveys found shortfalls in music therapy provision for people living in Northern Ireland (Bracefield, Kirk-Smith, Slevin, Sutton, & Thompson, 2000), and in the curriculum and staffing of music education in England (Ockelford, Welch, & Zimmermann, 2002). They also offered encouragement for music therapists. Evers (1992) established that, in the Federal Republic of Germany at least, paediatricians, child and youth psychiatrists and paediatric institutions were ready to employ music therapy as a treatment for autism. Jellison and Duke (1994) discovered that US teachers supported educational mainstreaming, and accepted the inclusion of students with intellectual disability in regular music lessons. When Jackson (2007) asked nurses, teachers and care staff in the Republic of Ireland, they agreed that music “enabl(ed) people with intellectual disability to reach desired goals” (p. 37). Saul (2007) also received positive feedback from professionals and carers involved with a music therapy service in South East London. They “gave a clear indication that music therapy could support their clients in gaining greater access to their wider communities and experiencing more opportunity and control in planning their lives” (p. 120).

The third group of surveys (client responses) was the most interesting. Music was identified as a favourite activity of the intellectual disability population in general (Hughes & Fullwood, 1985), and of people with Rett syndrome in particular (Merker, Bergström-Isacsson, & Engerström, 2001). Bunt and Alberman (1981) highlighted positive changes in children’s behaviour and in staff attitudes. They used three separate questionnaires to evaluate the role of music therapy in a London district. Kaplan and Steele (2005) analysed the goals and outcomes of a music therapy

programme for individuals (2-49 years) with diagnoses on the autism spectrum. The respondents (30 out of 42 parents/carers invited to participate) used a four point Likert scale, and they told Kaplan and Steele (2005) that all those who attended sessions (n=30) either “occasionally” or “frequently” (p. 14) generalised responses acquired or practised in music therapy to non-music therapy environments.

The survey is a method of collecting information, and the material gathered on provision, on methodology and on client responses, informs practitioners by identifying development areas, and offering practical details on undertaking music therapy with the client group. The survey also provides evidence that supports the efficacy of the intervention. These endorsements, especially those from outside the profession, provide music therapists with useful evidence when advocating increases in music therapy provision either in their geographical area, or to education and health service administrators.

As well as the surveys identified above the descriptive accounts were either an overview of a particular aspect of work (report), or they looked at how one client, or a group, responded to improvisation or Music Activity Therapy (narrative case study). The next section will summarise the reports.

4.5.2.1.2 Reports

There were 101 reports. Although mostly written by music therapists, the authors also included an artist in residence (Langford, 1985), and individuals from the nursing (Hodges, 1981; Parriott, 1969), teaching (Dunn, 1992; Groves & Groves, 1980) and occupational therapy professions (Zielinski, 2001).

Several authors provided general accounts of work settings and music therapy programmes. Wigram (1988), for example, described “a broad-based, but specialised service” (p. 42). Wigram focused on the processes involved (e.g. each session began with a musical greeting activity when group members greeted the therapists and each other), and identified a “considerable reduction in aggression and a notable increase in their tolerance of each other” (p. 45). Farnan (2003) wrote about music therapy groups in Central Wisconsin and summarised treatment goals. Ely and Scott (1994) and Sutton (2002) described programmes that integrated isolated people into the wider community. In each case, when people were welcomed and valued in a music therapy session, rather than segregated or avoided, it accelerated social skills, turn

taking, concentration and interaction. Portowitz and Klein (2007) gave examples of how MISC-Music (a programme focusing on the content of music sessions, the learning environment and the skills fostered) enhanced the cognitive processing of young children with severe intellectual disability.

The writers described how each programme was set up (Chance, 1987; Farnan, 2003; Tuduri, 2006), and/or identified specific techniques. These techniques included: (a) non-traditional guitar (Cassity, 1977), (b) Soundbeam, (equipment that creates sound without physical contact) (Swingler, 1998), (c) music software (Anonymous, 2006; Ingber, 2003; McCord, 2001), (d) the Orff-Schulwerk method (it uses task analysis to determine and then develop the component skills necessary to perform an exercise) (Dervan, 1982), (e) learning an instrument (Rosene, 1982; Zielinski, 2001), (f) taking part in public performance (Beall, 1985; Williams, 1985), (g) listening to short concert performances (Alvin, 1959; Murphy, 1958), and (h) a multidisciplinary approach combining music therapy with other arts therapies (Watson & Vickers, 2002), speech therapy (Oldfield & Parry, 1985), physiotherapy (Dunachie & Budd, 1985; Oldfield & Peirson 1985) and occupational therapy (Oldfield & Feuerhahn, 1986).

Finally, the reports often detailed the benefits of introducing music therapy to people with an intellectual disability. Table 2 lists and cites the specific skills that were encouraged. The emphasis was clearly on non-musical gains as only Alvin (1971), who reported improved melodic and rhythmic discrimination, described musical developments.

Table 2: Reported benefits of introducing music to people who have an intellectual disability

Social	<i>Communication</i> <i>Relating to others</i> <i>Cooperation</i> <i>Peer acceptance</i>	Rowe (1995) Sutton (2002) Parriott (1969) Ely and Scott (1994)
Cognitive	<i>Motivation</i> <i>Concentration</i> <i>Perceptual ability</i> <i>Learning</i> <i>Musical development</i>	McMahon (1978) Smith (1987) Grant (1989) Thomas (1978) Alvin (1971)
Physical	<i>Movement</i> <i>Body awareness</i> <i>Spatial awareness</i> <i>Limb extension</i>	Oldfield and Peirson (1985) Bean (1986) Thomas (1978) Bean (1986)
Emotional and Psychological	<i>Expressing emotion</i> <i>Alleviating agitation</i> <i>Pleasure</i> <i>Accomplishment</i> <i>Self esteem</i>	Parriott (1969) Hooper (1991) Clark (1968) Monagan (1989) Monagan (1989) Zielinski (2001)

4.5.2.1.3 Case study

As well as describing specific programmes, music therapists have used narrative case study writing (hitherto simply referred to as the case study) to look at individual or group responses in closer detail.

The single, multiple, or group case study was the favoured method of descriptive writing. It accounted for over half (174 out of 308) of the descriptive articles. 95% (166 out of 174) were accounts of active music therapy. The remaining eight described receptive techniques. They discussed the use of VAT (Ellis, 2004; Persoons & De Backer, 1997; Wigram, 1997b) and recorded music (A.L. Steele, 1967; Sullivan, Laverick, & Lewis, 1994).

Each case study illustrates a client's progress either over a lengthy period (Atkinson (2003) and Tyler (1998) describe 4 years improvisation), or by focusing on significant moments (Ansdell, 1995b; Atkinson, 2006; Cole, 2003), specific sessions (Levinge, 1993; P. Steele & Leese, 1987), or certain periods of therapy (Agrotou, 1988; Levinge, 1990). The writer describes a client before s/he commences active or receptive music therapy and then reports his/her progress.

A case study written in this way often provides an opportunity to illustrate and comment on the intervention offered, or to identify ways in which music therapy can

address a specific condition. For example, Aigen (1995), Ansdell (1995a) and Ritholz and Turry (1994) discussed Creative Music Therapy. Purdon (2002) and Kowski (2002) illustrated Analytical Music Therapy (AMT). In the case studies that documented using music therapy with specific diagnoses, Krout, Burnham, and Moorman (1993) addressed the lack of independence, and Herron (1970) the muscular coordination problems, associated with cerebral palsy. Di Franco (1999) tackled the compulsive behaviour, Wimpory and Nash (1999) the social isolation, and Wolf, Ruttenberg, Levin and Levin (1969) and Nye (2003) the emotional detachment characteristic of autism. Finally, Wigram (1991a; 1997b) attended to the purposeless mannerisms and high activity levels displayed by girls with Rett syndrome.

The case studies did not adhere rigidly to the format outlined above. Watson (2007b) used three imaginary clinical examples to illustrate the four stages in the therapy process: referral, assessment, treatment and ending of therapy. Wheeler and Stultz (2008) combined descriptions of typically-developing infants, and children with severe intellectual disability during music therapy, to demonstrate that therapists and helpers can use typical infant development to gather ideas about development issues. Hooper, McManus and McIntyre (2004) supplemented their account by evaluating eye-contact, interaction and participation, Agrotou (1988) added musical scores, and Rainey Perry (2003) video analysis. Some writers described programmes carried out as part of a multi-disciplinary team (Richards, 2007; Watson, 2008), with children and their families (Bull, 2008; Loth, 2008), or in conjunction with speech therapists (Bruscia, 1982), physiotherapists (Elefant & Lotan, 2004), or other creative arts experiences (Alvares, 1998; Zigelbaum & Rubino, 1991). Finally, some either examined an element of the music therapy process (Cowan, 1989), or focused on a particular active music therapy technique (Oldfield, 1995; Turry & Marcus, 2005). Cowan (1989) used an individual case study to discuss the therapist's role in Creative Music Therapy. Turry and Marcus (2005) illustrated the teamwork in Nordoff-Robbins music therapy with a moment-by-moment description of each music therapist's role.

Case studies lack the empirical foundation of controlled, or comparative, experimental research, and do not present results that use observation or experiment to test a particular hypothesis; nevertheless, they do give a good account of the potential benefits of improvisation and MAT.

The group case studies (n=16) illustrate the social benefits of music therapy. Nicholls (2002), describes how four 16-17 year old adolescents with severe intellectual disability “explored their roles”, “worked on emotional issues” and “developed some important social skills” (p. 244). Watson (2007a) demonstrates that music therapy can play a key role during social transition by helping people anxious about the opportunities they are being given to take part in community activities. The group case studies also look at how to set up and run a session, and discuss some of the problems that can occur. Watson (2007c), and Goodman (2007) take the reader through the organisation, aims, structure, musical input and outcomes of a group session. Tyler (2002) worked with four boys (14 years to 17 years) and described how it was difficult to set group boundaries and encourage interaction.

Single or multiple case studies, that described individual improvisation or MAT sessions, accounted for 150 of the remaining 158 case studies, and made up the majority (150 out of 174 or 86%) of the case study literature. While they demonstrated progress in a variety of areas, any improvement often depended on redirecting or reducing challenging behaviour. Wigram (1991b), for example, described 22 months of music therapy re-channelling the mannerisms of an 11-year-old girl with Rett’s Syndrome. Steele (1967) described how recorded music controlled a child’s aggressive, self-directed behaviour, and increased cooperative interactions.

Several authors reported gains either in social functioning (Salas & Gonzalez, 1991; A. L. Steele, 1984), in cognitive (Goldstein, 1964) or musical ability (Barclay, 1978; Shoemark, 1991; Spitzer, 1989), or in a combination of these areas (Krout, Burnham, & Moorman, 1993). Krout et al. (1993) described how electronic music increased the independence, attention-to-task and colour and instrument identification skills of a 17-year-old girl with intellectual disability and cerebral palsy.

In some individual case studies active music therapy achieved physical goals. Herron (1970) explained that the continual use of hands and fingers, and the continuous air stream needed to play a melodica, improved the muscular co-ordination and breath support of cerebral palsied children with mild intellectual disability. Yasuhara and Sugiyama (2001) addressed physical symptoms of Rett syndrome. They gave three children the chance to play instruments by themselves,

and increased purposive hand use “from 2 to 12 s(econds) in case 2 and from 7 to 80 s(econds) in case 3” (p. 82).

Improvisation facilitated improvements in communicative behaviour. These improvements ranged from helping a woman (35 years) with profound intellectual disability to communicate at a deep preverbal level (Kowski, 2002), through developing turn taking and interaction (Rainey Perry, 2003), to promoting speech and language development (Sutton, 1993). A coordinated MAT and speech therapy intervention prompted a similar array of outcomes: non-verbal communication (Mahlberg, 1973; Stevenson, 2003), the speech articulation of a ten-year-old autistic boy (Farmer, 1985) and the elementary reading skills of a child with mild intellectual disability (Lathom, Edson, & Toombs, 1965).

Improvisation allows people with an intellectual disability to use instruments and sounds to represent and externalise emotions such as anger, sadness and melancholy (Wigram et al., 2002). Several authors described how it held, contained and supported a client expressing painful feelings (Etkin, 1999), managing anger (Ansdell, 1995c; Brown, 2002), or accepting failure (Bennis, 1969). Different authors have outlined different outcomes. For example, Heal and O’Hara (1993) and Etkin (1999) indicated the psychological benefits. Heal and O’Hara (1993) described the progress made by an anorexic Down syndrome woman (28 years) who had mild intellectual disability. Nine months into therapy, significant changes were apparent in the young woman’s mental state, and although admitting to episodes of anorectic behaviour when under stress her weight remained fairly stable. Etkin (1999) described how three years holding, containing and supporting the experience and expression of painful feelings helped an abused child (9 years) with severe intellectual disability. Ritchie (1991), on the other hand, looked beyond the confines of the music therapy room. She described how improvisation helped a disturbed and isolated man trust other people, and made it easier for him to be integrated into other hospital day services. Saville (2007) described a similar outcome. Music therapy provided the emotional support for an aggressive and self-injuring man with autism spectrum disorders (ASD) to move to a new home.

Overall, reports and case studies provide a very comprehensive and compelling account of how music therapy helps the intellectual disability population. Nevertheless, more attention could be paid to the assessment phase of the treatment

process, and the role it might play understanding behaviour. Raglio, Traficante and Oasi (2006) and Wigram (1992b; 1995a; 1999; 2000; 2002; 2007a) provide useful starting points. Raglio et al. monitored the first improvisations of seven children (3 to 10 years) with intellectual disability, and devised a system for coding changes in patient/therapist interactive behaviour. Wigram used the abilities and skills that emerged during assessment, to differentiate autism from communicative disorder and other forms of intellectual disability. In a similar manner, papers that describe the practical benefits outside the treatment room (Boisvert, 2002; Bunt, 2002), and that evaluate the musical content of sessions (Luck et al., 2006), should encourage practitioners to either consider documenting the long-term effect of music therapy, or to examine how musical response and the degree of intellectual disability are related.

This review will now discuss the philosophical literature. It will consider how that literature promotes music therapy and contributes to professional debate.

4.5.2.2 Philosophical

There were fifty-five philosophical articles. The earliest examples, written at a time when music therapy was developing as a profession, either considered how it might benefit diagnostic sub-groups (Alvin, 1961; Lathom, 1964), or focused on the part it could play in conjunction with other interventions (Buchan, 1943), or in the promotion of particular skills (Cleland & Swartz, 1970; Gilliland, 1951). Alvin (1961) and Lathom (1964) discussed the treatment of cerebral palsy and emotional disturbance. The first published paper (Buchan, 1943) considered how it contributed to an education programme. Gilliland (1951) focused on the development of physical skills, and Cleland and Swartz (1970) on facilitating socialisation.

Although subsequent material still promoted music therapy as a viable and credible intervention for people with an intellectual disability, writers began debating professional and practical issues. For example, LaFon (1989, p. 25) criticised “the behavioural tunnel vision” of some music therapists; whereas, Dunachie (1995) favoured a more objective approach, and argued that musical material should be understood within the normal musical development framework rather than as an abstract representation of inner state. Twyford and Watson (2007) discussed the benefits (e.g. offering a holistic approach) and positive challenges (e.g. assuming different roles) of multidisciplinary work, and provided music therapists with

guidelines for good collaborative working. Kittay (2008) posed the problem of adapting and designing a suitable sound environment for people particularly attuned to sounds around them.

Writers also discussed particular stages of the treatment process, and either examined the music therapist's role in assessing client need (James, 1986), in determining treatment goals (Lathom & Eagle, 1982), or in evaluating progress (Wigram, 1993b). James argued that quality music therapy services depended on careful assessment. He wrote brief rationales asking readers to consider how twelve different standardised instruments might help them document progress. Lathom and Eagle (1982) suggested that the four non-musical aims (encouraging participation, encouraging cooperation, improving motor skills, improving cognitive skills) most frequently identified by music therapists working with children who had severe intellectual disability were "the key to the child's success in school" (p. 31). Wigram (1993b) outlined the positive effect of VAT and improvisation on self-injurious behaviour, and argued that different techniques were needed to evaluate contrasting music therapy interventions. Wigram (1993b) suggested that whereas the passive nature of VAT made it possible to record information while the session was going on, a music therapist could not be distracted during an improvisation session, and subsequently video analysis was the best way to evaluate that particular intervention.

Finally, philosophical papers discussed how to manage and administer a music therapy programme in the light of changing government legislation. In the UK, Watson (2003) asked music therapists to consider how they might meet two of the objectives of a government white paper *Valuing People* (Department of Health, 2001), and deliver a community music therapy programme that helped people with intellectual disability develop full and satisfying lives. In the US, DeLoach Walford (2007) helped music therapists use a new educational approach (The SCERTS®model) by identifying current music therapy activities that addressed its goals and objectives. (The SCERTS®model uses a multidisciplinary approach and current research to address the educational priorities of children with ASD (Prizant, Wetherby, Rubin, & Laurent, 2006)).

The descriptive and philosophical writing described to date has an important part to play understanding and developing the role of music in the treatment of intellectual disability. It identifies clinical outcomes, and informs and advances

clinical practice. The experimental literature that follows considers another aspect: it examines the efficacy of music therapy as an intervention for individuals with an intellectual disability.

4.5.2.3 Experimental

The experimental literature is divided into two sections. It examines how people with an intellectual disability respond to active music therapy techniques (n=77), and looks at material that evaluates their response to receptive music therapy techniques (n=112).

4.5.2.3.1 Active music therapy

In active music therapy the client produces the musical content, and shares instrumental and/or vocal ideas with the therapist (Grocke & Wigram, 2007). This part of the review looks at active music therapy research that evaluated improvisation (n=9) and MAT (n=68) sessions.

4.5.2.3.1.1 Improvisation

Improvisation is generally an insight-orientated approach intended or used to resolve psychological conflicts. The musical content of improvisation-based active music therapy *evolves* through instrumental and vocal exchanges (Bunt, 2001). These exchanges usually take place between therapist and client; although on some occasions the client's mother might also participate (Alvin (1981), Warwick (1995), and Woodward (2003; 2004) have all described playful mother-child interactions).

Although music therapists who evaluated improvisation continued to deliver an intervention with a psychodynamic orientation, their experimental investigations did not focus on psychological outcomes; instead, they evaluated how improvisation affected the behaviour and/or the skills of individuals with an intellectual disability. Lawes and Woodcock (1995) measured generalisation of gains and compared improvisation with a control condition. They observed four females (41 to 52 years) with severe intellectual disability in their everyday environment, and recorded the incidence of self-injury during music therapy and therapist interaction conditions. There were “no observable gains in positive engagement, vocalisation, or self-injurious behaviour...as a result of the music therapy” (p. 270).

In contrast, improvisation techniques helped Oldfield and Adams (1990), Hooper (1993) and Edgerton (1994) achieve individual objectives. Edgerton (1994) increased the communicative behaviours of 11 autistic children (6 to 9 years). Oldfield and Adams (1990) and Hooper (1993) compared the effect of improvisation and play therapy, and suggested that the improvisation process had been key when they achieved individual objectives to a greater extent in music therapy than in play sessions. Oldfield and Adams (1990) randomly recruited four participants, identified therapeutic goals and created a behavioural index for each goal. Random, time-sampled video analysis provided frequency and duration measures that determined each individual's progress. Hooper (1993) introduced a 27-year-old-woman with severe intellectual disability to five music therapy and five play therapy sessions. Independent observers used Likert scales to evaluate random sections of video footage chosen from each session. The Likert scores suggested that music therapy was twice as effective as play therapy developing participation, interaction, eye contact, cooperation and motivation.

Fillingham (2007) examined relationships in an improvisation group. She interviewed the six participants before and after twenty weekly sessions, and asked two music therapists to code the degrees of connection within the group (minimal, low, medium, high) from four, eight minute video extracts. The interviews showed that the participants had widened their social network, and developed friendships with group members. The two music therapists detected a shift from minimal to medium levels of connection.

Finally, Aldridge, Gústroff and Neugebauer (1995a) used waiting-list controls to evaluate Creative Music Therapy. They detected an improvement in hearing and speech, hand-eye co-ordination and personal-social interaction. A follow-up study (Aldridge, Gústroff, & Neugebauer, 1995b) suggested that these changes occurred as early as the first session, and that they influenced each child's behaviour at home.

These studies are the first tentative evaluations of improvisation. There is the sense that researchers, determined to build on the case study literature, develop a methodology that takes their set of circumstances into account. Inevitably, each is forced to make compromises. Lawes and Woodcock (1995), for example, expressed concern that experimental design had interfered with the therapeutic process; the music therapist deviated from normal working practices by interacting without

conducting music therapy. Oldfield and Adams (1990) acknowledged that practical constraints had restricted the number of treatment sessions videotaped, limited the number of participants observed and precluded an assessment of long-term effect. Indeed, all the researchers were quick to recognise that results needed to be validated by a much larger participant group, and that until this was the case each outcome was “best considered a pointer in a general direction rather than a conclusive statement” (Aldridge et al., 1995a, p. 204).

4.5.2.3.1.2 Music Activity Therapy (MAT)

The musical content of a MAT session is *predetermined*. Clients are engaged in musical activities that practice or teach a targeted adaptive behaviour. In this way MAT accommodates and augments the goals and treatment plans of other disciplines, such as physical, occupational and speech therapies, and focuses on the acquisition of sensorimotor, perceptual, cognitive, emotional, or social skills (Bruscia, 1998). This section looks at the treatment goals (sensorimotor, cognitive, and social development) and the particular music activities (songs and singing) evaluated by experimental research.

(a) Sensorimotor development:

Many people with intellectual disability experience physical disabilities that restrict their mobility and range of movement, and impair their sensorimotor development.

James, Weaver, Clemens and Plaster (1985) used a music and movement programme to improve motor skills. They matched slow swaying, spinning and bouncing with the beat of music. They compared twelve individuals with severe or profound intellectual disability and a control group (n=12), and “facilitated significant gains...for the experimental group” (p. 32).

(b) Cognitive and social development:

The intellectual disability population possess a significantly below average level of intelligence (based on an IQ test), and they experience cognitive, language, motor and social impairments. MAT can enhance their cognitive and social skills.

Experiments that evaluated music instruction detected improvements in basic music ability (Walker, 1982; Wilson & Fredericks, 1982) and rhythmic responsiveness (Leimohn, 1986; Luckey, Carpenter, & Steiner, 1967; Ross, Ross, &

Kuchenbecker, 1973). Wilson and Fredericks (1982) completed two pilot investigations, and they found that moderately and severely handicapped children were capable of making gains in keyboard skills, and increased the time they spent humming, singing and trying to play musical instruments. Ross et al. (1973) compared the pre- and post training scores of fourteen experimental and fourteen control group participants with mild intellectual disability. The results indicated that teaching rhythm skills improved eight categories of rhythmical responses including clapping to a beat, imitating a rhythm and keeping time with instruments.

There were also significant gains in measured intelligence. When Wingert (1972) assessed ten children who attended MAT, and a control group (n=10) who participated in regular music classes, the difference between pre- and post-test Peabody Picture Vocabulary Test scores was +5.6 for the experimental group and – 1.6 for the control group. Staples (1968) improved Paired-Associate learning by presenting pairs of words and nonsense syllables in a rhythmic framework. This outcome suggested that music assisted cognitive development by improving retention and memory skills.

A more recent experiment showed MAT contributing to the social development of individuals with an intellectual disability. MacDonald, O'Donnell and Davies (1999) recruited an experimental group (n=19) who participated in music workshops using a set of percussion instruments collectively known as the Gamelan, a non-intervention group (n=16), and an intervention control group (n=24) that took part in cooking and art classes. There was evidence that “gains in communication (identified by the research) were significantly correlated with gains in Simple Rhythm Production and Instrumental Rhythm Production (measured by the Elmes test of Musical Attainment)” (p. 235). MacDonald et al. (1999) commented that “at the same time as developing musical skills, the participants also appear(ed) to develop certain communication skills that (were) important in terms of inter-personal interactions” (pp. 235-236). Boso, Emanuele, Minazzi, Abbamonte and Politi (2007) also found that music therapy affected the participant's musical skills and behaviour profile. When eight young adults took part in fifty-two sessions it helped music absorption and rhythm reproduction, and improved autistic symptoms.

Other investigations have shown that music activities affect the social behaviour of children and adults with an intellectual disability. When music therapy

was structured for the purpose, it increased attentive behaviour (McCarthy & Bakaitis, 1976), communication responsiveness (Braithwaite & Sigafoos, 1998), and interactions with intellectually disabled (Hooper, 2001b; Humpal, 1991) and non-intellectually disabled peers (Gunsberg, 1988). Braithwaite and Sigafoos (1998) used an ABAB reversal design to compare appropriate communication responses during social interaction (A), and singing and playing activities (B). Five children (3 years 5 months to 4 years 10 months) were included in the study. The results suggested that the music condition increased the communication responsiveness of three participants. When Humpal (1991) evaluated a programme that structured peer interaction, the mean percentage of students (n=25) who selected a partner rose from 69% during pre-test to a post-test figure of 93%. Hooper (2001b) organised MAT and a control condition (ball games) to assist the social interactions of four people with an intellectual disability (33 to 51 years). He found that both interventions increased peer interactions, and suggested that these results affirmed the value of employing non-verbal interventions to encourage interaction. The participants had been able to interact in spite of limited linguistic skills, and the music activities and ball games had diffused the stress associated with doing so. Gunsberg (1988) suggested that music sustained social play between children with and without intellectual disability because it accommodated their varying playing styles and skills.

Finally, DeBedout and Worden (2006) highlighted the key role personal contact with a music therapist plays when MAT addresses the social factors that contribute to challenging behaviour. They monitored the movement responses (assumed to be a positive measure of an attempt to interact) of 17 children (5 years to 13 years). A music therapist singing to and playing with an intellectually disabled child evoked more movement responses than two impersonal interventions (switch activated toys and recorded music).

(c) Songs and singing:

Music Activity Therapy is an active music therapy intervention that employs a variety of activities, and in particular research has focused on how songs and singing meet the needs of individuals who have an intellectual disability.

There is evidence that songs and singing have assisted speech and language by developing imitation (Buday, 1995), articulation (Detzner, 1997) and expressive language skills (Hoskins, 1988). Buday (1995) demonstrated that 10 children with

autism and mild to severe intellectual disability (4 years 4 months to 9 years) correctly imitated more sung than spoken words. Detzner (1997) improved the articulation and self-confidence of 10 people with profoundly intellectual disability (12 years to 21 years) by asking them to humm and tap the rhythm of a target word, to then add the actual word to the tapping, and finally to move on to independent vocalising. Hoskins (1988) reported a significant improvement in pre-/post-intervention Peabody Picture Vocabulary Test scores of 16 children (2 years to 5 years) with intellectual disability.

Songs and singing have also played a significant role assessing and treating Rett syndrome. When Elefant (2005) used a single subject multiple probe case design to monitor how seven participants (4 years to 10 years) responded to familiar and unfamiliar songs, clear likes and dislikes emerged (they preferred familiar songs that were faster and included differences in tempo and vocal sounds). This suggested that a motivational list could be put together for each child that would “ensure (their) co-operation in any activity calling for active participation” (p. 158).

Finally, songs and singing activities developed skills and modified behaviour. Orlando (1993) and Kern (2004) used original songs to increase basic coin money skills. Kern also found that songs embedded into classroom routines as structural prompts increased social interaction (Kern, Wolery, & Aldridge, 2007) and improved independent performance during self-care tasks (Kern, Wakeford, & Aldridge, 2007). Participants with mild intellectual disability, who sang out their psychological history (psychodramatics) (n=20), or took part in group singing (n=20), developed “more positive and healthy concepts of self” (p. 71) than those who did not (n=20) (White & Allen, 1966). Hooper, Lindsay and Richardson (1991) found that a daily singsong reduced displays of anxiety-related challenging behaviours when an institutionalised 36 year-old woman with moderate intellectual disability returned to her ward. Brownell (2002) and Pasiali (2004) demonstrated that setting a social story to music (a short story that describes appropriate responses to a person, skill, event or social situation (Gray, 1998)) had the potential to decrease a targeted challenging behaviour.

(d) Discussion:

There is some compelling empirical evidence that active music therapy contributes to the skills and well being of the intellectual disability population. Furthermore, music therapists appear to be aware of the range of adaptive functions affected when an individual has an intellectual disability, and they realise the

importance not just of finding out whether MAT alleviates impairments associated with the condition, but also of considering how it does so. However there are confounds and limitations that detract from this body of work.

When group formats are investigated, the extent to which observational learning plays a part remains unclear. It is possible that different results may have been obtained in a one-to-one format. Maturation, and/or any concurrently running treatments, may have contributed to observed improvements when results were based on pre- and post-test measures separated by a period of time. Short experimental periods, and the added interest of another person (the consequence of the strong interpersonal element in improvisation and MAT), may have increased the possibility of a Hawthorne Effect (Landsberger, 1958) when responses are due to the novelty of the intervention.

A positive assessment of the improvisation and MAT research must also be weighed against the overall absence of generalisation and maintenance data. In the main, the studies stopped short of identifying any long-term effect. MacDonald et al. (1999) were a rare exception. They indicated that the developments made by the experimental group remained six months following the intervention. Likewise, Elefant (2005) performed maintenance sessions, and established that learning was sustained over time. Otherwise, the reported effects were limited to a particular stimulus and a very specific context.

Finally, there is a shortfall in experimental research (n=77) compared to descriptions of active music therapy (n=174). Reviews of music therapy and education (Stephenson, 2006), music therapy and autism (Accordino, Comer, & Heller, 2007), two meta-analyses (Gold, Voracek, & Wigram, 2004; Whipple, 2004), a Cochrane review (Gold, Wigram, & Elefant, 2006) and a Succinct and Timely Evaluated Evidence Review (STEER) (Ball, 2004) reached the same conclusion. Accordino et al. (2007) found that there were a limited number of empirical investigations. Stephenson (2006) carried out an exhaustive search, and identified only seven studies published between 1995 and 2004 that included children aged 4 to 18 years old with moderate to profound intellectual disability or multiple disabilities (excluding ASD). Ball (2004), Gold et al. (2006) and Whipple (2004) focused on autistic spectrum disorder and found less than ten published studies.

In many respects, the paucity of experimental literature may reflect underlying concern within the music therapy profession that reducing a dynamic, interpersonal process to series of numbers ignores the musical content of active music therapy as a whole, and the psychodynamic orientation of models based on improvised music. Certainly, Lawes and Woodcock (1995) struggled with that notion when they questioned whether their experimental design may have interfered with the therapeutic process.

Active music therapy is grounded in one-to-one relationships, and often explores the emotional states of individuals, and this makes it difficult to gain scientific proof of success. However, more studies are needed that provide valid clinical evidence from which to draw substantive conclusions. Music therapists must be careful how they achieve this. When Duffy and Fuller (2000) compared a non-music control group (n=15), and participants with moderate intellectual disability (5 to 10 years) who took part in a music therapy social skills training programme (n=16), the music therapy condition was a cassette tape of pre-recorded music and an instruction manual. Although it controlled for Hawthorne effect, the intervention failed to capture the spontaneity and creativity of active music therapy. As psychologists they may be excused for believing that MAT can be presented in this manner. However, the answer is not to compromise active music therapy interventions but to find a research methodology that (1) retains the flavour of music therapy sessions, (2) takes account of the individuality of treatment, and (3) acknowledges how recruitment difficulties and the complex nature of intellectual disability make it difficult to create homogeneous control and experimental groups.

Only six of the seventy or so studies that examined MAT gathered qualitative data. These studies used interviews (Allgood, 2005; Tam et al., 2007), qualitative examination (Stough, 1994), video analysis (Holck, 2004; Wheeler, 1999) and detailed narratives (Donnell, 2007). It is difficult to explain why qualitative methodologies have not been employed more frequently. Qualitative research is a more naturalistic method of enquiry which relies on observation, and uses words rather than numbers to describe the qualities of phenomena (Bowling, 1997b). As such, it seems the natural extension of the descriptive writing that is so widely favoured. Single subject research design (also referred to as single-case experimental design) is another answer. The term originates from the fact that each participant

serves as his/her own control, and a single subject study determines the relationship between *dependent variables* (the behaviour(s) measured) and *independent variables* (the interventions) (Goodwin, 1995). Elefant (2005) and Kern (2004) demonstrated that it did not compromise the flexibility of active music therapy, and allowed music therapists to adapt MAT to the particular needs of a single child.

4.5.2.3.2 Receptive music therapy

Instead of making music, receptive music therapy always involves listening (Wigram et al., 2002). The music, which may be pre-composed, specially composed, or improvised, is based on the client's need (Grocke & Wigram, 2007). Children's songs are used with younger individuals (Macurik, 1979), and adults are introduced to contemporary music, and contemporary music styles, that include rock and roll (Cotter, 1971) and country (Rapp, 2004). The stimulus may be presented 'live' (i.e. sung or played to the client by a music therapist), or it may be relayed via a CD player, computer, or through a vibroacoustic device (Grocke & Wigram, 2007). The client who attends receptive music therapy often responds silently. However, they may be encouraged to react verbally or non-verbally. For example, music collage is a non-verbal technique that allows clients to express their inner feelings by arranging illustrations, photographs, pieces of coloured paper or cloth and other materials on to a piece of paper or cardboard (Grocke & Wigram, 2007).

4.5.2.3.2.1 Contingent and contingent-interrupted stimulus

Fifty-six studies played a music stimulus to people with an intellectual disability. It was presented either dependent (contingent) on the performance of a desired behaviour, or removed (contingent-interrupted) when there was unwanted behaviour. The passive stimuli that were used included: recorded music (Cotter, 1971), the subject's preferred recorded music (Hallum, 1984), music and vibration (McClure, Moss, McPeters, & Kirkpatrick, 1986), televised music lessons (Dorow, 1976) and record listening (Jorgenson, 1974). Although active stimuli were employed less frequently, Talkington and Hall (1970) and Cook and Freethy (1973) used piano playing, Walker (1972) playing rhythm instruments in time to recorded music, and Garwood (1988) an improvisational music therapy session.

Contingent music was rewarding enough, and contingent-interrupted music punishing enough, to either promote a desired behaviour, or reduce the incidence of an inappropriate one. The various contingent or contingent-interrupted music stimuli (a) developed motor skills and promoted better posture, (b) improved academic performance and work rate, and (c) addressed challenging behaviour.

(a) Developing motor skills and promoting better posture:

People with an intellectual disability may also experience physical impairment (Hooper & Lindsay, 1997), and whereas researchers by and large ignored the effect of active interventions on sensorimotor development, they demonstrated the value of receptive ones.

A contingent stimulus encouraged participants with a physical disability to control head (Walmsley, Crichton, & Droog, 1981) and hand movements (Gutowski, 1996). It was also used to develop upper body posture (Johnson, Catherman, & Spiro, 1981; Silliman-French, French, Sherrill, & Gench, 1998) and head positioning (Grove, Dalke, Fredericks, & Crowley, 1975; Macurik, 1979; Wolfe, 1980). Wolfe (1980) promoted correct head posture among some cerebral palsied participants with mild to profound intellectual disability. Macurik (1979) decreased the slouching of three patients with severe intellectual disability by presenting recorded children's music dependent on correct head position.

(b) Improving academic performance and work rate:

The intelligence level of the intellectual disability population is significantly below average (American Psychiatric Association [APA], 2000), and some investigations have discovered that contingent music can enhance academic performance and work rate.

Miller (1976) presented high preference (rock) and low preference music (classics) when more sums were correctly calculated. It improved the arithmetic performance of four groups (n=6) of children with mild intellectual disability. Cotter (1971) and Bellamy and Sontag (1973) increased assembly line production rates. Cotter (1971) demonstrated that eight girls with moderate intellectual disability worked significantly faster under contingent music conditions than eight non-contingent participants.

(c) Addressing challenging behaviour:

Intellectual disability is associated with additional unusual behaviours that fall into the broad categories of aggression, destructiveness, self-injury and stereotyped mannerisms. The term 'challenging behaviour' is used to describe these behaviours. It is a reminder that they are 'challenges' to services, and not problems that people with an intellectual disability carry around with them (Blunden & Allen, 1987).

Steele and Jorgenson (1971) interrupted preferred music immediately after each challenging behaviour and decreased the stereotypic hand movement and rocking of a 10-year-old child with profound intellectual disability. Rapp decreased stereotypy by taking away background country music (Rapp, 2004), and by using music to compete with or substitute the sensory stimulation generated by vocal stereotypy (Rapp, 2007). Dellatan (2003) reduced the food refusal behaviours, and increased the food consumption, of a five-year-old boy with autism. His favourite music was turned off when he did not swallow all his food, and only turned on again when he had swallowed all his food and said, "I want music, please!" (chapter 7 will discuss eating disorders and disruptive eating behaviours in more detail).

(d) Discussion:

How do contingent and contingent-interrupted stimuli measure up as interventions? There are possible methodological limitations and confounds that will affect any investigation. First, surrounding noise may distract participants when they try to focus on an auditory stimulus. Second, the interrupted music conditions generally involve two contingencies: removing music contingent on disruptive behaviour, and re-presenting music contingent on non-disruptive behaviour. It is possible that either, or both, may have been responsible for the changes observed. Third, the treatment phases of each investigation reward an increase in performance. Consequently, an experimental procedure which ensured success bred more success may have contributed to increased performance rather than the contingent musical stimulus.

Despite the reservations that surround the use of contingent and contingent-interrupted music, Standley (1996) gave a measure of their success with participants who had in intellectual disability. Standley (1996) included 98 studies in a meta-analysis that calculated mean effect size when contingent and contingent-interrupted music was used to reinforce education/therapy objectives. The studies were carried

out with normal participants, emotionally impaired, medically/physically impaired and people with an intellectual disability. The greatest effects were observed among the intellectual disability population (ES=3.16).

4.5.2.3.2.2 Non-contingent stimulus

A non-contingent stimulus must have an effect on behaviour. It is a process that begins with music altering mood state (a psychological change) and then influencing heart rate or pulse rate (a physiological change). There are investigations that demonstrate both a positive and a negative correlation between the tempo and volume of music and changes in general activity. These investigations provide the theoretical basis for using non-contingent music with the intellectual disability population. For example, Adams, Tallon and Stangl (1980) compared television viewing, listening to the radio and periods of quiet. They found that four participants (23 to 56 years) with profound intellectual disability displayed significantly lower levels of stereotypic behaviour during periods of quiet, than when the television or radio were turned on. On the other hand, Cunningham (1986) discovered that the vocalisations of seventeen people with severe intellectual disability decreased when instrumental jazz-rock music was played loudly in the group room, and increased when it was played softly.

Non-contingent music has been widely used in the treatment of pre-op (Robb, Nichols, Rutan, Bishop, & Parker, 1995), post-op (Burke, 1997a) and hospital out patients (Bampton & Draper, 1997). It has also helped the elderly by facilitating sleep (Lindenmuth, Patel, & Chang, 1992), reducing agitation (Tabloski, McKinnon-Howe, & Remington, 1995) and decreasing disruptive behaviours (Casby & Holm, 1994). However, despite evidence that a non-contingent stimulus alters their activity level, only a small number of studies considered how it affected individuals with an intellectual disability. These studies looked at (a) productivity and task performance (n=14), (b) activity level and attention (n=7), (c) challenging behaviour (n=6), range of movement (n=7) and anxiety (n=8).

(a) Productivity and task performance:

Richman (1976), and later Groenweg, Stan, Celser, MacBeth and Vrbancic (1988), examined whether people with an intellectual disability performed monotonous workshop tasks any better with non-contingent background music. Both

demonstrated that it improved the accuracy and rate of performance. Richman (1976), for example, increased the mean number of envelopes 30 participants with a severe intellectual disability filled and then dropped into a wooden bin.

Non-contingent background music also enhanced performance in a learning environment, and during physical exercise. Riddoch and Waugh (2003) found that, compared to rock music, non-contingent classical music significantly improved paintings produced by students both with (n=12) and without (n=12) severe intellectual disability. Owlia, French, Ben-Ezra and Silliman (1995) invited five adolescents with profound intellectual disability to ride a stationary ergometer. Time-on-task was significantly higher during preferred music than a non-reinforcement condition.

(b) Activity level and attention:

There are just a handful of investigations that examine the effect of non-contingent music on activity level and attention. Ayres (1987) is the only study, experimental or otherwise, that considered how individuals with an intellectual disability responded when non-contingent music was introduced during mealtimes. Ayres (1987) compared oral functions and elapsed feeding times when six severely handicapped people dined in a school cafeteria with unpredictable noise, and in an environment where unpredictable noise was less intrusive and non-contingent music was played. The music condition relaxed high muscle tone and improved oral function. The elapsed feeding times were longer during the music condition, and the feeder's perceptions that they were either shorter or unchanged suggested that the music had calmed them and they had not felt rushed.

Gadberry, Borroni and Brown (1981) and Kaufman and Sheckart (1985) both found that non-contingent music did not change general activity level. Gadberry et al. (1981) recruited ninety-six institutionalised adults with an intellectual disability. They found that the presence or absence of music "had no significant effect on overall attention or on selective attention" (p. 314). Kaufman and Sheckart (1985) observed twenty adults with profound intellectual disability in their daily living environments. The auditory stimulation/activity level relationship did not differ significantly during fast and slow tempo music, white noise and no auditory stimulation (control condition).

(c) Challenging behaviour, range of movement and anxiety:

Investigations of challenging behaviour, range of movement and anxiety, used sedative, rather than stimulating music, as a non-contingent stimulus. In these instances, the researchers were testing the evidence discussed earlier that calming music decreased activity levels.

A sedative stimulus had a mixed effect on challenging behaviour. Caron, Donnell and Friedman (1996) reduced some of the participants teeth grinding. Coyne, Dwyer, Kennedy and Petter (2000) introduced classical music (60 bpm) into four classrooms for students with severe intellectual disability. They decreased out of seat behaviour, lowered the noise level and in one case “lightly-reduced” self-stimulatory behaviour. On the other hand, Kennedy and Souza (1995) relayed background music via a portable radio, and discovered that it was not as effective as a hand-held video game competing with and reducing the eye-poking of a youth with profound intellectual disability.

Wigram used VAT to improve the range of movement of individuals with profound intellectual disability and spastic cerebral palsy (Skille & Wigram, 1995; Wigram, 1992a, 1997a), and to reduce the anxiety, restlessness and challenging behaviour of two out of three adult participants (26 to 31 years) (Wigram, 1993a). Finally, a series of controlled case studies (Hooper & Lindsay (1990; 1991; 1997)) demonstrated that sedative music lowered anxiety levels. Hooper and Lindsay (1990) and Hooper and Lindsay (1997) compared the effect of recorded and live music (singing to the participants), and highlighted an advantage of providing relaxing music in person; the participants “respond(ed) better to the attention of an individual” (Hooper & Lindsay, 1997, p. 173).

4.5.2.4 Conclusion

So, what has been learned from this review, and how has it been implemented in the empirical work that follows?

First, an important question has just been asked about introducing non-contingent, or for that matter contingent and contingent-interrupted, music to people who have an intellectual disability: namely, will it command their attention? Ford (1999) suggested that it would. Ford (1999) compared a non-music activity (water play), an active (instrument playing) and a receptive (listening) music intervention,

and found that music listening was the only one that encouraged a strong downward trend in teeth-grinding. On the other hand, Luckey, Carpenter and Steiner (1967) reached the opposite conclusion. They discovered that the motor activity, interest and attention of fifteen adults with mild intellectual disability increased when a music therapist clapped, sang and marched compared to when s/he played recorded music and sat inactively. It appeared that just as Hooper and Lindsay (1997) and DeBedout and Worden (2006) were suggesting, individual attention played an important role encouraging a positive response, and non-contingent music was often no substitute for the presence of a music therapist.

Although this may explain why Gadberry et al. (1981) and Kaufman and Sheckart (1985) discovered that non-contingent music did not significantly alter the general activity level of individuals with an intellectual disability, it ignores the many occasions when receptive interventions influenced motor skills, activity level, attention, academic performance, work rate, or challenging behaviour. Perhaps the choice of stimulus explains the lack of effect. Gadberry et al. (1981) commented that they “did not independently verify the attractiveness of the musical accompaniment program” (p. 315). Consequently, it seems that a researcher should get this aspect of any receptive intervention correct. S/he can do this, either by identifying the participant’s preferred music, or when this is not possible by carefully selecting contingent, contingent-interrupted, or non-contingent music, and by making sure a procedure is in place to identify the most appropriate stimulus.

Second, only a handful of experimental studies examine how music therapy affects challenging behaviour, and they investigate a variety of interventions: improvisation (Lawes & Woodcock, 1995; Muller & Warwick, 1993), singing (Brownell, 2002; Hooper et al., 1991; Pasiali, 2004), contingent, contingent-interrupted and non-contingent music (Barmann & Croyle-Barmann, 1980; Caron et al., 1996; Ford, 1999; Greenwald, 1978; Rapp, 2004, 2007; A.L. Steele & Jorgenson, 1971; Wigram, 1993a). Further research is needed. In many cases, there was a small sample. In addition, music therapists were reluctant, not just in this writing, but also in the literature as a whole, to consider whether music therapy exerted any influence out with the treatment room in areas of daily life. Aldridge et al. (1995b), Ayres (1987), Boisvert (2002), Bunt (2002), Kaplan and Steele (2005), Ritchie (1991) and Saville (2007) have been identified as rare exceptions, but of these only Aldridge et

al. (1995b) and Ayres (1987) completed experimental investigations. This thesis carries out empirical work in an everyday environment by investigating how a receptive music therapy intervention affects disruptive behaviours that present a 'challenge' during mealtimes. Ayres (1987) has already examined the situation (mealtimes) chosen for this thesis; however, while it is an interesting piece of work, the setting (a sound controlled environment) and the eating abilities of the participants (they required physical assistance) are different.

Finally, let's look ahead to what follows in this thesis. When chapter 3 identified the harmful side effects and aversive quality of some challenging behaviour treatments, and expressed unease about the applicability of others, there appeared to be room for a low-tech, easily used alternative that made few cognitive demands and that did not raise any ethical concerns. Non-contingent sedative music meets all these criteria. All it requires is an individual who is able to encode the stimulus.

The way the intellectual disability population often responds to generalised and phobic anxiety disorders suggests that maladaptive ways of dealing with anxiety, as much as underlying pathology, drives challenging behaviour (Lindsay, Neilson, & Lawrenson, 1997). In theory, sedative music may calm that agitated mental state; however, there are technical and practical difficulties, not least balancing concerns about hypersensitivity to sound, and worries over noise abuse, with the need expressed in the literature to ensure that participants can hear the stimulus. The introduction of background music also raises concern about the lack of control the intellectual disability population are being allowed to exercise over their own environment. While it helps to closely observe their reactions, and quickly withdraw background music if necessary, the intellectual disability population often respond to it in an unpredictable way. Consequently, the same conclusion is reached as before; namely, that great care needs to be taken selecting an appropriate stimulus.

The next two chapters (chapters 5 and 6) introduce criteria that were developed to define sedative music, and describe the selection of an appropriate sedative stimulus for two investigations in chapter 7 with people who have an intellectual disability.

Chapter 5

Developing criteria to determine the selection of commercially recorded non-contingent sedative music for research

“A survey of music selected for relaxation and anxiety reduction revealed not only a wide variety of musical genres including classical, soft rock, hard rock, folk, Christian and jazz, but also a variety of dynamic and structural features including tempo, loudness, orientation, rhythm, and form. ...The characteristics of the selections defy the more traditional categorization of music as either sedative or stimulative”
(Davis & Thaut, 1989, pp. 180-181).

5.1 Introduction

The previous three chapters have set the context for this chapter and for the research that follows. Chapter 2 discussed the complex aetiology of challenging behaviour, and suggested that it was driven by maladaptive ways of dealing with anxiety, as much as by underlying pathology. Chapter 3 examined the theoretical basis for using psychodynamic, behaviourist, cognitive, humanistic and psychopharmacological approaches to manage challenging behaviour. It concluded that none of the interventions associated with each approach was 100% effective, and it suggested that there appeared to be room for a low-tech, easily used alternative that made few cognitive demands, and that did not have harmful side effects. When chapter 4 presented a wide-ranging review of music and intellectual disability, non-contingent sedative music met all these criteria. However, because they were often unable to exert choice or control over their environment and the stimuli within it, there were ethical issues that needed to be considered when such a stimulus was provided for people with an intellectual disability. Chapter 4 suggested that very careful attention needed to be paid to the selection of appropriate music.

This chapter will include a discussion of music psychology, ethnomusicology and sociology of music. It will also review research, published between 1996 and 2008, which used commercially recorded non-contingent sedative music (hereafter referred to as sedative music). The latter, will inform the development of a more considered and robust sedative music selection procedure which culminates with the introduction of a tool making clear statements about the criteria that determine the choice of this stimulus. The former, will highlight aspects of the musicology literature relevant both to the development of that tool and the experiments reported in chapter 6.

5.2 Music psychology, ethnomusicology and sociology of music

The term musicology literally means reasoned discourse concerning music. Music psychology, ethnomusicology and sociology of music are three disciplines from within the field of musicology, and each have distinct interests (Sadie, 2001).

At the theoretical and experimental end of the research spectrum, music psychologists believe that “the aesthetic response to music is behaviour and is amenable to an empirical approach” (Carterette & Kendall, 1999, p. 726). They

ignore the subtleties of the musical frame, and focus instead on the perceptual and cognitive functions of music. Dowling and Harwood (1986), for example, suggested that melodies were heard and remembered by a few salient perceptual features. The search for these features was governed by mental schemas that developed during childhood from the melodies of a culture. They were a level of information higher than specific pitches or tempos, and they could be affected by a variety of factors including an individual's musical training. Research has demonstrated that musicians out performed non-musicians identifying pitches (Cuddy, 1970) or recognising a chord played with different instruments (Beal, 1985), not because being a musician was associated with different cognitive or perceptual processing systems, but because musicians had stored more patterns and strategies related to musical structures (Carterette & Kendall, 1999).

At the anthropological, humanistic, end of the research spectrum, sociology of music and ethnomusicology employ observational and descriptive field methods (Carterette & Kendall, 1999). Sociology of music studies finds out how people 'consume' music, and what it does in their social life. For example, DeNora (1997) examined the role of music during intimate occasions, focused on its connection to love and courtship, and highlighted how it was viewed as a non-verbal accomplice. The interviewees (in particular the two younger age groups) described how they used 'mood' music which had served as a 'soundtrack' on previous occasions, to reproduce feeling states, and to structure the grammar and style of intimate interaction.

Ethnomusicology is widely regarded as the anthropology of music (Titon, 1997). Ethnomusicology examines music in its cultural context. It endeavours to understand music by recording and transcribing it, or by interviewing musicians. An ethnomusicologist who is a universalist looks for common behaviours or beliefs, while a particularist is interested in differences (Becker, 2001). Baily (1988) carried out particularist ethnomusicological research that used the observations, descriptions and verbal reports of expert musicians to compare the music cultures of North India and the Afghan city of Herat. Baily (1988) provided a link with music psychology by concluding that Heratans learnt to play by ear, whereas North Indians thought musically in schemas. The next section of this chapter continues to look at the relationship between the different musicology disciplines.

5.3 Relationship between music psychology, ethnomusicology and sociology of music

The different experimental and theoretical perspectives in music psychology, ethnomusicology and sociology of music prompted Carterette and Kendall (1999) to highlight possible sources of conflict between an observational paradigm like ethnomusicology and an objective paradigm like music psychology. Carterette and Kendall (1999) suggested that for those involved in sociology of music and ethnomusicology “the use of experimental methods, explicit theories, and quantification ... is seen as a misguided effort to reduce observations to statistical mappings onto the grids of rigid models whereupon beautiful, subtle phenomena disappear” (p. 727). Conversely, they suggested that music psychologists regard “the observational, descriptive field methods of the ethnomusicologist ... as subjective, undisciplined efforts with findings that lack objectivity and are colored by the biases of the discipline and its methods and of the individual researcher” (p. 727). Nevertheless, despite these tensions there is evidence that music psychology overlaps with ethnomusicology and sociology of music.

Music psychology developed in the last decades of the nineteenth century. The first phase (1880-1920) was characterised by experimental research carried out by Stumpf (1883-1890). Stumpf observed and measured responses to selected single tone stimuli. This work was the foundation for behaviourist music psychology (Lundin, 1967), for the empirical study of auditory discrimination skills (tone psychology) and for the development of musical tests (Seashore, 1919). New theories have emerged since then. In the 1930s, Kurth (1931) and Mursell (1937) adopted a Gestalt point of view, and instead of isolating single stimuli attempted to understand tone psychology within the context of the musical experience (Kurth, 1931). More recently, music psychology reflected the influence of the humanistic tradition and ethnomusicology. Sloboda caricatured laboratory studies as the “pharmaceutical model” (Sloboda, 1989b) because they presented listeners “with music that was not of their own choosing in an environment (the laboratory) ... controlled and constructed by the experimenter” (Sloboda, 2005c, p. 319). Sloboda took a diametrically opposite position. He moved research away from the laboratory and examined everyday uses of music listening. He acknowledged that situation influenced musical response, and when he investigated cognitive, affective, or aesthetic responses

participants were allowed to choose what to listen to, and where and when they wanted to listen to it (Sloboda, 2005c). This approach has informed the methodology of experiments reported in chapter 6 of this thesis.

Music psychology also overlaps with sociology of music. Hargreaves and North (1997), in the introduction to *The Social Psychology of Music*, suggest that music psychology will always be an interdisciplinary area because musical behaviour “cuts across a number of different psychological processes (perception, creation, cognition, skill, learning and so on)” (p. 3). They observe that when Sloboda (1986) attempted to define the main concerns of music psychology he identified several sub-disciplines (“distinct tributaries of the mainstream” (p. 3)) of which the social aspects of musical behaviour was one of the most prominent. It was a sub-discipline that recognised how the social environment played an integral role explaining age-related changes, and that complimented the social psychologists responsibility to consider the social dimension and investigate the effects of particular listening and performing/composing situations.

5.4 Emotional response to music

It is out with the scope of this chapter to comment further on how music psychology, ethnomusicology and sociology of music overlap. Instead, it will look at the part they play understanding emotional responses to music.

5.4.1 Introduction

Two ideas best sum up current thinking about the emotional effects of music: perception and production. The first is that music *expresses* emotion (perception). The second, that music goes beyond the cognitive inference of what the music is said to express and *produces* emotion (production). Although it is a popular conception that composers express their present feelings (Cook & Dibben, 2001), the more plausible view is that they use various structural factors to achieve expressions unrelated to those feelings (Scherer & Zentner, 2001). Tchaikovsky, usually considered a very ‘emotional’ composer, gave some indication that this was the case when he wrote....

“Those who imagine that a creative artist can – through the medium of his art – express his feelings at the moment when he is moved, make a great mistake. Emotions – sad or joyful – can only be expressed retrospectively ... a work composed in the happiest surrounding may be touched by dark and gloomy colors” (cited in Fisk, 1997, p. 157).

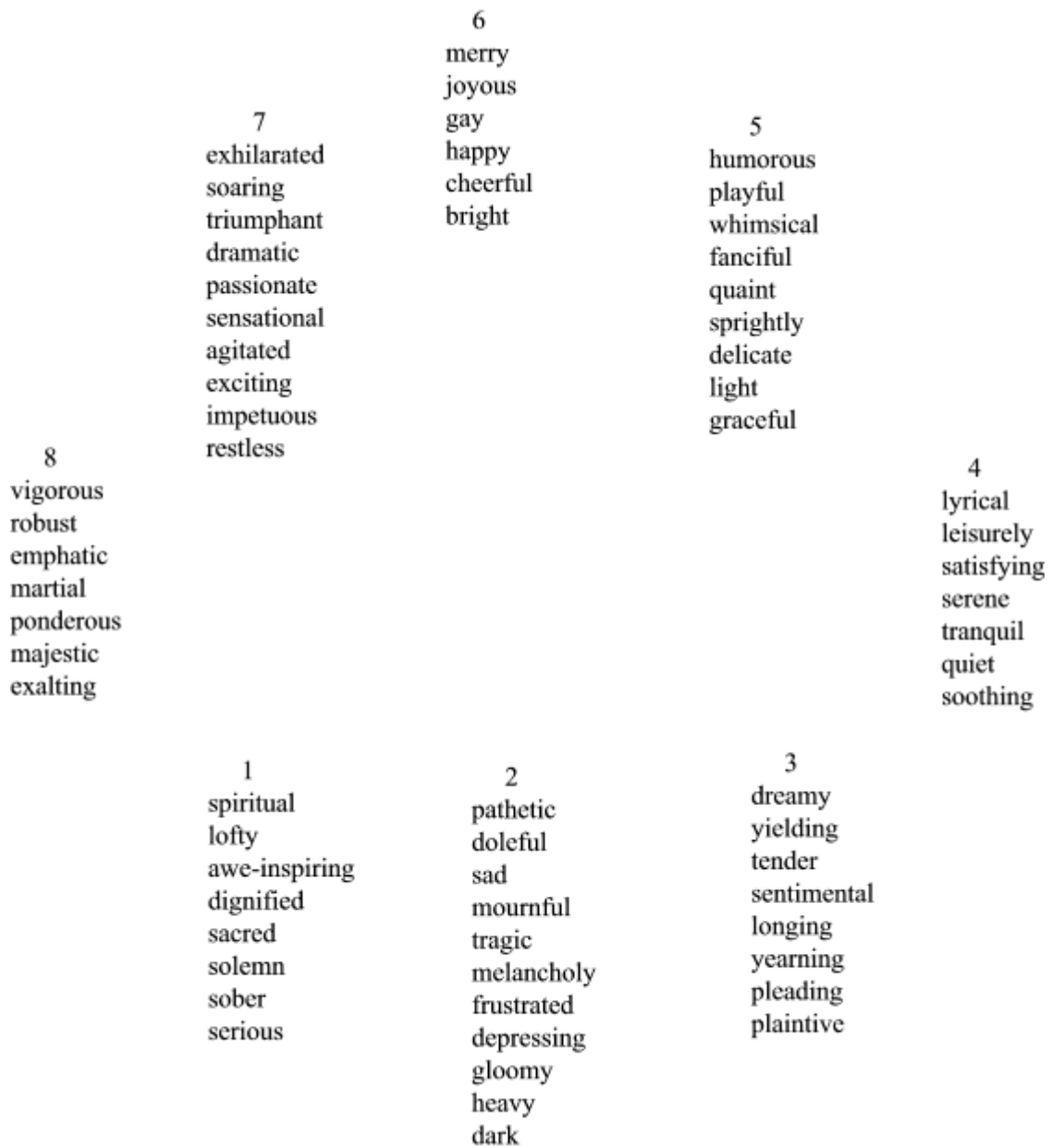
5.4.2 Structural factors and perceived expression

Empirical studies have established relationships between a variety of structural factors (e.g. tempo, pitch, loudness, interval distribution, melodic range) and perceived expression (Gabrielsson & Lindström, 2001). After a cautious start in the late nineteenth century, this type of investigation became more common from the 1930s onwards. Participants reported perceived expression either by using free descriptions, by selecting adjectives or nouns from a list, or by rating how well adjectives or nouns described music. The listener’s free descriptions were subjected to content analysis, their selections were analysed for frequency or intersubject agreement, and their ratings were usually subjected to multivariate analysis (e.g. factor analysis, cluster analysis) (Gabrielsson & Lindström, 2001). In the last twenty years or so psychologists have also been using continuous self-report as it allows them to monitor moment-to-moment fluctuations (Schubert, 2001).

Davidson, Scherer and Goldsmith (2003) have provided a very useful review of this research. They identified several investigations that asked participants to listen to real music. In an early example, Watson (1942) studied the relationship between different musical elements and perceived expression. Twenty experts were given a list of fifteen adjectives. They listened to thirty classical compositions, selected the most appropriate adjective, and used a five-step Likert scale to judge pitch, loudness, tempo, sound, dynamics and rhythm. The results suggested that high pitch and fast tempo tended to express happiness and excitement, low pitch and slow tempo expressed sadness, high loudness conveyed excitement, and small dynamic range expressed dignity, sadness and peacefulness.

Some studies used real music and manipulated specific factors. Lindström (1997) manipulated the rhythm, melodic contour and direction of Frère Jacques. A multivariate analysis of 19 psychology student’s responses found that emotional

expression was most affected by harmonic, followed by rhythmic and melodic factors. The earliest and still the best known investigations of this type were completed by Hevner (1935a; 1935b; 1936; 1937). Hevner arranged a large number of emotion terms into eight clusters that were supposed to be close in meaning. Figure 1 shows how the clusters (dignified (cluster 1), sad (2), dreamy (3), serene (4), graceful (5), happy (6), exciting (7), vigorous (8)) were placed in a circle so that the dignified cluster was opposite graceful, sad was opposite happy and so on. Hevner selected short pieces of tonal music, and asked participants to mark adjectives as they listened to the original version and a variant. The variant differed from the original in mode (1935a), in melodic direction, harmony and rhythm (Hevner, 1936), and in tempo and pitch level (1937), and any difference in their choice was ascribed to the manipulated variable.

Figure 1: Hevner's emotion terms arranged in 8 related clusters

Gabrielsson and Lindström (2001) have adapted Hevner's summary of the results (Hevner, 1937, p. 626). It is reproduced in table 3. The summary shows the musical factor associated with each emotion cluster. The numbers indicate the relative weight of each musical factor for each emotion cluster. For example, the most important factors in order for the serene cluster were slow tempo, simple harmony and high pitch.

Table 3: Gabrielsson and Lindström's adaptation of Hevner's summary of the results

Musical factor	Dignified	Sad	Dreamy	Serene	Graceful	Happy	Exciting	Vigorous
Mode	Minor 4	Minor 20	Minor 12	Major 3	Major 21	Major 24	-	-
Tempo	Slow 14	Slow 12	Slow 16	Slow 20	Fast 6	Fast 20	Fast 21	Fast 6
Pitch	Low 10	Low 19	High 6	High 8	High 16	High 6	Low 9	Low 13
Rhythm	Firm 18	Firm 3	Flowing 9	Flowing 2	Flowing 8	Flowing 10	Firm 2	Firm 10
Harmony	Simple 3	Complex 7	Simple 4	Simple 10	Simple 12	Simple 16	Complex 14	Complex 8
Melody	Ascend 4	-	-	Ascend 3	Descend 3	-	Descend 7	Descend 8

Finally, research was also carried out with isolated musical stimuli. It associated the major and minor mode (or key) with happiness and sadness respectively (Crowder, 1984; 1985; Crowder, Reznick, & Rosenkrantz, 1991), and demonstrated that rapid rhythms were rated happier than slow rhythms (de la Motte-Haber, 1968). Studies that examined emotional response to harmonic intervals (simultaneous two-tone chords) and melodic intervals (successive tones) discovered that listeners found high-pitched harmonic intervals more happy and powerful than low-pitched ones (Costa, Bitti, & Bonfiglioli, 2000; Maher, 1980), and associated consonant melodic intervals with stability (Costa, Fine, & Bitti, 2004; Smith & Williams, 1999).

Some of this research is summarised in table 4. It is based on information provided by Gabrielsson and Lindström (2001). Table 4 lists five factors: form, tempo, volume, melody and harmony, and subdivides melody into four elements (line, timbre, pitch, and accents). Each factor is then split into different levels (e.g. fast or slow tempo; soft or sharp timbre), and alongside each level the table states the emotion identified by the researcher(s) who appear in brackets.

Table 4: The influence of musical factors and levels within each factor on emotional expression

FACTOR	LEVEL	EMOTIONAL EXPRESSION
Form	Low complexity	Relaxation/less tension (Nielsen, 1983), Peace (Balkwill & Thompson, 1999)
	High complexity	Tension (Krumhansl, 1996; Nielsen, 1983)
Tempo	Fast	Agitation (Rigg, 1940b), Happy, Vigorous (Hevner, 1937)
	Slow	Serene, Dreamy, Sad (Hevner, 1937), Tranquil (Gundlach, 1935)
Volume	Loud	Excitement (Watson, 1942), Joy (Rigg, 1939), Gaiety (Nielzén & Cesarec, 1982)
	Soft	Peaceful (Watson, 1942), Tenderness (Kleinen, 1968)
	Large changes	Fear (Scherer & Oshinsky, 1977)
	Small changes	Pleasantness (Scherer & Oshinsky, 1977)
	Rapid changes	Playful (Watson, 1942), Fear (Krumhansl, 1997)
	Few/no changes	Peaceful (Watson, 1942)
Melody – Line	Regular/smooth rhythm	Peaceful (Watson, 1942), Serene (Hevner, 1936)
	Irregular/rough rhythm	Amusing (Watson, 1942), Uneasy (Gundlach, 1935)
	Complex/varied rhythm	Angry, Joyful (Thompson & Robitaille, 1992)
	Firm/flowing rhythm	Dignified, Graceful, Serene (Hevner, 1936)
Melody – Timbre	Soft	Tenderness, Sadness (Juslin, 1997)
	Sharp	Anger (Juslin, 1997)
Melody – Pitch	High	Serene, Happy, Dreamy (Hevner, 1937)
	Low	Sad (Hevner, 1937), Melancholy (Gundlach, 1935), Solemn, agitation (Rigg, 1940a)
	Wide range	Glad (Gundlach, 1935), Joy (Balkwill & Thompson, 1999)
	Narrow range	Tranquil, Melancholy (Gundlach, 1935), Sadness (Balkwill & Thompson, 1999)
Melody – Accents	Staccato	Agitation (Rigg, 1939), Energy (Wedin, 1972), Anger (Juslin, 1997)
	Legato	Melancholy (Rigg, 1939), Softness (Wedin, 1972), Sadness (Juslin, 1997)
Harmony	Simple/consonant	Relaxation/Tenderness (Lindström, 1997), Graceful, Serene, Dreamy (Hevner, 1936)
	Complex/dissonant	Exciting (Hevner, 1936), Agitation (Rigg, 1939), Tension (Nielsen 1983), Krumhansl (1996), Lindström (1997))

There are two reasons why table 4 is important. First, it identifies the effects of separate musical factors. Second, it has established that a sedative response occurs either when there are few or no changes to a factor, or at one extreme of two contrasting levels.

Few changes in volume, a melody with a narrow pitch range, and the stability of firm/flowing rhythm encourages peaceful, tranquil and serene emotions.

Non-aroused and aroused responses are associated with the extreme ends of each factor. At the extreme ends of form, low complexity is associated with non-arousal and high complexity with high arousal. The same applies to tempo (slow is linked with non-arousal and fast with arousal), volume (soft is associated with non-arousal and loud with arousal), and harmony (consonant is linked with non-arousal and dissonant with arousal). Finally, in melody (a) a regular and smooth line is linked with non-arousal and an irregular and rough line with arousal, (b) soft timbre is associated with non-arousal and sharp timbre with arousal, (c) high pitch is associated with non-arousal and low pitch with arousal, and (d) an unaccented and legato line is linked with non-arousal and an accented and staccato line is associated with arousal. (Arousal will be discussed in more detail in chapter 6).

5.4.3 Performance, listener and contextual features and perceived expression

There are unsurprising correlations between certain ‘gross’ characteristics and the emotions they represent (e.g. the anger of sharp timbre and a staccato melody contrasted with the sadness of soft timbre and a legato melody). However, there is a particularly acute problem studying the emotional response to music because the same piece of music can produce a different emotional experience for each person (*between-person variation*), and can move a person to tears on one occasion, while s/he remains completely detached on another (*within-person variation*) (Sloboda, 2005b).

Sopchak (1955) offered early evidence that people could not agree on the particular emotion that was being expressed. Sopchak’s experiment was carried out long before Plutchik created a wheel of emotions that consisted of 8 basic and 8 advanced emotions (Plutchik, 1980), and ahead of psychological research classifying six facial expressions to corresponded with distinct universal emotions (happiness, sadness, surprise, fear, disgust, anger) (Gross, 2000). Consequently, Sopchak (1955)

grouped 48 adjectives into what in today's way of thinking are twelve quite unrelated and random emotional categories: sorrow, joy, calm, yearning, love, eroticism, jealousy, wonder, solemnity, cruelty, rage and assertion. 553 students (381 male, 172 female) listened to 5 classical, 7 popular and 3 folk compositions, and selected as many, or as few, of 48 adjectives that were applicable. Sopchak (1955) reported that there was "not a single case (when) all the male *Ss* agreed on the presence or absence (of jealousy) for any one of the fifteen records. Male *Ss* sometimes agree highly (that it is absent) but are at other times fairly evenly divided" (p. 4).

At least three factors might be responsible for *between-person variation*. They are set out by Davis and Thaut (1989).

"First, physiological response can be affected by the lability or stability of an individual's autonomic regulatory system, which in turn is influenced by constitution, age, sex, lifestyle, physical fitness, state of health, and temporary conditions such as fatigue or hunger. The second factor is emotional reactivity, or the individual's unique psychological interpretation of a set of circumstances. Finally, the individual's attitudes towards the stimulus are influenced by extramusical associations, preference, and the testing situation influence physiological response" (p. 170).

Gabrielsson and Lindström (2001), Davies (1978) and Sloboda and Juslin (2001) have each carried out work or put forward ideas that support these observations. Gabrielsson and Lindström (2001) completed a Strong Experiences of Music (SEM) project in which 300 people provided 400 retrospective reports describing the strongest, most intense, experience of music they ever had. While concern must be expressed about a method that perhaps relies too heavily on linguistic competence (many stated that they could not describe their SEM in words), content analysis showed that SEM was influenced by personal and situational factors. Davies (1978) coined 'Darling, they're playing our tune', and placed music alongside smells and tastes as a stimulus that triggered the strong emotion(s) associated with past events. Finally, common cultural experiences like the strong emotional identification with popular music prevalent during teenage years can result in shared emotions (Holbrook & Schindler, 1989). However, Sloboda and Juslin (2001)

recognised that because of the link to individual life histories the emotional response to music is often completely idiosyncratic.

Sloboda (2005a; 2005b) accounts for *within-person variation* by outlining why the same piece of music does not always produce the same emotional experience. He explains that it has little to do with the music itself and more with the person's attitudes, and with decisions s/he makes.

First, a person's prevailing mood will affect his/her response. "It may be hard to experience grief or sadness in response to music when one's prevailing mood is cheerfulness, even though one is carrying out the relevant cognitive appraisals of music, which in other circumstances would lead to sadness" (Sloboda, 2005b, p. 208).

Second, there is no one way to listen to a piece of music, and no one emotion appropriate to it. The listener can engage greater or lesser degrees of attention and concentration, and can choose different aspects for their emotional attention. Ortony, Clore and Collins (1988) theorised that experienced emotion arose from appraising a situation as either an event, an action of agents or an object. They suggested that "when one focuses on events one does so because one is interested in their consequences, when one focuses on agents, one does so because of their actions, and when one focuses on objects, one is interested in certain aspects or imputed properties of them qua objects." (Ortony et al., 1988, p. 18). The most undifferentiated emotion puts either a positive or negative valence on the appraised situation, so that the basic pairs are: PLEASED-DISPLEASED (event), APPROVE-DISAPPROVE (actions of agents), and LIKE-DISLIKE (objects).

Sloboda (2005a) applied this theory to the emotional experience of music, and suggested that because experienced emotion depended on this type of appraisal, and on the level of differentiation, "a musical passage appraised (on one occasion) as 'event' may incline a listener to an event-based emotion such as sadness. (Whereas, on another occasion)... the same piece of music appraised as 'the action of an agent' may incline a listener towards an emotion such as gratitude" (Sloboda, 2005a, p. 208). Waterman (1996) investigated emotional responses to a single piece of music, and identified thirteen discrete antecedent categories that would have triggered a whole range of emotions.

5.5 Selecting sedative music

5.5.1 Introduction

This chapter began with an observation attributed to Davis and Thaut (1989). They examined how preferred relaxing music influenced the state anxiety, relaxation and physiological responses of 18 non-musicians. When they found that the “characteristics of the (participant’s) selections def(ied) the more traditional categorization of music as either sedative or stimulative” (p. 181), the message for anyone selecting sedative music for research appeared to be clear: they should try to consider an individual’s unique musical preferences and background.

It is not as simple as it might seem to take account of individual preference. Taylor (1973), for example, decided to investigate how accurately researchers had categorised musical selections as stimulative or sedative. He measured the galvanic skin response and subjective impressions of thirty people from the student body and clerical staff at the University of Kansas. When the participants responded to five of the researcher’s sedative, and five of their stimulative, musical selections “both measures showed that music which had been precategorized as stimulative or sedative did not elicit those same responses in listeners” (p. 93). Taylor concluded that

“the physically stimulative or physically sedative classification of a musical selection may not be determined on the basis of the properties of the music alone; such classification should include consideration of the musical background as well as the response of the listener at the time he hears the music” (p. 93).

However, just how practical are the implications of this statement, especially as it would appear to suggest that not only is pre-selection no substitute for individual verification, but also that throughout the course of any investigation a participant should be able to choose different pieces of music depending on his/her response at the time? In order to answer this question it is worth remembering that the success of any experiment often rides on controlling variables; a large number of uncontrolled, extraneous variables will make it difficult to isolate the one variable that is hypothesised as the cause of another (Bowling, 1997b). Consequently, when researchers have asked participants to choose sedative music the demands of

experimental methodology have consistently won out over Taylor's ideal. They have ignored Taylor's advice, and have allowed participants to use just one piece of their own music (Burns, Labbe, Williams, & McCall, 1999; Pinkey, 1997), or asked them to select a single composition either from a short list (Ferguson & Voll, 2004; Sand & Levin, 1997), or in one instance from up to over 350 CDs in different genres and styles (Weber, Nuessler, & Wilmanns, 1997). It would add another uncontrolled variable if participants were allowed different choices during an investigation, and it would also require a large library of available musical resources (something that may even be beyond the scope of a music download resource facility like iTunes).

There are other considerations that preclude individual selection to the degree that Taylor advocates, and both apply to the two investigations in chapter 7 of this thesis. First, therapy often occurs in groups. Second, experience has taught this researcher that when the participants have moderate to severe intellectual disability their attendant cognitive and expressive difficulties mean they often do not understand the concepts of sedative and non-sedative music, let alone being able to tell the researcher what music they find most relaxing.

What does a review of the literature reveal about this aspect of sedative music research, and how might that review inform the selection of a sedative stimulus for the experiments that follow in this thesis?

5.5.2 Review of the sedative music literature (1996-2008)

The literature review focused on research published between 1996 and 2008, and used the keywords 'sedative music', 'soothing music', 'calming music' and 'music for relaxation' to search AMED (Allied and Complementary Medicine 1985-), British Nursing Index Archive (1985-1996), British Nursing Index (1994-), CINAHL – Cumulative Index to Nursing and Allied Health Literature (1982-), EMBASE (1980-), ERIC (1965-), Ovid MEDLINE (R) (1950-), PsycINFO (1806-) and Social Work Abstracts (1977-) for relevant papers. (A comprehensive analysis of all the sedative music literature was too large to be included in this thesis).

Table 5 summarises the forty-four papers that were identified. It shows the variety of participants. It includes studies with musicians (Sand & Levin, 1997), musicians and non-musicians (Wolfe, O'Connell, & Waldon, 2002) and with undergraduate students (Rickard, 2004). As well as a predominance of physiological

investigations (Burns, Labbe, Williams, & McCall, 1999; Iwaki, Hayashi, & Hori, 1997; Iwanaga, Ikeda, & Iwaki, 1996; Iwanaga, Kobayashi, & Kawasaki, 2005; Khalfa, Bella, Roy, Peretz, & Lupien, 2003; Knight & Rickard, 2001), the work with undergraduates also examines consumer attitudes (Chebat, Chebat, & Viallant, 2001), grip strength (Karageorghis, Drew, & Terry, 1996) and sensation seeking (Nater, Krebs, & Ehlert, 2005). It introduces research with volunteers that investigated hypnotic susceptibility (Morris, 1999), clinical investigations that range from examinations of arousal in newborn (Kaminski & Hall, 1996) and premature infants (Calabro, Wolfe, & Shoemark, 2003), through task performance in school children (Hallam, Price, & Katsarou, 2002), to the mood (Pinkey, 1997), sleep quality (Lai & Good, 2005), nutrition (A. Wong, Burford, Wyles, Mundy, & Sainsbury, 2008) and mealtime behaviour of the elderly (Hicks-Moore, 2005; Ragneskog, Brane, Karlsson, & Kihlgren, 1996; Richeson & Neill, 2004). Finally, there are examples of research carried out with psychiatric patients (Roper & Manela, 2000), post-op patients (e.g. M. Good & Chin, 1998; Nilsson, Unosson, & Rawal, 2005; Shertzer & Keck, 2001; Szmuk et al., 2008) and clients with pulmonary disorders (Sidani, Brooks, Graydon, & Hall, 2004; H. L. C. Wong, Lopez-Nahas, & Molassiotis, 2001).

The publications are arranged by year and then alphabetically by author. They highlight three issues that should be addressed when selecting appropriate sedative music.

1. Reporting the choice of music.
2. Identifying the criteria determining the choice of music.
3. Obtaining a consensus of opinion.

Each issue will be taken in turn, and relates to the specific column in table 5 identified in brackets.

Table 5: Review of the sedative music literature (1996-2008)

Author(s)	Year	Research area/ participants	Choice of sedative music	Criteria determining choice	Chosen by R C P
Iwanga, et al.	1996	Physiological response/ Undergraduates	Satie: Gymnopedie No 1 (Orchestration by Debussy)	"soft, calm and melodious"	Y N N
Kaminski, Hall	1996	Arousal & lability/ Newborns	Beethoven: Piano Sonata No 2 1st Mvt Symphony No 6 2nd Mvt Brahms: Three Intermezzi, Symphony No 2 2nd Mvt, Lullaby Debussy: Clair de Lune, Le Apres Midi d'une faune Dvorak: Silent woods, Cello concerto Grieg: Peer Gynt Suite 1: Morning, Ase's death Mendelssohn: Violin Concerto in E minor 2nd Mvt, A Midsummer Night's Dream Mozart: Piano Concerto No 21 (slow mvt) Ravel: Pavane pour une Enfante de Funte Respighi: Pines of Rome Saint Saens: Carnival of the Animals: The Swan, Aquarium Schubert: Quintet in A for Piano & Strings 3rd & 4th Mvts Tchaikovsky: Nutcracker Suite: Waltz of the Flowers Vaughan Williams: Fantasia on "Greensleeves"	"soothing arrangements with a flowing lyrical melody; a quiet calm tone colour; simple & consonant harmony; an easy slow rhythm at approx. the same rate as a regular heart beat (65-80 beats per minute (BPM))"	Y N N
Karageorhis, et al.	1996	Grip strength/ Undergraduates	Louis Armstrong: We have all the time in the world	"own criteria" (<i>details not included</i>)	Y Y N
Ragneskog, et al.	1996a	Mealtime behaviour/ Elderly	"Relaxing and romantic music"	"soothing, soft, melodious, without sudden changes in tempo or volume"	Y N N
Ragneskog, et al.	1996b	Mealtime behaviour/ Elderly	"Relaxing and romantic music"	"soothing, soft, melodious, without sudden changes in tempo or volume"	Y N N
Cruise, et al.	1997	Cataract surgery/ Elderly	"Classical music accompanied by soothing sounds of nature"	no details provided	Y N N
Iwanga, Tsukamoto	1997	Physiological response/ Undergraduates	Mozart: Symphony No 35 2nd mvt Satie: Gymnopedie No 1 (Orchestration by Debussy) Dvorak: Symphony No 8 3rd mvt	"melodious and sedate using the rhythmic and melodious factors reported by Henkin (1955)"	Y N N
Iwaki, et al.	1997	Physiological response/ Undergraduates	Holst: The Planets – Venus	made reference to an earlier study that "rated Venus as calming"	Y N N

R= Researcher C= Consensus P= Participant

Author(s)	Year	Research area/ participants	Choice of sedative music	Criteria determining choice	Chosen by R C P
R= Researcher C= Consensus P= Participant					
Pinkey	1997	Mood and behaviour/ Elderly	Elgar: Nimrod Bach: Ave maria Puccini: 'One fine day' - Madam Butterfly	no details provided	N Y N
Sand, Levin	1997	Dream content/ Musicians	Satie: Gymnopedie I, II, III Debussy: Danse Sacred and Profane Haydn: Cello Concerto No 1 (2nd movement) Holst: The Planets – Venus Beethoven: Symphony No 6 (2nd movement)	no details provided	Y N Y
Weber, et al.	1997	Anxiety/ Cancer patients	Participants brought their own music, or they made their choice from over 350 CDs in different genres and styles (classical, light orchestral, German folk music, pop, jazz, light rock, slow movements of classical music produced for relaxation purposes)	no details provided	N N Y
Good, Chin	1998	Pain/Post-op patients	Synthesizer, harp, piano, orchestral, and slow jazz (<i>listed Good 1992 p. 201-5</i>)	"without lyrics, 60-80 BPM, general absence of strong rhythms or percussion" (Gaston 1951)	Y Y Y
Burns, et al.	1999	Physiological response/ Undergraduates	"relaxing music"	n/a	N N Y
Good, et al.	1999	Pain relief/Post-op patients	Synthesizer, harp, piano, orchestral, and slow jazz (<i>listed Good 1992 p. 201-5</i>)	no details provided	Y N Y
Morris	1999	Volunteers/ Hypnotic susceptibility	"Rings of Saturn by Halpern" "Bach's Air for the G String"	"quiet music with no heavy insistent beat, played at a low volume and/or speed"	Y N N
White	1999	Balance & anxiety/ Post-op patients	"classical music"	no details provided	Y N N
Roper, Manela	2000	Perception of waiting time/ Psychiatric patients	"a variety of music from classical to country"	no details provided	Y N N
Chebat, et al.	2001	Consumer attitudes/ Undergraduates	Mozart: Horn Concerto No 3 (1st mvt) Bach: Brandenburg Concerto 6 (2nd mvt) Mozart: Oboe Concerto	no details provided	Y Y N
Knight, Rickard	2001	Subjective & Physiological response/ Undergraduates	"Pachelbel's Canon in D major"	no details provided	Y N N

Author(s)	Year	Research area/ participants	Choice of sedative music	Criteria determining choice	Chosen by R C P
R= Researcher C= Consensus P= Participant					
Shertzer, Keck	2001	Pain Relief/ Post acute care patients	"A Mozart piece" "tape of ocean music"	"consistent melody" & "relatively constant "music mood""	Y N N
Wong, et al.	2001	Anxiety/ Ventilator dependent patient	7 cassettes of relaxing music. (3 Western: classic, movie, piano) (4 Chinese: folksong, Buddhist, played by Chinese instruments, played by Western instruments)	no details provided	Y N Y
Aitken, et al.	2002	Anxiety/ Pediatric dental patients	In the Enchanted Garden by Kevin Kern	"slow, lulling instrumental music"	Y N N
Hallam, et al.	2002	Task performance/ Primary school children	Study 1- selections from Walt Disney films & other childrens' music Study 2- Albinoni: Adagio in G minor	"mood calming"	Y Y N
Remington	2002	Agitation/ Elderly	"New age arrangement of Pachebel's Canon"	"chosen for its calming qualities" "slow tempo and beat, soft dynamic levels, repetitive musical themes, non vocal qualities, absence of loud sound impulses"	Y N N
Wolfe, et al.	2002	Physiological response/ Study 1: Musicians	98 selections from "CD titles that included "Classical Stressbusters" "Meditations for a Quiet Dawn" "Beethoven at Bedtime"	"words appearing in the title of the CD, or within the literature booklet accompanying the CD suggestive of sedative/relaxing music"	Y Y N
		Study 2: Non- musicians	10 of the 98 selections in Study 1 - Beethoven: Romance No 2 in F, Emperor Concerto, Moonlight Sonata Vaughan Williams: The Lark Ascending, Five Variants on Dives and Lazarus Pursell: Christ Looking Over Jerusalem Ives: The Unanswered Question Rachmaninoff: Symphony No 2 (Adagio) Crowley: A New Day Kenny G: Innocence	chosen in Study 1 by musicians who rated relaxation quality on a 4 point Likert scale, & specified musical characteristics that enhanced and/or distracted from relaxation	Y Y N
Calabro, et al.	2003	Physiology & behaviour/ Premature infants	""Brahms Lullaby" and "Sandman" from "Music for Dreaming""	"minimum range and minimum change in tonality, tempo, register, timbre, volume & attack"	Y N N
Khalfa, et al.	2003	Physiological response/ Undergraduates	"concatenation of ten relaxing excerpts from Enya, Vangelis and Yanni"	no details provided	Y N N
Ferguson, Voll	2004	Anxiety & pain/ Burns patients	6 tapes in Lifescapes series (Summer Thunder, Calming Sea, Hymns Relaxing Sax, Relaxing Piano, New Age)	no details provided	Y N Y

Author(s)	Year	Research area/ participants	Choice of sedative music	Criteria determining choice	Chosen by		
					R	C	P
R= Researcher C= Consensus P= Participant							
Kane, et al.	2004	Pain/Post-op patients	Llewellyn: Carrielian	no details provided	Y	N	N
Lai	2004	Preferred relaxing music/Elderly	Synthezier, harp, piano, orchestral, slow jazz, & Chinese orchestral music (<i>with exception of the latter listed Good 1992 p. 201-5</i>)	"slow tempo, controlled variations in volume and speed, no lyrics, sustained melodic quality, 60-80 BPM, no strong rhythms or percussion"	Y	Y	Y
Owen-Buckley	2004	Relaxation/ Middle school children	John Hulings: Canyon Spirit	no details provided	Y	N	N
Richeson, Neill	2004	Mealtime agitation/ Elderly	Pure relaxation (New World Music) Sleep (Mind, Body & Soul collection) The best of classics for relaxation	"quiet music"	Y	N	N
Rickard	2004	Physiological arousal/ Undergraduates	Satie: Gymnopedie No. 1	"calm, soft, and melodious"	Y	N	N
Sidani, et al.	2004	Breathing & anxiety/ Pulmonary disease patients	"pieces of classical (e.g. Debussy's Prelude to the afternoon of a fawn) and easy listening (e.g. Lanz's Cristofori's dream) selections"	"soothing with a slow tempo (60 to 72 beats per minute)"	Y	N	Y
Voss, et al.	2004	Anxiety & pain/ Post-op open heart patients	Synthezier, harp, piano, orchestral, slow jazz and flute music(<i>with exception of the latter listed Good 1992 p. 201-5</i>)	"without lyrics, 60-80 BPM, general absence of strong rhythms or percussion" (Gaston 1951)	Y	Y	Y
Hicks-Moore	2005	Mealtimes/ Elderly	Relax with the Classics Vol 1. (Largo) Relax with the Classics Vol 2. (Adagio)	"quiet, melodic and peaceful, without sudden changes in tempo or volume, yet with sufficient variation to avoid boredom"	Y	N	N
Iwanga, et al.	2005	Physiological response/ Undergraduates	Satie: Gymnopedie No 1 (Orchestration by Debussy)	"melodious, delicate, soft & beautiful"	Y	N	N

Author(s)	Year	Research area/ participants	Choice of sedative music	Criteria determining choice	Chosen by		
					R	C	P
R= Researcher C= Consensus P= Participant							
Lai, Good	2005	Sleep quality/ Elderly	Synthesizer, harp, piano, orchestral, slow jazz & Chinese folk music (<i>with exception of the latter listed Good 1992 p. 201-5</i>)	"without lyrics, 60-80 BPM, general absence of strong rhythms or percussion" (Gaston 1951)	Y	Y	Y
Nater, et al.	2005	Sensation seeking/ Undergraduates	Allegri: Miserere (CD Gimell 454 939-2)	no details provided	Y	Y	N
Nilsson, et al.	2005	Stress reduction/ Post-op patients	New Age synthesizer ("seven different melodies with 43 minutes playing time")	"soft and relaxing"	Y	N	N
Lai, Good	2006	Sleep quality/ Elderly	Synthesizer, harp, piano, orchestral, slow jazz & Chinese folk music (<i>with exception of the latter listed Good 1992 p. 201-5</i>)	"without lyrics, 60-80 BPM, general absence of strong rhythms or percussion" (Gaston 1951)	Y	Y	Y
Bergström- Isacsson, et al.	2007	Physiological response/ Rett Syndrome	"Candle in the Wind by Elton John was the calming music for one of our subjects"	"slow beat...soft lyrics and a supportive basic rhythm"	N	N	N ¹
Szmuk, et al.	2008	Postoperative recovery/ Hernia patients	"classical, pop-rock, or Israeli"	no details provided	N	N	Y
Wong, et al.	2008	Nutrition/Elderly	"soothing music"	no details provided	Y	N	N

¹The participant's parents or carers chose the music.

As can be seen in table 5, the various researchers or research teams were inconsistent when they reported their choice of sedative music, and when they identified the people (researcher, participant, consensus) and the criteria they used to choose a sedative stimulus. This chapter will now use the information presented in table 5 to look at each of these areas in more detail.

5.5.2.1 Reporting the choice of music (Choice of sedative music)

When they reported the choice of music, researchers or research teams either gave a general description of the music (e.g. White (1999, p. 223) - “classical music”), a general description with an example (e.g. Sidani, et al. (2004, p. 8) - “pieces of classical music (e.g. Debussy’s Prelude to the afternoon of a fawn) and easy listening (e.g. Lanz’s Cristofori’s Dream) selections”), or they identified specific composition(s) (e.g. Karageorghis et al. (1996) - the Louis Armstrong classic ‘We have all the time in the world’). This is disappointing, as they were ignoring scientific expectations and practices.

Empirical research should be replicable, and the method section of any paper that describes an experiment should include the information another researcher will need to repeat it (American Psychological Association, 1994). Aspects of performance influence emotional reaction to music (Scherer & Zentner, 2001), and this implies that the listener’s response is determined not just by the piece of music itself, but by elements within the recording that distinguish one musician or group of musicians from another. Consequently, the method section should tell the reader about the performer. It can do this by giving details of the compact disc along with the name of the composition. This level of reporting will provide the information needed to replicate an investigation. Nater et al. (2005) were alone in setting a standard that will be followed in the empirical work described in this thesis.

5.5.2.2 Obtaining a consensus of opinion (Chosen by Researcher, Consensus and Participant)

The various researchers or research teams used different methods to choose a sedative stimulus. Over half (24 out of 44) selected the music themselves; they did not ask the participants or seek a consensus of opinion (e.g. Iwanaga et al., 1996; Owen-Buckley, 2004; Rickard, 2004; Roper & Manela, 2000). Of the remaining twenty teams, Bergström-Isacsson, Julu and Witt-Engerström (2007) asked parents or carers; Burns et al. (1999) and Szmuk et al. (2008) asked the participants to choose the music they wanted to use; and researchers gave post-operative patients (M. Good et al., 1999), patients with pulmonary disorders (Sidani et al., 2004), patients on ventilators (H.L.C. Wong et al., 2001) and burns patients (Ferguson & Voll, 2004) a range of options. Weber, Nuessler and Wilmanns (1997) wanted to alleviate anxiety

during chemotherapy, and they went as far as allowing cancer patients to choose from over 350 compact discs. Sand and Levin (1997) examined whether listening to music before sleep influenced dream content. They identified five compositions they expected to be calming. The participants rated them all on a 7-point Likert scale, and the “most calming” two were played.

Eleven research teams used a consensus of opinion. Good and Chin (1998), Good, Stanton-Hicks and Grass (1999), Lai (2004), Voss et al. (2004), Lai and Good (2005) and Lai and Good (2006) asked participants to choose from synthesizer, harp, piano, orchestral and slow jazz selections developed during masters research (M.P.L. Good, 1992). These selections had been validated by a music therapist. Nater et al. (2005) asked 12 undergraduates to rate the emotions and mood elicited by the sedative music chosen (Allegri: Miserere). The undergraduates evaluated it as “slow and relaxing” (p. 241). Chebat et al. (2001) consulted “15 undergraduate students ... and music experts” (p. 118) when they selected three pieces of music for an undergraduate project. Karageorghis et al. (1996) and Hallam et al. (2002) asked 10 individuals who matched the age profile of the participant pool, and followed the decision of the majority. They rated the qualities of a selection of music on Likert scales, and picked Louis Armstrong: “We have all the time in the world” for research examining the grip strength of undergraduates (Karageorghis et al., 1996), and Albinoni: Adagio in G minor to assess the task performance of primary school children (Hallam et al., 2002). However, the most comprehensive piece of work was carried out by Wolfe et al. (2002) who used two separate studies with a total of 92 participants to “determine the kinds of musical selections/CDs to place in a portfolio to be used within a music listening/relaxation program for parents of children in a pediatric hospital” (p. 40).

Wolfe et al. (2002) published a commendable study. First, they identified ten pieces of relaxing music by inviting six musicians to listen to the opening 90 seconds of 98 musical selections, and rate their relaxation quality. Then, they played the same ten pieces to 86 non-musicians. These participants were also asked four questions about the music (a) was it familiar? (b) was it relaxing? (c) what characteristics enhanced and/or distracted relaxation? and (d) did they enjoy it? A content analysis of their response to directive (c) showed that the non-musicians were not relaxed by music that was too fast, loud, or shrill, or by compositions that had too many changes.

Conversely, consonant harmony, pleasant associations, small numbers of instruments and few changes (in tempo, volume, or instrumentation) enhanced relaxation. The researchers used the frequency of enhancing and distracting responses, in combination with the percentage of participants who enjoyed and did not enjoy each selection, to identify eight suitable selections of relaxing music. The rejected selections were enjoyed by less than 50% of the participants, and received more distracting than enhancing written responses.

Wolfe et al. (2002) were cautious about their results. They suggested that, since only the opening 90 seconds were used, it could not be assumed that “the remaining minutes of a piece will continue to be perceived as relaxing” (p. 52). In addition, concern must be expressed about the quality of the measures used to determine the final selection of eight pieces of relaxing music, and the criteria employed to determine the initial 98 selections. The 98 selections placed before the six musicians had been chosen because “words appearing in the title of the CD, or within the booklet accompanying the CD, (were) suggestive of sedative/relaxing music” (p. 43). In both cases, a more rigorous approach was needed: statements about a range of musical factors should have determined the initial selections, and more robust data should have been used to choose the most appropriate music.

So, which is the best method? Research teams which on the one hand selected music that soothed newborns (Kaminski & Hall, 1996) and nursing home residents with dementia (Ragneskog, Kihlgren, Karlsson, & Norberg, 1996), and on the other that did not help pediatric dental patients (Aitken, Wilson, Coury, & Moursi, 2002), all stressed the need to accommodate personal preference. Kaminski and Hall (1996) wished to extend their research by finding out how “familiarity and preference affect(ed) the utility of music” (p. 52). Ragneskog et al. (1996) commented that they “(did) not really know what the patients thought about the type of music” (p. 275). Aitken et al. (2002) wondered if not allowing a choice of music affected the outcome of their investigation. However, despite these comments, table 5 shows that only thirteen investigations (29%) used participant selected sedative music. Although in some of the remaining investigations, the participants were not involved in the selection of a sedative stimulus because researchers were controlling extraneous variables as they examined physiological responses, consumer attitudes and grip strength.

Some researchers did use a consensus of opinion to strengthen the validity of their choice, but even this is still far from ideal. Hadsell (1989) has completed a piece of work that should convince researchers to include participants, whenever possible, in the decision making process. Hadsell (1989) wanted to find out if a group of participants would agree about the quality of thirty-four different pieces of music placed along a sedative/stimulative continuum. 49 female musicians and 42 female non-musicians were asked to rate each extract on a nine-point Likert scale that ranged from 1 (most sedative) to 9 (most stimulative). An average rating between 1 and 3.5 would indicate sedative music, between 3.51 and 6.5 would indicate music in the neutral category, and between 6.51 and 9 would indicate stimulative music. When the musicians “overall ratings ... were significantly different from those of nonmusicians” (p. 111) Hadsell concluded “it was obvious, therefore, that no group method of selection will substitute for individual verification” (Hadsell, 1989, p. 114).

5.5.2.3 Identifying the criteria determining the choice of music (Criteria determining choice)

Some researchers and research teams (e.g. Chebat et al., 2001; Cruise, Chung, Yogendran & Little, 1997; Owen-Buckley, 2004; Szmuk et al., 2008; White, 1999) did not identify the criteria they used to select sedative music. It often seemed that while they provided a detailed account of the dependent variable(s), the independent variable (sedative music) did not command the same level of attention. For example, White (1999) gave a comprehensive two-page account of the instruments used to measure each participant’s heart rate, respiratory rate, systolic blood pressure, heart rate variability and anxiety (pp. 223-224), yet simply described the independent variable in four words as “investigator selected classical music” (p. 223). This is not unprecedented. Pothoulaki, MacDonald and Flowers (2006) highlighted the limited descriptions of music interventions when they reviewed twenty-four music and oncology studies published between 1985 and 2002. Grocke and Wigram (2007) observed that research literature usually provided little detail about the music stimulus used in receptive music therapy. It only provided a vague description instead of giving recording details, information about performers and mentioning the name of the work.

Fortunately, the majority of the researchers or research teams in this review did state the criteria they used.

Some described the quality of the music. They referred to it as either sedate (Iwanaga & Tsukamoto, 1997), delicate (Iwanaga et al., 2005), soft (Iwanaga et al., 2005; Nilsson et al., 2005), beautiful (Iwanaga et al., 2005), melodious (Hicks-Moore, 2005; Iwanaga et al., 2005; Ragneskog et al., 1996), soothing (Kaminski & Hall, 1996; Sidani et al., 2004; A. Wong et al., 2008), relaxing (Nilsson et al., 2005), calm (Hallam et al., 2002; Iwanaga et al., 1996; Remington, 2002), quiet (Hicks-Moore, 2005; Richeson & Neill, 2004), lulling (Aitken et al., 2002), or peaceful (Hicks-Moore, 2005).

A list of adjectives that does not say anything about the individual musical factors (form, tempo, volume, harmony, melody) that helped the researchers or research teams choose sedative music.

Other researchers or research teams identified individual factors, and used music with one or more of these six characteristics.

- (a) Soft (e.g. Iwanaga et al., 1996; Remington, 2002)
- (b) Absence of lyrics (e.g. M. Good & Chin, 1998; Lai & Good, 2005; Voss et al., 2004)
- (c) A flowing melody (e.g. Kaminski & Hall, 1996; Lai, 2004)
- (d) Consonant harmonies (Kaminski & Hall, 1996)
- (e) Slow rhythm at approximately the same rate as a regular heart beat (65-80 beats per minute) (e.g. M. Good & Chin, 1998; Kaminski & Hall, 1996; Sidani et al., 2004; Voss et al., 2004).
- (f) Predictability (e.g. Shertzer and Keck (2001) used music that had a “consistent melody”, and “relatively constant “music mood”” (p. 94). Ragneskog, Brane et al. (1996), Ragneskog, Kihlgren et al. (1996), Hicks-Moore (2005) and Remington (2002) avoided sudden changes in tempo or volume. Calabro et al. (2003), described the characteristics of their music (‘Brahms Lullaby’ and ‘Sandman’ from ‘Music for Dreaming’) as “minimum range and minimum change in tonality, tempo, register, timbre, volume and attack” (p. 8)).

Finally, several research teams cited Gaston (1951), and they perhaps made the strongest statement about the type of sedative stimulus they had selected for research (e.g. M. Good & Chin, 1998; Lai & Good, 2005; Voss et al., 2004).

Everett Thayer Gaston (1901-1970) was an American psychologist who was active between the 1940s and 1960s. He helped develop music therapy by categorising stimulative and sedative music (Hadsell, 1989). Gaston (1951) stated that stimulative music exhibited an unrestrained quality, and contained brief, staccato melodies, a clear underlying beat and percussive rhythms that encouraged physical activity. Sedative music encouraged a dream like mood. The more legato melodic motives, nonaccented beats and unclear rhythmic pulses produced a calming effect.

However, whatever the merits of Gaston's criteria, Hadsell (1989) amongst others suggested that they were not specific enough. As a consequence, none of the investigations identified by the literature search had based their choice of sedative music on clear statements about the complete range of musical factors (i.e. form, tempo, volume, melody, harmony). The researchers or research teams may have named some of the individual factors that helped them choose, but they had not approached the selection of sedative music in an organised or comprehensive way.

5.5.2.4 Summary

This literature review has demonstrated that anyone choosing sedative music for research should: (a) provide appropriate information about the music, (b) make clear statements about a range of musical factors, and (c) access a consensus of opinion.

Earlier, this chapter suggested that the first requirement could be met by naming the composition used, and by providing details of the compact disc it was drawn from (i.e. title and catalogue number). The remainder of this chapter will introduce a tool that tackled the second requirement to make clear statements about a range of musical factors.

5.6 The Predictable Factors in Sedative Music (PFSM)

Music produces a sedative response at one extreme (e.g. the soft extreme of volume, the slow extreme of tempo), or when musical factor(s) remain stable and predictable. This was outlined in table 4, as well as during the discussion of music

psychology, sociology of music, ethnomusicology and the investigations carried out by Wolfe et al. (2002). Watson (1942) established a relationship between low pitch, slow tempo and sadness, and between small dynamic range and the expression of dignity, sadness and peacefulness. Hevner linked slow tempo, simple harmony and high pitch with the serene emotion cluster. Bruner (1990) reviewed marketing literature and suggested that tranquil music was in the major mode, and that it had slow tempo, medium pitch, flowing rhythm, consonant harmony and soft volume. Finally, Wolfe et al. (2002) linked consonant harmony, pleasant associations, small numbers of instruments and few changes (in tempo, volume, or instrumentation) with enhanced relaxation.

A clear set of criteria for sedative music could either be based on statements about the extremes associated with non-arousal, or on the stability of each musical factor. A combination was not considered for the sake of clarity and consistency. Wigram (1996) demonstrated that music with stable and predictable elements reduced arousal, and encouraged relaxation, during doctoral research with Vibroacoustic Therapy. This information later appeared in *A Comprehensive Guide to Music Therapy: Theory, clinical practice, research and training* when a table of predictable and unpredictable elements suggested that people tend to relax if musical elements are stable and predictable, and only maintain a higher level of arousal and stimulation if musical elements vary significantly over time, and are subject to sudden and unpredictable change (Wigram, Pedersen, & Bonde, 2002).

There are two reasons why Wigram's statement was used as a starting point for the criteria. First, it reflected the ideas of researchers who also thought sedative music was predictable, and who chose music with "consistent melody" and "relatively constant "music mood"" (Shertzer & Keck, 2001, p. 94), without sudden changes in tempo or volume (e.g. Hicks-Moore, 2005; Ragneskog, Brane et al., 1996), and with "minimum range and minimum change in tonality, tempo, register, timbre, volume and attack" (Calabro et al., 2003, p. 8). Second, it identified individual musical factors (e.g. tempo, timbre, form, harmony), and described them either as predictable (e.g. tempo was stable), or as unpredictable (e.g. tempo had sudden accelerandos (getting faster) or ritardandos (slowing down)). However, Wigram's statement lacked clarity because it mixed together explanations of individual factors (e.g. unpredictable changes in tempo) with descriptions (e.g.

unexpected dissonance) that did not refer to a specific musical factor and that may have confused a non-musician. (Dissonance, a reference to harmony, is the antonym to consonance, and occurs when two or more notes are perceived as having 'roughness' when sounded together (Sadie, 2001)).

This chapter goes on to show the tool developed to categorise sedative music. The Predictable Factors in Sedative Music (PFSM) (table 6) identifies six musical factors (form, tempo, volume, texture, melody, and harmony). Form, tempo, volume, texture, melody and harmony are widely considered to be the principal factors of a musical composition. On-line dictionary and encyclopaedia sources either allude to these factors or refer to them specifically when they define music as "an art of sound in time that expresses ideas and emotion in significant forms through the elements of rhythm, melody, harmony, and colour" (Dictionary.com Unabridged (v 1.0.1), n.d.), or as "organised in time and consist(ing) of pitch, rhythm, harmony and timbre" (Wikipedia.org, n.d.).

The next section of this thesis shows how the PFSM was carefully constructed. The statement from Wigram et al. (2002, pp. 138-139) is reproduced on page 122. It is then followed by the Predictable Factors in Sedative Music (PFSM) (table 6, page 123), and by table 7 (page 124) that shows how the PFSM evolved from the potential elements in stimulating and relaxing music (Wigram et al., 2002).

Table 7 indicates the steps taken to overcome any confusion or lack of clarity, and to make clear statements about the criteria determining sedative music. These are a series of statements that cover the complete range of musical factors.

Physiological responses to music

Wigram et al. (2002) “defined the parameters that influence whether a piece of music has such effects [might affect stimulation or relaxation] in terms of predictability within the music. If the musical elements are stable and predictable, then subjects tend to relax; whereas, if the elements in the music vary significantly over time and are subject to sudden and unpredictable change, then the subject will maintain a higher level of arousal and stimulation”.

The material on this page of the thesis can be found on pp. 138-139 of *A Comprehensive Guide to Music Therapy: Theory, clinical practice, research and training* (Wigram et al., 2002). It is reproduced with the permission of the authors.

- Potential elements in stimulating music:

- unpredictable changes in tempo
- unpredictable or sudden changes in:
 - volume
 - rhythm
 - timbre
 - pitch
 - harmony
- wide variations in texture in the music¹
- unexpected dissonance
- unexpected accents
- harsh timbres
- lack of structure and form in the music
- sudden accelerandos, ritardandos, crescendos and diminuendos²
- unexpected breaks in the music³

- Potential elements in relaxing music:

- stable tempo⁴
- stability or only gradual changes in:⁵
 - volume⁶
 - rhythm⁷
 - timbre⁸
 - pitch⁹
 - harmony¹⁰
- consistent texture¹³
- predictable harmonic modulation¹¹
- appropriate cadences¹²
- predictable melodic lines¹⁴
- repetition of material¹⁵
- structure and form¹⁶
- gentle timbre¹⁷
- few accents¹⁸

Table 6: Predictable Factors in Sedative Music (PFSM)

<i>Musical factor</i>	<i>Description of predictability</i>
Form^a	Verse & chorus or introduction, verse & chorus structure.
Tempo^b	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).
Volume^c	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).
Texture^d	Remaining stable with subtle changes in style or instrumentation.
Melody -Line^e	Repetition of material.
- Line^f	Little embellishment, no unexpected pauses or breaks.
- Timbre^g	Gentle sound with gradual changes within and between instrument families.
- Pitch^h	Gradual changes between registers.
-Accentsⁱ	Few: used to add expression rather than energy to a melodic line.
Harmony^j	Modulations, cadences that don't introduce unexpected harmonies or dissonance.

Table 7: How the PFSM evolved from the potential elements in stimulating and relaxing music defined by Wigram et al. (2002)

Wigram (potential elements in relaxing music)	PFSM (musical factors)
Stable tempo. ⁴	2 nd factor. ^b (“Gradual increases or decreases” statement contrasts sudden accelerandos, ritardandos ² in the description of stimulating music).
<i>Statement about “stability or only gradual changes in”.</i> ⁵	<i>Applied to descriptions of tempo^b, volume^c, texture^d, timbre^g, pitch^h.</i>
Stable volume. ⁶	3 rd factor. ^c (“Gradual increases or decreases” statement contrasts sudden crescendos and diminuendos ² in the description of stimulating music).
Stable rhythm. ⁷	Implied in the definition of a line. ^f
Stable timbre. ⁸	3 rd sub-section of melody. ^g
Stable pitch. ⁹	4 th sub-section of melody. ^h
Stable harmony ¹⁰ , predictable harmonic modulation ¹¹ & appropriate cadences. ¹²	6 th factor (harmony). ^j
Consistent texture. ¹³	4 th factor. ^d (“Subtle changes” statement contrasts “wide variations in texture” ¹ in the description of stimulating music).
Predictable melodic lines. ¹⁴	2 nd subsection of melody. ⁱ (“No unexpected breaks” contrasts “unexpected breaks” in the description of stimulating music ³).
Repetition of material. ¹⁵	1 st subsection of melody. ^e
Structure and form. ¹⁶	1 st factor. ^a
Gentle timbre. ¹⁷	3 rd sub-section of melody. ^g
Few accents. ¹⁸	5 th sub-section of melody. ¹

The numbers placed alongside statements in **Wigram** (potential elements in stimulating and relaxing music), and the **PFSM** (musical factors) columns, can be crosschecked against those placed within the original statement. The letters entered in the **PFSM** (musical factors) column can be crosschecked against those in the Predictable Factors in Sedative Music (PFSM).

For example, in the first line, the number ⁴ in the column headed **Wigram** (predictable elements in relaxing music) can be crosschecked against its appearance in the statement from Wigram et al. (2002). In the **PFSM** (musical factors) column the ^b beside ‘2nd factor’ can be crosschecked against the ^b in the Predictable Factors in Sedative Music (PFSM) to show that ‘stable tempo’ appears in the definition of the second musical factor ‘tempo’. The explanation in brackets indicates that the descriptor ‘gradual increases (accelerandos) or decreases (ritardandos)’ is a direct contrast to the description provided for potential elements in stimulating music that appears in the original statement, and is identified in that statement with the number ².

The PFSM describes how each factor occurs in a stable and predictable manner in sedative music. In the PFSM, form is the structure of a musical composition. In this instance, it is restricted to accommodate the type of music that will be used in the empirical research. It refers to a very regular verse and chorus, or introduction, verse, and chorus format. Tempo and volume are the speed and loudness of the composition. Texture is the instrumentation (the instruments that are playing) and the style of the music. When the PFSM describes tempo, volume and texture it recognises that they may not always remain stable, and accepts that they may change gradually or subtly. Harmony is defined as consonance, the antonym to dissonance explained earlier in this chapter. Music can modulate (change key) but not to unrelated keys that introduce unexpected harmonies or dissonance.

Melody has five sub-sections in order to incorporate the richness of the material in Wigram et al. (2002), and to reflect the complexity of a factor with essential elements that DeLone et al. (1975) suggest include pitch, timbre, texture and loudness. The five elements in the PFSM describe a flowing and gentle sounding melody. It has a simplicity that arises from little embellishment and the repetition of material. It is distinguished by gradual changes in pitch (i.e. without sudden leaps from high to low, or vice-versa) and by even timbre (e.g. without sudden contrasts between high and low instruments, and between the different sound of string instruments one moment and brass instruments the next).

The PFSM defines sedative music by combining statements about quality with as the title suggests those about predictability. This distinction is illustrated by comparing the descriptions of tempo, volume and texture, with those of melody and harmony.

The descriptions of tempo, volume and texture focus on the predictability of these factors (i.e. they all remain stable with gradual or subtle changes). The PFSM does not make statements that equate sedative music with specific qualities like slow tempo, soft volume and a particular musical texture. The PFSM states that the sedative quality of music is dependent on the tempo, volume and texture established at the start of a piece of music (it may be soft and slow, but just as equally fast and loud) remaining unchanged, or being subject to gradual increases or decreases (tempo or volume), or subtle changes (texture). In this way unpredictable music has sudden changes in volume (either from soft to loud or vice-versa), sudden changes in tempo

(either slower or faster) and striking contrasts in style and/or instrumentation (e.g. moving between the instrument families in an orchestra, or exploring the different textures of a solo instrument or chamber group).

In contrast, the description of harmony and the detailed explanation of melody does equate sedative (predictable) music with specific attributes, and there is unpredictability when these attributes are contradicted. Harmony is predictable when it is consonant, and when it follows a regular harmonic pathway that modulates to closely related keys. (This would be termed predictable when it meets the expectations of listeners familiar with western music). It is unpredictable when interrupted cadences, unexpected or inharmonic modulations, or dissonance are introduced. A predictable melody has a gentle unembellished line, and it is characterised by repetition, gradual changes between registers, a logical contour and accents that add expression. An unpredictable melody has few repeated passages. It has a harsh embellished line with wide contrasts of register, sudden interval jumps, and accents that give drive and energy, and which also may startle and appear unexpectedly or in an irregular pattern.

The PFSM has a dichotomous yes/no scoring system. The listener, who uses it, should first consider the factors that define sedative music strictly in terms of predictability (tempo, volume and texture), and answer either 'yes' or 'no' to each of these questions.

1. Does the tempo remain stable with only gradual increases (accelerandos) or decreases (ritardandos)?
2. Does the volume remain stable with only gradual increases (crescendos) or decreases (diminuendos)?
3. Is the texture stable with subtle changes in style or instrumentation?

A single listening should be enough to reach these decisions. After listening a few more times, s/he should then be able to answer 'yes' or 'no' to the next seven questions about melody, harmony and form.

4. Is there repetition within the melodic line?
5. Is the melodic line unembellished so that there are no unexpected changes, pauses or breaks?
6. Is the timbre of the melodic line gentle, and is the melody subtly passed between instrument families?

7. Are there gradual changes in the pitch of the melody?
8. Are any accents in the melody adding expression rather than energy?
9. Do the harmonies remain consonant and predictable so that there are no interrupted cadences, unexpected modulations, or dissonance?
10. Is there either a verse and chorus structure, or is the music in introduction, verse and chorus form?

In each case, a score of 0 is recorded when the answer is ‘no’ (i.e. this factor is unpredictable), and a score of 1 is recorded when the answer is ‘yes’ (i.e. this factor is predictable). After answering all these questions, the listener then gives the piece of music a total PFSM score. It will range from zero (unpredictable/non-sedative) to ten (predictable/sedative) along an interval measurement scale in which numerically equal distances represent equal distances on the dimension that underlies the scale. (In other words, music with a PFSM score of nine is three times more predictable and sedative than music with a PFSM score of three).

A performance of Piano Sonata No.14 in C-sharp minor “*Quasi una fantasia*”, Op. 27, No. 2 by Ludwig van Beethoven, widely known as the “Moonlight” Sonata (Beethoven Sonaten, Daniel Barenboim, Deutsche Grammophon #419602) is the first track on “Compact Disc 1” attached to the inside back cover of this document. Appendix 3 is a copy of the score. Both are included to demonstrate how the PFSM might be used to evaluate a piece of music included in the “Most Relaxing Classical Music in the Universe” collection (Denon Records, Catalogue No. 17232).

A first listening will establish the predictability of the tempo and the volume, and it will help identify a composition that eschews the versatility of the instrument and presents the same texture throughout (i.e. harp-like broken chords accompanying song-like themes, and firm grounding octaves in the bass).

There is repetition within the melodic line. The movement is in binary, two-part song form. It presents an opening theme (0:27/bar 5) and a second theme (1:24/bar 15). The opening theme recurs (although not repeated verbatim) (3:55/bar 42), and it is followed by the same second theme (4:47/bar 51). Finally, the rhythm of the first three notes of the accompanying song (bar 5) is used in the bass of a short coda (5:37-6:31/bars 60-69).

The melodic line is unembellished and the timbre is gentle as the “Moonlight” Sonata is performed, in accordance with Beethoven’s own superscription, in a

sonorous and delicate manner. There are no sudden changes in pitch. The melody, which is occasionally accented for expression, gently undulates, and any larger intervals (e.g. 2:07/bar 23) are bridged by the accompaniment.

Finally, the composition's very predictable harmonies are interspersed with strategically placed dissonances, and these dissonances form harmonic suspensions which quickly resolve to create a gentle sensation of tension and relaxation very common to relaxation programmes (e.g. 1:26/bar 16, 1:38/bar 18). Otherwise, the harmonic content is consonant and predictable and there are no interrupted cadences or unexpected modulations. Overall the "Moonlight" Sonata appears to match most of the requirements of sedative music set out in the PFSM, and in doing so it would seem to justify being included in a collection of the most relaxing classical music in the universe.

5.7 Conclusion

This chapter began with a discussion of music psychology, ethnomusicology and sociology of music. It demonstrated that a set of criteria (Predictable Factors in Sedative Music (PFSM)) were influenced by the potential elements in stimulating and relaxing music (Wigram et al., 2002) and by music psychology research that discovered correlations between separate musical factors and the emotions they represented.

The PFSM was developed to provide a systematic way of defining the properties of music so that music could be classified as sedative. The next chapter describes research that validated the PFSM, it demonstrates that people with and without an intellectual disability respond to music in the same way, and it uses 224 participants without an intellectual disability to choose sedative music for participants with an intellectual disability who cannot identify the music they like listening to when they want to stay calm and relaxed.

Chapter 6:
**Validating criteria (PFSM) that determine the selection of
sedative music for research, and selecting sedative music
based on a consensus of opinion**

“The early researchers of arousal, treated arousal as a unidimensional physiological construct. Today, arousal is viewed as a multidimensional construct that includes a physiological dimension paired/grouped with cognitive, affective, and/or behavioral dimensions”
(Zaichkowsky & Naylor, 2004, p. 156).

6.1 Introduction

The previous chapter introduced the Predictable Factors in Sedative Music (PFSM). The PFSM were specific criteria that guided the choice of commercially recorded non-contingent sedative music (hereafter referred to as sedative music) for research. The PFSM identified and defined six musical factors in terms of predictability. There were ten items, with one factor (melody) divided into five subsections.

The PFSM was considered an important and necessary development for the criterion and validity of the studies that follow in chapter 7, as well as the reliability of the measure. It was developed after a literature review (chapter 5) demonstrated that research teams (e.g. Calabro, Wolfe, & Shoemark, 2003; Iwanaga, Kobayashi, & Kawasaki, 2005; Nilsson, Unosson, & Rawal, 2005) had not based their choice of sedative music, for the purpose defined in the study, on specific and consistent statements about a complete range of musical factors.

The PFSM was also part of a process that used a consensus of opinion to choose sedative music. The literature review in chapter 5 highlighted an over reliance on subjective decisions made by a researcher or a small number of individuals, and methodological limitations on the one occasion when a more sizeable group of people (6 musicians and 86 non-musicians) was consulted (Wolfe, O'Connell, & Waldon, 2002). (Wolfe et al. (2002) acknowledged that since only the opening 90 seconds of music were used in their investigation, it could not be assumed that “the remaining minutes (would) continue to be perceive(d) as relaxing” (p. 52)).

This chapter describes two experiments that validate the PFSM (experiments 1 and 2) and two experiments that choose sedative music for clinical research with adults from the intellectual disability population (experiments 3 and 4). Chapter 5 discussed empirical research that examined the relationship between different musical factors and perceived emotional expression, and described the reaction to the separate factors (e.g. tempo, pitch, loudness, interval distribution, melodic range) as either aroused or non-aroused. The discussion of arousal that follows, and the section looking at how gender and musicianship affects the response to music (6.3), inform the method and interpretation of these four experiments.

6.2 Arousal

Arousal is described as “a condition conceived to vary in a continuum from a low point in sleep to a high point in extreme effort or intense excitement” (Duffy, 1962, p. 5). An aroused person is generally wide awake, alert, vigorous, excited and full of pep; whereas, someone who is unaroused is sleepy, sluggish, tired and relaxed (Thayer, 1989).

The concept of arousal and following on from that how to measure it has evolved. Cannon’s research in the early decades of the twentieth century, and in particular his idea of the emergency “flight or fight” response (Cannon, 1929) is the earliest modern version of the construct. (Cannon suggested that emotion was a reaction that caused the body to react with the resources needed to cope with an emergency (Haynie, 2001)). It was commonly referred to as the undifferentiated, or unidimensional, arousal construct as only the autonomic nervous system (ANS) was involved in the process, and it generally functioned as a single system (Geen & Geen, 1995). In the 1950s, researchers like Lindsley (1951), Hebb (1955) and Malmö (1959) linked cortical and skeletal motor factors to the arousal continuum. In the 1960s and 1970s researchers broadened their understanding when arousal began to be posited as a component in personality and human performance theories, and in the study of memory and affect. Lacey (1967), for example, suggested a multiple system (electro-encephalographic, autonomic and behavioural) after discovering that hand (skin conductance), heart (heart rate) and head measures (electroencephalograph (EEG)) of ANS activity rarely correlated.

It is clear from personal experience that affect and arousal are often linked. For example, in a lively party positive affect is generally associated with increased arousal (Geen & Geen, 1995). This emotion is the interplay of directional and intensity components. The directional component is either a positive or a negative cognitive evaluation. It is a judgement about the pleasantness or unpleasantness (valence) of an emotional state. Intensity, in its most simplistic form, is high versus low arousal (Geen & Geen, 1995). Academics have examined the interplay between the evaluation and intensity components to find which is primary in the experience of an emotion. Schacter and Singer (1962), for example, completed a seminal piece of work (the ‘adrenaline experiment’¹) that demonstrated the primacy of the evaluative component.

Academics have also developed categorisation systems (Adjective Checklists) that measure emotions via self-report. Thayer (1978), Mackay, Cox, Burrows and Lazzarini (1978) and Russell (1979) drew up checklists with two bi-polar dimensions: energetic arousal and tense arousal. Thayer (1978) used awake-tired adjectives to measure energetic arousal, and tense-calm adjectives to measure tense arousal. Mackay et al. (1978) and Russell (1979) had a single arousal dimension, and added hedonic tone (i.e. feelings of pleasantness-unpleasantness).

Sjoberg, Svensson and Persson (1979) and Matthews, Jones and Chamberlain (1990) decided that two dimensions were not enough, and they developed three and four-dimensional models. Sjoberg et al.'s (1979) 71 adjective (item) instrument measured two arousal-related dimensions (activation and tension) and a pleasantness dimension. The instrument, constructed from a pool of 148 adjectives, "could be checked within five minutes and...seem(ed) convenient for repetitive use" (Sjoberg et al., 1979, p. 16).

The University of Wales Institute of Technology Mood Adjective Check List (UWIST-MACL), or UMACL for short, (Matthews et al., 1990) is a more manageable 24 item tool. It measures hedonic tone, energetic arousal and tense arousal (all 8 items). The fourth and final dimension (general arousal) is a composite of 6 energetic arousal and 6 tense arousal adjectives, and it provides "a contrast...between high and low arousal, irrespective of pleasure-displeasure" (Matthews et al., 1990, p. 24).

¹Schacter & Singer (1962) told their participants that they were testing the effect of an injection on their vision. The participants were told it was a vitamin injection, but in reality it was adrenaline (3 treatment groups) or saline (control group). The treatment groups were either given accurate information (Group A), false information (Group B), or no information (Group C) about side effects. The control group (Group D) received no information. Before the test half the participants in each treatment group shared a waiting room either with someone acting happily (euphoria condition), or acting angrily (anger condition).

The participants behaved in the predicted manner. Group A and Group D did not join in with the other person's waiting room behaviour. Group B and Group C did assume the other person's behaviour and emotional state. The results demonstrated that the nature of the arousal was immaterial, and what mattered was the evaluation or interpretation of that arousal. In contrast to those in Group A, who labelled their arousal state based on the appropriate explanation given to them, the participants in Groups B and C, who lacked any explanation, evaluated their arousal state in terms of the cognitions available to them, and labelled the same state of arousal as either anger or euphoria (Gross, 2000).

The items in each dimension of the UMACL measure positive and negative responses. For example, the adjectives “energetic”, “alert”, “vigorous” and “active” determine the level of positive energetic arousal, and “passive”, “sluggish”, “unenterprising” and “tired” indicate the degree of negative energetic arousal. A Likert scale asks the respondent whether each adjective ‘definitely’, ‘slightly’, ‘slightly not’, or ‘definitely not’ applies to their present mood. (Appendix 4 shows how responses to each adjective are scored, and how a single UMACL score is calculated for each of the four dimensions). Matthews et al. (1990) have completed a series of studies that establish the discriminant and concurrent validity of the UMACL, and demonstrate its sensitivity to external stressors such as sleep deprivation and drugs with sedative effect. The UMACL, or a modified version of the UMACL, have been used to measure arousal in two of the four studies that follow in this chapter.

6.3 Research that differentiates responses to music by musicianship and gender

Chapter 5 has already discussed the difference in the music perception and music processing skills of musicians and non-musicians, and there are variations in their brain structure and brain activation as well. Ozturk, Tascioglu, Aktekin, Kurtoglu and Erden (2002) detected significant differences in the dimensions and thickness of their corpus callosum (a white matter structure in the brain that connects the left and right cerebral hemispheres). Marinoni, Grassi, Latorraca, Caruso and Sorbi (2000) identified a different pattern of cerebral activation during various musical tasks. There was a predominant left hemispheric activation in musicians, and a predominant right one in non-musicians.

Gender also affects hearing ability. When Cassidy & Ditty (2001) studied 350 newborn girls and boys they found that female hearing was superior at higher frequencies. Uchida (2003) found that females continued to out-perform males throughout adult life. Sato (1991) found that shorter, stiffer cochlea, and Don, Ponton, Eggermont and Masuda (1995) that a faster, more sensitive acoustic brain response were the anatomical reasons for this phenomena.

Despite detailed cortical work with musicians and non-musicians, and experiments examining the link between gender and hearing ability, the emotional and physiological responses of both pairings is under investigated. Nater, Abbruzzese, Krebs and Ehlert (2006) presented the paper “Sex differences in emotional and

psychophysiological responses to musical stimuli” and concluded that research failed “to address differences between men and women” (p. 301). An OVID search of ten data bases, using the keywords musician\$ and non-musician\$, was carried out for this thesis. It identified 311 separate results. It found only one examination of emotional engagement (Timmers, Marolt, Camurri, & Volpe, 2006) and only one examination of emotional awareness (Mundra, 2004). When Timmers et al. (2006) asked participants to judge emotionality in three performances of a Scriabin étude, the results suggested that musicality influenced their emotional engagement. Mundra (2004) compared the emotional awareness of 60 people, divided into groups of musically trained and non musically trained, male and female participants, and detected no significant main or interaction effects.

6.4 Experiment 1: A PFSM study - Identifying selections of sedative music

6.4.1 Aim

The PFSM was devised to identify sedative music by its evident parameters. It isolated ten separate music factors and defined them in terms of predictability. The experimenter listened to different pieces of music, evaluated them against the PFSM, recorded the number of predictable factors, and gave them a PFSM score. The reliability of these scores was established when Spearman rho tests found very strong significant positive correlations ($\rho=0.904$, $n=15$, $p<0.01$, two tailed, and $\rho=0.854$, $n=15$, $p<0.01$, two tailed) with two other people who evaluated the music in the same way. (A non-parametric test was used after it was established that the data did not satisfy parametric test assumptions. Normality tests produced p-values <0.05 and indicated that the data were not normally distributed).

The primary aim of this experiment is to examine whether other people agree with the experimenter’s PFSM scores. It also explores the minimum number of predictable factors needed for music to be perceived as sedative, finds out if participants respond to intrinsic factors in the music or memories and experiences they associate with it, and considers the effect of gender and musicianship.

6.4.2 Method

6.4.2.1 Participants

Forty-eight participants (18-69 years) were recruited by post. They were not offered any form of incentive or payment. They formed a quota sample. First, four sample strata were identified (male, female, musician, non-musician). After that, convenience sampling divided them into males (n=24) and females (n=24) and musicians (n=24) and non-musicians (n=24), and created four gender/musical ability combinations: male/musician (n=12), male/non-musician (n=12), female/musician (n=12) and female/non-musician (n=12). An information sheet instructed each participant to identify him/herself as a musician if s/he either currently or in the past had pursued a career in music (e.g. as a teacher, performer, or therapist), and/or if s/he had participated in music making on a regular basis (e.g. singing in a choir, playing in an orchestra or band). Otherwise, the participants were told to identify themselves as non-musicians.

There was no significant difference between the average age of male (48.29 years, $s=11.58$) and female participants (45.63 years, $s=13.21$), and between musicians (49.54 years, $s=13.9$) and non-musicians (44.38 years, $s=10.25$). The results of independent groups t-tests comparing age by gender and musical ability were ($t=0.744$, $df=46$, $p=0.461$) two-tailed and ($t=1.465$, $df=46$, $p=0.150$) two-tailed respectively.

6.4.2.2 Procedure

Each participant received a cassette tape. It contained fifteen, two-and-a-half minute pieces of music: instrumental arrangements of contemporary songs with PFSM scores that fell from nine (most predictable/sedative) to one (least predictable/stimulative).

Contemporary instrumental music was used for two reasons. First, some of the selections were being played during research that determined how sedative music affected the behaviour of individuals with an intellectual disability. The review of music therapy and intellectual disability research (chapter 4) had revealed that the intellectual disability population responded positively to contemporary contingent or non-contingent music stimuli. Second, the literature review in chapter 5 had

identified the absence of lyrics (i.e. instrumental music) as one of the primary characteristics of sedative music.

Table 8 names the selections used in the experiment, gives the title and catalogue number of the compact disc they were taken from, offers a brief description, and finally indicates the PFSM score².

There were two arrangements of ‘I Have a Dream’ and ‘Yesterday’ to find out if the participant’s response was influenced by past memories and experiences (extrinsic associations) or by intrinsic musical factors particular to each arrangement.

Each selection is on the “Experiment 1: Music Selections” compact disc attached to the inside back cover of this document.

Table 8: Selection of music

No	Name	CD Title and (Catalogue No)	Description	PFSM Score
1	No matter what	<i>Julian Lloyd Webber plays Andrew Lloyd Webber (PHILIPS 468362-2)</i>	Flowing and gentle cello melody accompanied with an unembellished bass line. It maintains stable tempo, texture and volume throughout.	9
2	The long and winding road	<i>From Yesterday to Penny Lane Göran Söllscher plays The Beatles (459692-2)</i>	A solo guitar arrangement with a gentle timbre throughout, and subtle changes to tempo, dynamic and texture.	9
3	Blue eyes	<i>HMV The Greatest Orchestral Pop Collection (724353543129)</i>	A keyboard and flute arrangement with predictable harmonies and with passages of unchanged, or subtly altered, tempo, dynamic and texture.	9
4	I have a dream (RPO)	<i>The Royal Philharmonic Orchestra plays Abba (EMPRCD585)</i>	An orchestral arrangement with gradual changes in volume, texture and timbre.	8
5	Yesterday (James Last)	<i>The very best of James Last & his orchestra (529556-2)</i>	An orchestral arrangement that moves subtly through changes of texture, and maintains a steady tempo and rich timbre.	8
6	Ticket to ride	<i>HMV The Greatest Orchestral Pop Collection (724353542924)</i>	An orchestral arrangement with a generally stable tempo and texture, and an unembellished melody.	7
7	Love me tender	<i>Las Vegas International Philharmonic plays Elvis Presley's ballads (edel 0144442ERE)</i>	A solo trumpet dominates, and while the tempo and volume of this arrangement are stable, it has unpredictable pitch, texture, melodic and harmonic factors.	6

8	How deep is your love?	<i>Richard Clayderman The Love Collection</i> (METRCD064)	An arrangement for piano and orchestra in which there are sudden changes of texture, and the melody is often harsh, embellished and accented.	6
9	Michelle	<i>HMV The Greatest Orchestral Pop Collection</i> (724353542924)	While tempo, volume & texture generally remain stable, the accompaniment has unexpected dissonance, & the melody is harsh, embellished & accented.	6
10	I have a dream (Pop Orchestra)	<i>HMV The Greatest Orchestral Pop Collection</i> (724353543020)	An orchestral arrangement in which, despite stable tempo and volume, guitar & sitar produce a harsh, accented melodic line.	5
11	Let it be	<i>Beatles in Classics The 12 Cellists of the Berlin Philharmonic</i> (0630-10012-2)	Arranged for 12 cellos, it has a harsh, embellished melodic line, and sudden changes of volume, pitch and texture.	5
12	Money, money, money	<i>The Royal Philharmonic Orchestra plays Abba</i> (EMPRCD585)	An orchestral arrangement with sudden pauses, and constantly shifting pitch, volume, texture and timbre.	4
13	Mamma mia	<i>The Royal Philharmonic Orchestra plays Abba</i> (EMPRCD585)	An orchestral arrangement with an embellished melodic line, and sudden changes of texture, pitch and timbre.	4
14	Suspicious minds	<i>Las Vegas International Philharmonic plays Elvis Presley's ballads</i> (edel 0144442ERE)	An orchestral arrangement with disrupted tempo, harsh timbre, and sudden changes of texture and pitch.	2
15	Yesterday (12 cellists)	<i>Beatles in Classics The 12 Cellists of the Berlin Philharmonic</i> (0630-10012-2)	A dissonant arrangement for 12 cellos, it has a broken melodic line, & sudden changes of tempo, volume, pitch & texture.	1

²Appendices 5-20 provide a much fuller explanation of how the fifteen selections were matched against the PFSM. In appendices 5-19, there is a written account of each two-and-half-minute extract alongside the PFSM. It describes each selection, and identifies unpredictable factors with an upper case number and their minute:second occurrence (e.g. ¹(1:33)). The moments, or passages, identified in this way are entered against a specific factor in the PFSM and identified with a zero (0). '1' is placed alongside any musical factor not described and cross-referenced as unpredictable to indicate that it remained predictable. In each appendix, the '1's are added together, and a total predictability score is recorded at the bottom of the PFSM. The total predictability scores are collated in appendix 20 that charts the predictable and unpredictable musical factors of all fifteen selections.

The music selections were put together in a random order. It was the same for all the participants. In this way, any sense of moving through increasingly arousing music was lost, and they responded to sedative music one moment, and more stimulating music the next, or two sedative extracts were followed by a stimulating one and so on.

6.4.2.3 Measures

The participants completed the 'listening activity' at their leisure. They did so not in the laboratory setting Sloboda (1989b) criticised as characteristic of the pharmaceutical model, but in the comfort of their home. They were instructed to listen to each music selection in turn, and they were asked, "As you listened, how did that particular extract of music make you feel?" In order to answer this question they were told to look down and choose six words from the list in front of them.

There were sixteen of the twenty-four UMACL adjectives on the response sheet (Appendix 21). The adjectives that described hedonic tone (happy, cheerful, satisfied, contented, dissatisfied, sorry, depressed, sad), and measured the directional component of an individual's response, had been removed from the UMACL. The words that were left measured positive energetic arousal (energetic, alert, vigorous, active), negative energetic arousal (passive, sluggish, unenterprising, tired), positive tense arousal (nervous, tense, jittery, anxious) and negative tense arousal (relaxed, composed, restful, calm).

A review of the literature had established that it was acceptable and legitimate to adapt the UMACL to meet the particular aims of an investigation. For example, Ruiters, Kok, Verplanken and Burg (2001) only used the tense arousal scale when they measured the level of fear evoked by breast cancer. Engleman et al. (1999) tested subjective ratings of state sleepiness with the energetic arousal scale, and Lane and Jarrett (2005) employed the hedonic tone and tense arousal subscales to measure the mood of senior recreational golfers.

6.4.3 Results

Table 9 is an interpretation of the median and mean number of positive (arousing (A)) and negative (non-arousing (NA)) adjectives chosen for each music selection. Table 9 lists each music selection, indicates its PFSM score, and then in the next four columns records the median and mean number of positive (arousing (A)) and negative (non-arousing (NA)) adjectives chosen by the participants.

The final column ('participant response') is an interpretation of the median and mean scores. The median distribution 6 to 0 or 5 to 1 in favour of non-aroused adjectives (a differential equal to or greater than four) is interpreted as a non-aroused (NA) response. The median distribution 6 to 0 or 5 to 1 in favour of aroused adjectives (a differential equal to or greater than four) is interpreted as an aroused (A) response. Finally, the median distribution 4 to 2 in favour of non-aroused adjectives (a differential less than four) is interpreted as an ambivalent non-aroused/aroused (NA/A) response, and the interpretation of ambivalent 3/3 median distributions as aroused/non-aroused (A/NA) is determined by the higher aroused mean score.

Table 9:

An interpretation of the median and mean number of positive (arousing (A)) and negative (non-arousing (NA)) adjectives chosen for each music selection

Music selection	PFSM Score	Median		Mean		Participant response
		+ A	- NA	+ A	- NA	
No matter what	9	0	6	.80	5.2	NA
The long and winding road	9	0	6	.70	5.3	NA
Blue eyes	9	0	6	.90	5.1	NA
I have a dream (RPO)	8	0	6	.60	5.4	NA
Yesterday (James Last)	8	0	6	.90	5.1	NA
Ticket to ride	7	0	6	.60	5.4	NA
Love me tender	6	0	6	1.0	5.0	NA
How deep is your love	6	1	5	1.3	4.7	NA
Michelle	6	1	5	1.8	4.2	NA
I have a dream (Pop Orch)	5	2	4	2.5	3.5	NA/A
Let it be	5	3	3	3.1	2.9	A/NA
Money, money, money	4	5	1	4.8	1.2	A
Mamma mia	4	6	0	4.8	1.2	A
Suspicious minds	2	5	1	4.6	1.4	A
Yesterday (12 Cellists)	1	3	3	3.1	2.9	A/NA

Spearman's rho test of correlation was used to determine the relationship between the PFSM score and the mean number of non-aroused adjectives. (A non-

parametric test was used after it was established that the data did not satisfy parametric test assumptions. Normality tests produced p-values <0.05 , and indicated that the data were not normally distributed). There was a very strong significant positive correlation between the two variables ($\rho=0.870$, $N=15$, $p<0.0005$, two tailed) and it indicated a degree of fit between the subjective PFSM score and the objective UMACL score.

The experiment combined within-subject (the music listened to by all the participants) and between-subject elements (allocating participants to musician or non-musician, male or female categories). A Mann-Whitney U Test was used to compare the number of non-arousing (NA) adjectives selected for each song by musicians and non-musicians, and by male and female participants. A two-tailed, non-directional, hypothesis was tested in both cases. The Mann-Whitney U Tests indicated no significant difference between the response of musicians and non-musicians ($U=85.5$, $N_1=15$, $N_2=15$, $p=0.267$) and between male and female participants ($U=81.5$, $N_1=15$, $N_2=15$, $p=0.202$) (see Appendix 22 for the data used in these analyses).

6.4.4 Discussion

The following issues will be addressed in turn in this section.

1. Would the participants agree with the experimenter's PFSM scores?
 2. What was the minimum number of predictable musical factors needed for music to be perceived as sedative?
 3. How would gender and musicianship affect the participant's response?
 4. Would participants respond to intrinsic music factors or extrinsic associations?
1. Would the participants agree the experimenter's PFSM scores?

The participants listened to fifteen pieces of music with different PFSM scores, and selected six adjectives that best described how they made them feel. When the outcome of a Spearman's rho test (a significant positive correlation between the PFSM and the mean non-aroused adjectives scores ($\rho=0.870$, $N=15$, $p<0.0005$, two tailed)) showed that the participants agreed with the experimenter's PFSM scores, it appeared that the PFSM had accurately assessed the sedative quality or otherwise of the music selections.

However the validity of the PFSM remains in doubt in spite of this outcome. The music selected for the experiment was restricted to instrumental arrangements.

Could the PFSM identify sedative vocal music? Furthermore, the results only confirmed the experimenter's judgements. Could the PFSM identify sedative music chosen by other people? Experiment 2 answers both these questions.

2. What was the minimum number of predictable musical factors needed for music to be perceived as sedative?

Table 9 lists each music selection, states its PFSM score and then the final column (participant response) interprets the median and mean scores.

The final column suggests that music with six or more predictable factors did not arouse the participants. In each case, the differential in the median score is equal to or greater than four in favour of non-aroused adjectives.

When the PFSM score is 5 (i.e. five predictable and five unpredictable factors) the median and mean scores in table 9 are closely distributed between the number of positive (arousing (A)) and negative (non-arousing (NA)) adjectives selected by the participants. This means that 'I have a dream' (Pop Orch) is described as NA/A, and 'Let it be' as A/NA. (NA/A conveys a higher mean and median non-aroused adjective score, and A/NA conveys a higher mean and median aroused adjective score). This ambiguity is not surprising because an even division of predictable and unpredictable factors implies that a piece of music is neither arousing nor non-arousing.

Table 9 suggests that participants pass from a non-aroused to an aroused response when there are four predictable factors. In each case ('Money, money, money', and 'Mamma mia') the aroused adjectives have a higher mean score, and a median score with a differential equal to or greater than four.

Finally, 'Yesterday' (12 Cellists) contradicts this interpretation. The least sedative selection has an ambiguous A/NA rather than the expected aroused (A) response. This outcome highlights the need to test other music compositions against the PFSM to confirm that six musical factors are the minimum required for music to be perceived as sedative.

3. How would gender and musicianship affect the participant's response?

There was no significant difference between how the male and female participants ($p=0.202$) and how the musicians and non-musicians ($p=0.267$) responded. This outcome occurred when there was a data collection method that did not control the environment or the circumstances under which an individual responded. The combination of these circumstances strengthens the evidence that the

participants agree with judgements the experimenter made using the PFSM, and that the PFSM estimates the sedative quality or otherwise of music.

It is also worth commenting further on the musician/non-musician pairing. Chapter 5 discussed how musicians and non-musicians responded to music. Musicians were able to call upon more patterns and strategies related to musical structures (Carterette & Kendall, 1999), and they were out-performing non-musicians identifying pitches (Cuddy, 1970) and recognising a chord played with different instruments (Beal, 1985). There is also evidence that the timbre (Chartrand & Belin, 2006) and pitch discrimination (Micheyl, Delhommeau, Perrot, & Oxenham, 2006) of musicians is superior to that of non-musicians, that musicians detect incongruous musical endings faster than non-musicians (Besson, Faita, & Requin, 1994), and that the musically trained use different neural networks for memorising pitch (Gaab & Schlaug, 2003) and processing melody and harmony (Schmithorst & Holland, 2003).

Why, despite all this evidence to the contrary, did the musicians and non-musicians in this experiment respond in the same way? Put simply, it was because the participants were not being judged on their understanding of musical structure; instead, they were making an emotional evaluation that did not depend on formal musical training. Sopchak (1955) supports this interpretation. Sopchak (1955) invited 553 students (381 male, 172 female) to listen to 5 classical, 7 popular and 3 folk compositions. Sopchak (1955) gave them 48 adjectives to choose from, and asked them to select as many or as few as were applicable. Although concluding that they could not agree on the particular emotion being expressed, a comparison of the responses for all emotional categories demonstrated that both genders responded “approximately in the same way” (p. 8), and that musical training rarely influenced the number of responses in each emotional category.

4. Would participants respond to intrinsic music factors, or extrinsic associations?

Sopchak (1955), also found that the participant’s responses were mood dependent. When all the pieces of music were grouped together, a higher percentage of gloomy males and cheerful females responded to the emotional characteristics.

Chapter 5 of this thesis has already identified two external factors that may influence how an individual responds to a piece of music: their prevailing mood, and whether they appraise music as an event, an action of agents, or an object (Sloboda, 2005b). Sloboda (2005b) added a third factor. He suggested that there may be occasions when an emotional or mood state, often linked to threatening or humiliating

early musical experiences (e.g. singing or playing in front of an audience or teacher), would in some way 'block' access to the system producing emotional experience and preclude appraisal-based emotion occurring at all.

This raises an important question about the outcome of this experiment. How accurately does each participant's response reflect their actual emotional experience? The participant's responses were limited by experimenter-determined categories and removing adjectives that recorded hedonic tone left participants with sixteen rather than twenty-four adjectives to choose from and added to the restrictions placed upon them. This decision was made early in the research process and it may have been unwise especially as the Circumplex Model of Affect demonstrates how all the omitted adjectives are related to either the arousal (happy, cheerful, satisfied, contented) or non-arousal concepts (dissatisfied, sorry, depressed, sad) being investigated in this experiment. So it would seem that as well as some judgements being made without any emotion being felt, the restrictions placed upon participants by a mood adjective checklist, and by the amendments to it, meant that the outcome may not have represented their emotional experience.

These concerns are partly offset by data Waterman personally communicated to Sloboda (2005b). When Waterman asked 76 college students to indicate on a checklist of emotions which ones they actually experienced to music, he was able to demonstrate that for most adults their range of emotion was not primarily the outcome of the type of cognitive appraisal. Furthermore, when the participants in this experiment listened to contrasting versions of 'Yesterday' and 'I have a dream', the different distribution of arousing and non-arousing adjectives suggested that they responded to intrinsic music factors and characteristics, rather than extrinsic associations. They were not reacting to memories and experiences on which appraisal-based emotion is based, but the predictable and unpredictable musical factors in the arrangement.

6.4.5 Summary

This experiment offers evidence that the participants agreed with the experimenter's PFSM scores and with the position of fifteen music selections on a sedative/stimulative continuum. It also suggests that six predictable factors are the minimum number required for music to be perceived as sedative. However, the music measured against the PFSM was from a single source (the experimenter) and

restricted to instrumental arrangements. Experiment 2 addresses both these limitations when it assesses the intrinsic validity of the PFSM.

6.5 Experiment 2: A PFSM study – Assessing intrinsic validity

6.5.1 Aim

The previous experiment indicated a very strong degree of fit between the subjective PFSM score and the objective UMACL score, and suggested that the PFSM was a useful way of estimating the sedative quality or otherwise of music. However, it only investigated the experimenter's choice of instrumental music. This experiment evaluates the designated trait (i.e. the sedative quality of music), and assesses intrinsic validity by finding out if the PFSM identifies sedative music (instrumental and vocal) chosen by other people.

6.5.2 Method

6.5.2.1 Participants

Twenty-five adults (18-59 years) formed a convenience sample. They were recruited by post, and took part in the experiment without any form of incentive or payment.

6.5.2.2 Procedure

Each participant received two blank compact discs (CDs) and a response form (Appendix 23). S/he was instructed: “think about the music you enjoy listening to and identify music that makes you feel calm and relaxed (sedative), and music that makes you feel energetic and want to move or dance (stimulative). It can be performed by a singer(s) or by instrumentalist(s), and can be in any genre (e.g. new age, jazz, rock, folk, classical)”.

The participants were asked to record the sedative music on to one CD and the stimulative on to the other. (The stimulative choices were included as a control condition). They were instructed to identify each selection by writing a code (e.g. 24678) on the CD. They had to write the codes, along with the relevant details about each selection on their response form and seal the form in an envelope. In this way, anyone judging the sample against the PFSM would not know whether the music on a

CD was sedative or a stimulative until they opened and read the contents of the envelope.

Some participants submitted one sedative and one stimulative selection, some two sedative selections and some two stimulative selections. If the first selection was sedative the experimenter could not circumvent the selection process and identify the second as stimulative. Likewise, if the first selection was stimulative the experimenter could not circumvent the evaluation process and identify the second as sedative.

Music up to five minutes long was evaluated in its entirety. The opening five minutes of any selection over five minutes were assessed. The experimenter evaluated all fifty CDs and established the reliability of resulting PFSM scores by asking a second person to assess 40% of the sample (n=20) in the same way. Spearman rho tests found a very strong significant positive correlation ($\rho=0.890$, $n=20$, $p<0.01$ (2 tailed)) between the two evaluations.

As this chapter cannot describe how each CD was evaluated two examples will be presented to demonstrate how the PFSM was used. (The predictable factors identified in each description are recorded in brackets and in bold type e.g. **(MELODY –LINE)**).

1) A CD, randomly numbered 77773, contained music 8:18 minutes long. The opening five minutes were assessed against the PFSM. The texture remained stable as a piano played rising triads, and a violin played a gentle unembellished line of rising and falling scales (**TEXTURE; MELODY-LINE; MELODY-TIMBRE; MELODY-PITCH**). There were moments when the melody and its accompaniment were accented to add expression to the composition (**MELODY-ACCENTS**), but otherwise the tempo remained slow (**TEMPO**) and any changes in volume were gradual (**VOLUME**). Overall, there was a feeling of serene tranquillity as a minimal musical style was combined with melodic repetition (**MELODY-LINE**) and harmony that followed a regular pathway of modulation (**HARMONY**). The evaluation identified nine predictable factors and it was categorised as sedative.

2) A CD, randomly numbered 24689, contained music 5:45 minutes long. The opening five minutes were assessed against the PFSM. The music was dance beat driven pop. It was a joyful sound energised by accents. It conformed to a verse-chorus structure (**FORM**), and was characterised by a melodic line based on almost hypnotic repetition (**MELODY-LINE**), a metronomic beat (**TEMPO**) and repetitive

harmonic sequences (**HARMONY**). Apart from these predictable factors, there were clattering electronic effects that constantly disturbed the dance beat texture, introduced sudden changes in pitch and broke up an already harsh and disjointed vocal line. An assessment of the music against the PFSM had identified just four predictable factors and it was categorised as stimulative.

6.5.3 Results

When the sealed envelopes were opened the completed response form revealed that 77773 was “Spiegel im Spiegel” (EMI 7243 5 75805 2 5) written by the contemporary classical composer Arvo Pärt (Track 2 on “Compact Disc 1” at the back of the thesis). It was the participant’s choice of sedative music. The second example described above was “Violently Happy” performed by Björk an Icelandic popular musician, and the PFSM had correctly identified it as stimulative (Track 3 on “Compact Disc 1”). After all the CDs were judged against the PFSM, the response forms revealed the diversity of the music selected for the experiment (Appendix 24 is an alphabetical list of the music chosen by the participants. It identifies musicians/composers, titles, performer(s) and CD catalogue numbers). The choices were drawn from classical, traditional folk and popular music.

Classical music was historically the music of the elite, upper strata of society, and the term is applied to that tradition as a whole and to a particular stage in its development (Sadie, 2001). The participants selected sedative (n=11) and stimulative (n=12) compositions by composers from the baroque (Matteis), classical (Mozart, Schubert), romantic (Beethoven, Rachmaninov Saint-Saëns, Sinding, Verdi), 20th century (Hindemith, Satie, Shostakovich, Stravinsky, Vaughan Williams) and contemporary periods (Adams, Barry, Du Prez, Pärt).

In contrast to the classical music tradition, folk music was historically composed by and for the common people, and it thrived, and indeed still thrives, when disseminated orally in societies unaffected by mass communication and commercialisation. When traditional folk music became a part of the popular music culture, musicians who actively played living folkloric musics adopted the synonymous term traditional music as a means of distinguishing their music from the popular music called "folk music" (Sadie, 2001). The participants picked traditional folk music played by instrumental groups (The Chieftains, Flook, Makarakit), and by solo performers on fiddle (Duncan Chisholm), bansuri (Hariprasad Chaurasia) and

accordion (Camarão). (A bansuri is an ancient musical instrument. It is a north indian bamboo flute. It is made of a single length of bamboo and it has six or seven open finger holes (Bansuri.org, n.d.)).

Popular music is the name applied to a variety of musical styles spread by the mass media and accessible to the general public (Sadie, 2001). The participant's popular music selections included jazz (n=3) played by solo trumpet (Miles Davis), guitar (Jim Hall) and piano (Michel Camilo), and pop music (n=18) that was either electronic (Björk, Brian Eno, Moby, Röyksopp, Ryuichi Sakamoto), indie (Clor, Flaming Lips), mainstream rock (Keane, U2, White Stripes), or performances by singer/songwriters (Bryan Adams, Tori Amos, Brendan Benson, Gavin DeGraw and Pink).

Table 10 shows the number of choices from the different genres (column 1). It divides them into sedative (column 2) and stimulative (column 3) selections, and the second figure (in brackets) alongside the first indicates the number of times the PFSM score matched participant perceptions. It shows that the experimenter used the PFSM to make accurate judgements about all the sedative music, and 84% (21 out of 25) of the stimulative category.

Table 10: Outcome of blind evaluations of participant's selections using the PFSM

<i>Musical genre</i>	<i>Sedative selections</i>	<i>Stimulative selections</i>
Classical (n=23)	11 (11)	12 (12)
Traditional folk (n=6)	3 (3)	3 (2)
Popular (n=21)	11 (11)	10 (7)
Totals	25 (25)	25 (21)

Table 11 organises the results into a 2x2 contingency table.

The rows show how the PFSM 'performed' identifying the participant's sedative choices (it categorised 25 as sedative, and 0 as stimulative), and how it 'performed' with the participant's stimulative choices (it categorised 4 as sedative, and 21 as stimulative).

The columns indicate that the PFSM assigned a sedative categorisation to 29 pieces of music in total (25 sedative choices, 4 stimulative choices), and that it assigned a stimulative categorisation to 21 pieces of music in total (0 sedative choices, and 21 stimulative choices).

Table 11: Performance of the PFSM identifying the participant's sedative and stimulative choices

	<i>Sedative categorisation</i>	<i>Stimulative categorisation</i>	Total
PFSM identifying sedative choices	25	0	25
PFSM identifying stimulative choices	4	21	25
Totals	29	21	50

Yates's Continuity Correction was used because the observed frequency in one cell was '0'. It yielded a highly significant value ($X^2_{Yates}=32.84$, $df=1$, $p<0.001$).

6.5.4 Discussion

This study evaluated whether or not the PFSM could be used to identify the participant's sedative and stimulative choices. The blind evaluations carried out with the PFSM identified all the sedative selections, and although less successful with the stimulative choices it correctly evaluated all from the classical genre. The result of Yates's Continuity Correction ($X^2_{Yates}=32.84$, $df=1$, $p<0.001$) indicated that the PFSM gave significantly different results identifying sedative and stimulative selections. This outcome, coupled with the descriptive data, showed that the PFSM distinguished between sedative and stimulative music, and confirmed the intrinsic validity of the tool.

The participants reflected the diversity of the classical genre by selecting music from several stages of its development, and also by choosing sedative and stimulative compositions scored for different instrumentation. The sedative music included works for solo piano (Beethoven: Piano Sonata No. 14 in C# Minor, Op. 27 No 2 (Moonlight), Schubert: Piano Sonata No 18 in G. Op. 78, D894, I Moderato e cantabile), solo instrument and accompaniment (Pärt: Spiegel im Spiegel, Satie: Gnossienne No. 4), chamber music (Clarinet Quintet in A, K581, II Larghetto) and compositions for full orchestra (Barry: The Beyondness of Things, Rachmaninov: Symphony No 2 in E minor, Op. 27, III Adagio, Vaughan Williams: The Lark Ascending). Likewise, there was stimulating music for solo piano (Sinding: Rustle of Spring Op.32 No 3), for ensemble (Du Prez: Bacchanalia), a composition for solo instrument and accompaniment (Saint Sæens: Allegro appassionato in C# minor, Op. 43 for violincello and piano) and examples written for full orchestra (Adams: Short Ride in a Fast Machine, Hindemith: Symphonic Metamorphoses on Themes of Weber, IV Marsch; Shostakovich: Symphony No 5 in D minor, Op. 47 IV Allegro non troppo; Stravinsky: Rite of Spring - Danses des adolescents). The successful

categorisation ranged from solo piano music to music written for full orchestra, and this illustrates the reliability of the PFSM and the emphasis it places on individual musical factors.

The previous chapter has already discussed how each musical factor in the “Moonlight” Sonata appeared to match most of the requirements of sedative music set out in the PFSM. In particular, it emphasised the consistent texture of the composition (i.e. harp-like broken chords accompanying song-like themes, and firm grounding octaves in the bass). Sinding’s Rustle of Spring (Frühlingsrauschen) matched the stable tempo and volume of the “Moonlight” Sonata, and also repeated melodic material. However, the composer wishing to convey constant motion symbolic of excited springtime restlessness added the expression marking “Agitato” (agitated) and included technically challenging sections that displayed the versatility of the instrument (The Columbia Encyclopedia, 2000) (Track 4 on “Compact Disc 1”). The PFSM captured his intentions with separate judgements about the unpredictability of the texture, the use of accents to convey energy rather than expression and the presence of a harsh and embellished melodic line. Consequently, whereas the “Moonlight” Sonata scored eight on the PFSM, Sinding’s Rustle of Spring scored three and it was given a stimulative categorisation that concurred with the participant’s reaction.

Turning to music written for full orchestra, Adams: Short Ride in a Fast Machine (EMI 5550512) was categorised stimulative in agreement with the participant’s response (Track 5 on “Compact Disc 1”) because the PFSM identified the separate musical factors that combined to convey the aural sensation of wrestling to keep control over a powerful machine. (According to John Adams, its contemporary American composer, this orchestral fanfare had been “inspired by the experience of driving a too-fast sports car” (Western Michigan University, n.d.)). The PFSM identified the constantly changing orchestral texture and sound, the energy of the harsh, accented, and broken melodic line, and the dissonant harmony.

The Lark Ascending, a popular composition by the British composer Ralph Vaughan Williams, is an orchestral work that features a prominent solo violin part (Track 6 on “Compact Disc 1”). The composition inspired by a George Meredith (1828-1909) poem about a skylark, conveys an impressionistic image of the lark’s song and flight and the beauty of the English countryside (Heninger, 2003). When it was assessed using the PFSM, the resulting sedative categorisation corresponded with

the participant's response. Once again, the tool captured the combination of individual factors creating that reaction. The fluid violin solo punctuating the straightforward ABA development structure of the piece was a highly embellished and, at times, angular line (not the simple, smooth melody of sedative music). However, the way it emerged from and blended back into the orchestral texture throughout the piece, the restrained and never forceful orchestration, and the carefully controlled changes of tempo and volume, resulted in a gentle sounding and expressive composition that received a PFSM score of seven.

In contrast to 100% success categorising sedative and stimulative classical music, the PFSM sometimes identified stimulative selections of popular and traditional folk music as sedative.

In general, each stimulative composition was distinguished from sedative material by embellished, accented, angular and harsh melodic lines: four of the five subsections of melody. This lowered their final PFSM score to six, one away from the score of five required to crossover from a sedative categorisation to an ambiguous one. Each of the stimulative selections categorised as sedative by the PFSM (Clor: Love + Pain (Popular), DeGraw: Chariot (Popular), Flook: Blackberry Blossom/The Independence (Traditional folk), Pink: Who Knew (Popular)) had the same four unpredictable elements. However, they either lacked the structural and textural complexities of Short Ride in a Fast Machine (described above) that carried it beyond an ambiguous categorisation to a stimulative one, or the dissonance and textural variety that resulted in the same outcome for Sinding's Rustle of Spring (also described above).

Popular music may be a rich and varied genre that includes acid, electronic, electro pop, Goth rock, indie, jazz, piano rock, pop, punk, rock and techno; the list, it seems, is endless. However, these riches are in direct contrast to the often very uncomplicated music performed by the likes of the post-punk electro-pop, five-piece Clor, and the singer-songwriters Gavin DeGraw and Pink. Popular music is often sectional, and the most common sections are verse, chorus (or refrain) and bridge. In comparison, classical works have greater structural complexity, and they are distinguished by the heavy use of development, modulation, (changing of keys), less outright repetition, and musical phrases that vary in length from the four or eight bars common in many forms of popular music (Sadie, 2001).

Popular music is not always simpler than classical. The outcome of this experiment showed that the PFSM was a useful tool when it assessed some of the more complex stimulative selections drawn from the popular music genre. There were nine instances when this proved to be the case, and here are three examples: “Violently Happy” by Björk (described earlier), the lush, multiplayed psychedelic performance of the “Yeah Yeah Yeah Song” by the Flaming Lips (Track 7 on “Compact Disc 1”), and “Hello Operator” by the White Stripes (Track 8 on “Compact Disc 1”) which has been described as having the “feel of improvisation” (Eliscu, 2000) and as a “disjointed, thrashy, stop-start rant” (Butler, n.d.). Björk, and the White Stripes, included a more expansive range of musical texture and volume, and the Flaming Lips a more contrasting musical texture, than the constantly fast, loud and percussive dance set performed by the traditional musicians Flook, and the brash but unvaried music of DeGraw, Pink and Clor.

Should this affect how the PFSM is employed? One option is to dispense with the idea of ambiguous music, and raise the maximum number of predictable factors needed for stimulative music to six. In other words, sedative music would require a PFSM score of at least seven. On the one hand, this would accommodate the uncomplicated choices discussed above, and result in a stimulative categorisation that concurred with the participant’s perception. On the other hand, eight of the participant’s selections with six predictable factors that were correctly identified as sedative would then receive a stimulative label that contradicted the participant’s response.

It might be more desirable to have sedative music erroneously identified as stimulative, rather than the other way around as was the case in this experiment. If stimulative pieces have the chance of being selected as sedative, it is possible that patient anxiety/stress may be increased rather than decreased.

The goal of this experiment was to maximize the correct selection of sedative music. The PFSM was developed to categorise sedative music, and changes should not be made to accommodate the stimulative selections included in this experiment as a control condition, especially if they compromise the overall success of the tool. This is quite an important outcome. This experiment confirms the intrinsic validity of the PFSM, and establishes that the PFSM performs reliably scoring music as sedative. However, as well as this, it appears that converse elements do not create a tool

capable of identifying stimulative music. Perhaps a separate categorisation tool needs to be developed to identify stimulating music.

Clearly, there remains the possibility that the PFSM identifies stimulating music as sedative. However, the results suggest that this is not a concern when classical music is being chosen, and, albeit based on a small sample, that it is an occasional rather than a common occurrence when it is used with traditional folk and popular music. (The separate issue of the PFSM scoring system is addressed in Chapter 8 (8.6 Future Research)).

6.5.5 Summary

This experiment has confirmed the intrinsic validity of the PFSM. The PFSM correctly identified sedative music chosen from a range of musical genres by a sample of participants. It would appear that the PFSM is evaluating the designated trait (the sedative quality of music), and when participants or clients cannot choose sedative music themselves, it can guide choices experimenters or clinicians make on their behalf.

6.6. Experiment 3: Choosing sedative music based on a consensus of opinion

6.6.1 Aim

In chapter 5, a review of sedative music literature (1996-2008) summarised forty-four papers. It highlighted the need to: (1) report the choice of sedative music, (2) identify the criteria determining that choice and (3) obtain a consensus of opinion. This experiment increases the consensus of opinion from that described in chapter 5. Furthermore, it addresses a source of some concern for one research team (Wolfe, O'Connell, & Waldon, 2002) that employed six musicians and 86 non-musicians to select eight pieces of relaxing music. Wolfe et al. (2002) used over ninety people to choose a sedative stimulus, yet they still urged caution because only the opening 90 seconds of each piece of music was used, and it could not be assumed that "the remaining minutes of the piece would continue to be perceived as relaxing" (p. 52). Consequently, the aim of this experiment is not just to use the PFSM and a large group of participants to select music. This experiment will also confirm that when the five highest scoring selections from experiment 1 are heard in their entirety they are consistently perceived as sedative.

Finally, a selection of non-sedative music is included in this experiment as a control condition. The control condition will examine the participant's passive listening experience, and separate it from how they respond to sedative music. It will determine whether changed arousal levels are simply caused by sitting down to listen to music, or whether they are the result of being exposed to sedative music.

6.6.2 Method

6.6.2.1 Participants

Group 1:

160 adults (18-69 years) were recruited by post and they participated without any form of incentive or payment. The participants formed a quota sample. First, four sample strata were identified (male, female, musician, non-musician). After that, convenience sampling divided them into males (n=80) and females (n=80) and musicians (n=80) and non-musicians (n=80), and created four gender/musical ability combinations: male/musician (n=40), male/non-musician (n=40), female/musician (n=40) and female/non-musician (n=40). Each participant received an information sheet, and s/he was instructed to identify him/herself as a musician if s/he either currently or in the past had pursued a career in music (e.g. as a teacher, performer, or therapist), and/or if s/he had participated in music making on a regular basis (e.g. singing in a choir, playing in an orchestra or band). Otherwise, the participants were instructed to identify themselves as non-musicians.

There was no significant difference between the average age of male (40.09 years, $s=11.56$) and female participants (37.09 years, $s=13.43$). The results of an independent groups t-test comparing age by gender was ($t=1.514$, $df=158$, $p=0.132$) two-tailed. There was a significant difference ($t=-2.557$, $df=158$, $p=0.011$) two-tailed) in the average age of musicians (36.09 years, $s=10.63$) and non-musicians (41.09 years, $s=13.89$). However, they were not separated by a generation gap likely to affect listening preferences and responses.

Group 2:

64 adults (18-69 years) were recruited by post and they participated without any form of incentive or payment. The participants formed a quota sample. First, four sample strata were identified (male, female, musician, non-musician). After that, convenience sampling divided them into males (n=32) and females (n=32) and

musicians (n=32) and non-musicians (n=32), and created four gender/musical ability combinations: male/musician (n=16), male/non-musician (n=16), female/musician (n=16) and female/non-musician (n=16). Each individual received an information sheet, and used the same criteria as Group 1 to identify him/herself as a musician or non-musician.

There was no significant difference between the average age of male (43.18 years, $s=11.97$) and female participants (42.19 years, $s=10.26$), and between musicians (40.56 years, $s=8.49$) and non-musicians (44.81 years, $s=12.94$). The results of independent groups t-tests comparing age by gender and musical ability were ($t=0.359$, $df=62$, $p=0.721$) two-tailed and ($t=-1.553$, $df=62$, $p=0.126$) two-tailed respectively.

6.6.2.2 Procedure

Both groups received a cassette tape. Group 1 were sent the five most sedative selections used in experiment 1 (table 12). They were sequenced together in full into seventeen minutes and thirty-nine seconds (17:39) of music.

Group 2 also received instrumental music. They were sent an eighteen minutes and twenty-five second (18:25) selection of accordion music (table 13). Unpredictable factors in the accordion music (harsh timbre, and angular, embellished and accented melodic lines) created an energetic and stimulating sound, and a contrast with sedative music.

All the participants completed the ‘listening activity’ at their leisure and in the comfort of their own home. This experiment eschewed the laboratory setting, and allowed them to choose where and when to listen.

Table 12: Sedative music (Tracks 5, 1, 4, 2, 3 “Experiment 1: Music selections”)

<i>Title</i>	<i>Album title</i>	<i>Catalogue No</i>	<i>Duration</i>
Yesterday (James Last)	The very best of James Last & his orchestra	529556-2	2:54
No matter what	Julian Lloyd Webber plays Andrew Lloyd Webber	PHILIPS 468362-2	3:49
I have a dream (RPO)	The Royal Philharmonic Orchestra plays Abba	EMPR CD585	4:45
The long and winding road	From Yesterday to Penny Lane Göran Söllscher plays The Beatles	459692-2	2:33
Blue eyes	HMV The Greatest Orchestral Pop Collection	7243 53543129	3:38

Table 13: Control music (Tracks 9 to 14 on “Compact Disc 1”)

<i>Title</i>	<i>Album title</i>	<i>Catalogue No</i>	<i>Duration</i>
Sailor’s hornpipe	Scottish Accordion Favourites - Gordon Pattullo	BIA 4169	2:53
Cuckoo waltz	Scottish Accordion Favourites - Gordon Pattullo	BIA 4169	3:06
Two step: <i>The Painter’s Choice</i>	Scottish Accordion Favourites - Gordon Pattullo	BIA 4169	2:36
Para handy	Scottish Accordion Favourites - Gordon Pattullo	BIA 4169	3:05
Reels: <i>Miss Suzanne Barbour / Jean’s Fancy / Boys of the Lough / Tony Reid of Balnakilly</i>	Scottish Accordion Favourites - Gordon Pattullo	BIA 4169	4:27
Alpine holiday	Scottish Accordion Favourites - Gordon Pattullo	BIA 4169	2:18

6.6.2.3 Measures

The participants received two copies of the University of Wales Institute of Technology Mood Adjective Check List (UWIST-MACL), or UMACL for short, devised by Matthews et al. (1990). The UMACL was not adapted for this experiment. The participants were asked to complete a UMACL before (pre) and after (post) they listened to the music (Appendix 25). They were to: “begin with the first adjective ‘Happy’ and circle either 1, 2, 3, or 4 alongside to indicate if you are feeling either definitely happy, slightly happy, slightly not happy, or definitely not happy. Don’t spend too long choosing a score before you move on to the next adjective ‘Dissatisfied’ and circle 1, 2, 3, or 4. Continue in this manner until the final adjective ‘Tired’”.

Each Likert scale response was converted into a score (see Appendix 4). The eight Energetic Arousal (EA), Tense Arousal (TA) and Hedonic Tone (HT) scores, and the twelve General Arousal (GA) figures were added together. The total EA, TA and HT score ranged along a non-aroused/aroused continuum from 8 (non-aroused) to 32 (aroused), and the total GA score ranged along the same continuum from 12 (non-aroused) to 48 (aroused). In other words, the higher the participant’s cumulated scores the more aroused s/he was feeling.

6.6.3 Results

6.6.3.1 Introduction

The results section is divided into two parts. The first part (6.6.3.2) examines the participant's response to a selection of sedative music. The second part (6.6.3.3) examines their response to the control condition.

Analysis of variance (ANOVA) was used to look at the interactions in the results of this study. An ANOVA determines the degree of variation between group means. Group means are almost never identical (Grimm, 1993). When group means are similar there is little variation between means, and when the group means are very different there is a greater degree of variation. An ANOVA can calculate the degree of variation between the means of groups (in this case male/female, musician/non-musician) and among scores within a group (in this case pre test/post test). It can also look at how the within group and between group elements interact (e.g. TEST*GENDER finds out how different the variation in male participant's mean pre and post test score was from the variation in female participant's mean pre and post test score).

6.6.3.2 Sedative music

The four dependent variables collected by the UMACL are Energetic Arousal (EA), Tense Arousal (TA), General Arousal (GA) and Hedonic Tone (HT). They are introduced in turn in this results section.

In each case, the descriptive statistics are mean UWIST-MACL scores for male and female musician and male and female non-musician participants (n=40), for all male and female and all musician and non-musician participants (n=80), and for all participants (n=160). The scores are converted from Likert scale responses and they indicate the participant's level of arousal. A lower post-score indicates that the music stimulus has reduced the level of arousal, and a higher post-score indicates that the music stimulus has increased the level of arousal.

This investigation combined repeated measures (pre and post dependent variables) and a between-participant's design (musician/non-musician; male/female participants). Consequently, the descriptive statistics are followed by mixed ANOVA results. The mixed ANOVA identifies three main effects. It identifies the within-subjects effects of pre and post scores (TEST), and the between-subjects effects of

male and female participants (GENDER) and musicians and non-musicians (MUSICIAN). The mixed ANOVA also examines three two-way interactions: two within-subjects effects (TEST*MUSICIAN, TEST*GENDER) and a between-subjects effect (MUSICIAN*GENDER). Finally, a within-subjects effect looks at the three-way interaction of TEST*MUSICIAN*GENDER. (Mauchly's Test of Sphericity produced a non-significant value that demonstrated the homogeneity of variance of all the repeated measures data collected during the investigation).

6.6.3.2.1 Sedative music - Energetic Arousal (EA)

Each participant completed the UMACL before and after they listened to a selection of sedative music. The UMACL has four dependent variables, and the mean scores of the first dependent variable (Energetic Arousal (EA)) are shown in table 14.

Table 14: Pre & post scores for each participant category & for all participants

<u>EA Pre</u>	Male	Female	Overall
Musician	19.33	19.93	(Musician overall) 19.63
Non-musician (NM)	21.33	20.95	(NM overall) 21.14
Overall	(Male overall) 20.33	(Female overall) 20.44	(All overall) 20.38
<u>EA Post</u>	Male	Female	Overall
Musician	18.53	18.30	(Musician overall) 18.41
Non-musician (NM)	19.35	18.98	(NM overall) 19.16
Overall	(Male overall) 18.94	(Female overall) 18.64	(All overall) 18.79

The results indicated a main effect of TEST ($F(1,156)=16$, $p<0.05$). The overall post test EA score (mean=18.79) was significantly **lower** than the overall pre test EA score (mean=20.38).

The main effect of GENDER and MUSICIAN, the two-way interactions (TEST*GENDER; TEST*MUSICIAN; MUSICIAN*GENDER), and the three-way interaction (TEST*MUSICIAN*GENDER) were all non-significant ($F<1$).

This means that the significant variation between mean pre-test and post-test scores was not affected by the participant's gender or degree of musicianship.

6.6.3.2.2 Sedative music - Tense Arousal (TA)

The second UMACL dependent variable is tense arousal (TA), and table 15 shows the mean TA pre and TA post scores for each participant category.

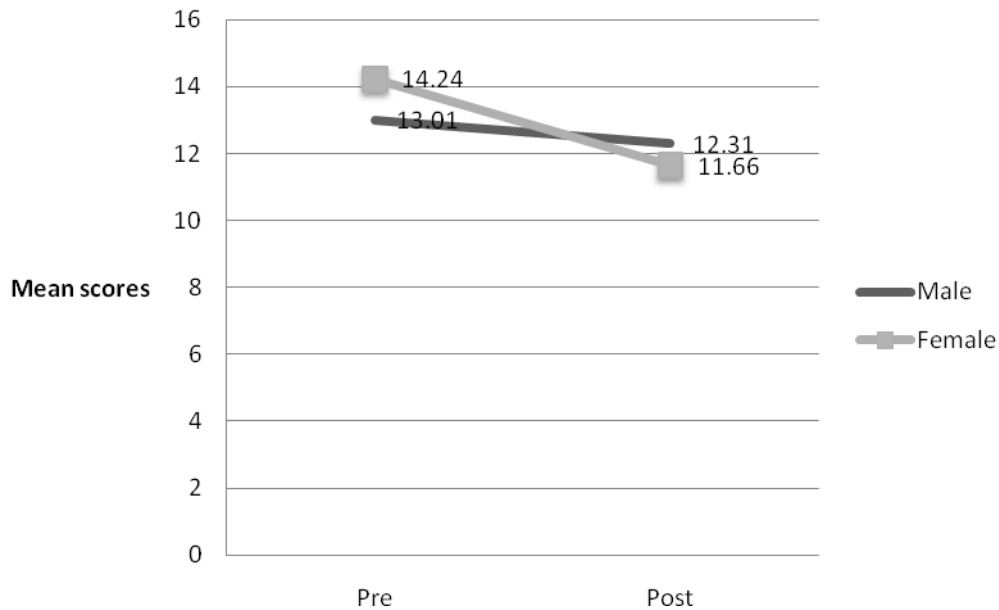
Table 15: Pre & post scores for each participant category & for all participants

<u>TA Pre</u>	Male	Female	Overall
Musician	13.68	13.28	(Musician overall) 13.48
Non-musician (NM)	12.35	15.20	(NM overall) 13.78
Overall	(Male overall) 13.01	(Female overall) 14.24	(All overall) 13.63
<u>TA Post</u>	Male	Female	Overall
Musician	13.78	11.35	(Musician overall) 12.56
Non-musician (NM)	10.85	11.98	(NM overall) 11.41
Overall	(Male overall) 12.31	(Female overall) 11.66	(All overall) 11.99

The results indicated a main effect of TEST ($F(1,156)=19.76$, $p<0.05$). The overall post test TA score (mean=11.99) was significantly **lower** than the overall pre test TA score (mean=13.63).

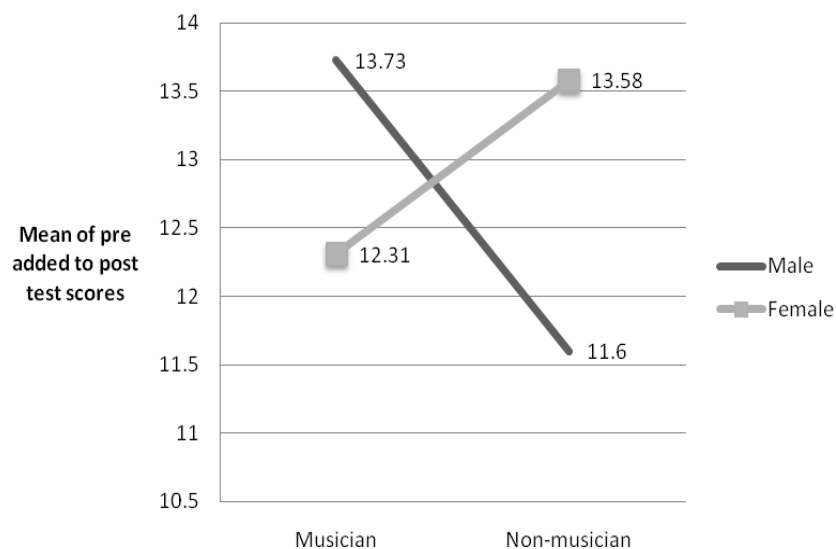
The main effect was qualified by the presence of a TEST*GENDER interaction ($F(1,156)=6.48$, $p<0.05$). Analysis of the simple main effect indicated that the effect of TEST occurred only among female participants ($t(79)=5.062$, $p<0.001$), and not among male participants ($t(79)=1.298$, $p=0.198$). Figure 2, is a graphical representation of this interaction.

Figure 2: Tense Arousal TEST*GENDER Interaction



The main effect of GENDER ($F(1,156)=0.26, p>0.05$) and the main effect of MUSICIAN ($F(1,156)=0.57, p>0.05$) were both non-significant. There was a significant interaction between MUSICIAN*GENDER ($F(1,156)=9.14, p<0.05$). Simple main effects analysis indicated that there was an effect of MUSICIAN for the male participants ($t(78)=2.74, p<0.05$), but not for female participants ($t(78)=-1.56, p=.122$). Figure 3 is a graphical representation of this interaction.

Figure 3: Tense Arousal MUSICIAN*GENDER Interaction



Finally the two-way interaction TEST*MUSICIAN and the three way interaction TEST*MUSICIAN*GENDER ($F(1,156)=.041$, $p=.839$) were both non-significant, although the TEST*MUSICIAN interaction approached significance ($F(1,156)=3.87$, $p=.051$).

These results mean that a closer look at the effect of gender showed the significant variation between mean pre-test and post-test scores for female participants but not male participants (figure 2). Furthermore, the mean of the pre-test added to the post-test scores showed that whether or not the person was a musician had a significant effect on the response of male participants but not female participants (figure 3).

6.6.3.2.3 Sedative music - General Arousal (GA)

General arousal (GA) is the third dependent variable in the UMACL, and table 16 shows the mean GA pre and GA post scores for each participant category.

Table 16: Pre & post scores for each participant category & for all participants

<u>GA Pre</u>	Male	Female	Overall
Musician	24.60	25.35	(Musician overall) 24.98
Non-musician (NM)	25.58	27.33	(NM overall) 26.45
Overall	(Male overall) 25.09	(Female overall) 26.34	(All overall) 25.71
<u>GA Post</u>	Male	Female	Overall
Musician	24.08	22.40	(Musician overall) 23.24
Non-musician (NM)	22.70	23.00	(NM overall) 22.85
Overall	(Male overall) 23.39	(Female overall) 22.70	(All overall) 23.04

Although the main effects of GENDER and MUSICIAN were non-significant (both $F < 1$), the results did indicate a main effect of TEST ($F(1,156)= 47.65$, $p=.000$). The overall post test GA score (mean=23.04) was significantly **lower** than the overall pre test GA score (mean=25.71).

The main effect of TEST was qualified by the presence of a two-way TEST*MUSICIAN ($F(1,156)=5.80$, $p<0.05$), and a two-way TEST*GENDER ($F(1,156)=6.28$, $p<0.05$) interaction. Figures 4 and 5 show the TEST*MUSICIAN and TEST*GENDER interactions. Analysis of the simple main effect indicated an effect of musicality on pre-test GA scores ($t(158)=-2.1$, $p<0.05$), but not on post-test GA scores ($t(158)=0.5$, $p=.619$). A simple main effects analysis of GENDER indicated that the female and male post scores were significantly lower than their pre scores ($t(79)=6.34$, $p=.001$, and $t(79)=3.187$, $p=.002$ respectively) and the 't' and 'p' values showed a weak interaction.

The remaining two-way MUSICIAN*GENDER interaction ($F(1,156)=1.38$, $p=.242$), and the three-way TEST*MUSICIAN*GENDER interaction ($F(1,156)=.397$, $p=.529$) were both non-significant.

Figure 4: General Arousal TEST*MUSICIAN Interaction

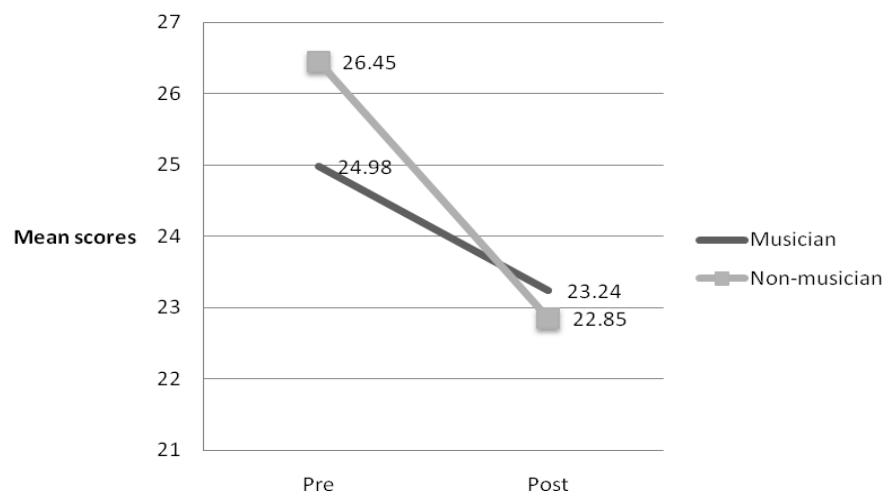
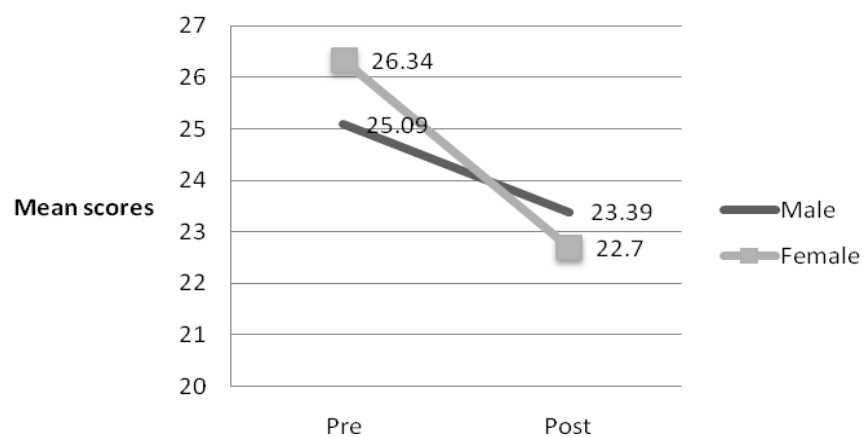


Figure 5: General Arousal TEST*GENDER Interaction



This means that both the female and male participant's post-test scores were significantly lower than their pre-test scores (figure 5). Furthermore, when the mean pre-test and post-test scores of musician/non-musician participants were compared whether or not the person was a musician had a significant effect on their pre-test but not on their post-test scores (figure 4).

6.6.3.2.4 Sedative music - Hedonic Tone (HT)

Hedonic Tone (HT) is the final dependent variable measured using the UMACL. Table 17 shows the mean HT pre and HT post scores for each participant category.

Table 17: Pre & post scores for each participant category & for all participants

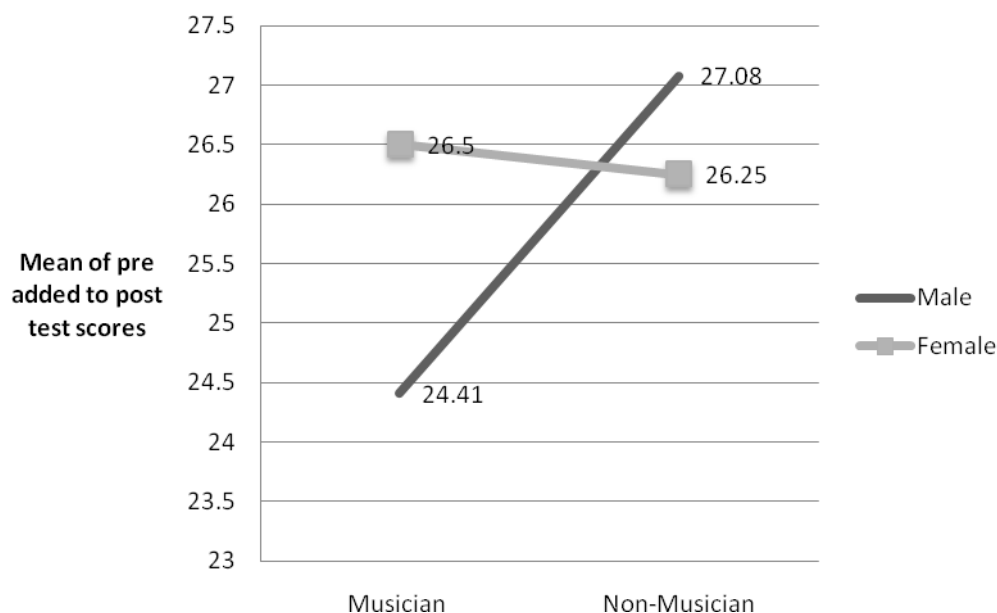
<u>HT Pre</u>	Male	Female	Overall
Musician	25.53	27.05	(Musician overall) 26.29
Non-musician (NM)	27.55	26.50	(NM overall) 27.03
Overall	(Male overall) 26.54	(Female overall) 26.78	(All overall) 26.66
<u>HT Post</u>	Male	Female	Overall
Musician	23.30	25.95	(Musician overall) 24.63
Non-musician (NM)	26.60	26.00	(NM overall) 26.30
Overall	(Male overall) 24.95	(Female overall) 25.98	(All overall) 25.46

The results indicated a main effect of TEST ($F(1,156)=6.67$, $p<0.05$). The overall post test HT score (mean=25.46) was significantly **lower** than the overall pre test HT score (mean=26.66).

The main effect of GENDER ($F(1,156)=0.94$, $p>0.05$) and the main effect of MUSICIAN were both non-significant. However, the main effect of MUSICIAN approached a level of significance ($F(1,156)=3.42$, $p=0.066$) and was qualified by a MUSICIAN*GENDER interaction ($F(1,156)=4.99$, $p<0.05$). A simple main effects analysis found an effect of MUSICIAN among male ($t(78)=-2.948$, $p<0.05$) and not

among female participants ($t(78)=.266$, $p=.791$). Figure 6 is a graphical representation of the MUSICIAN*GENDER interaction.

Figure 6: Hedonic Tone MUSICIAN*GENDER Interaction



Finally the two-way interactions TEST*MUSICIAN ($F(1,156)=1.03$, $p=.312$), and TEST*GENDER ($F(1,156)=.726$, $p=.396$), and the three way interaction TEST*MUSICIAN*GENDER ($F(1,156)=.133$, $p=.716$) were all non-significant.

In this case, the mean of the pre-test added to the post-test scores showed that whether or not the person was a musician had a significant effect on the response of male participants but not female participants (figure 6).

6.6.3.3 Control condition

The four dependent UMACL variables are Energetic Arousal (EA), Tense Arousal (TA), General Arousal (GA), and Hedonic Tone (HT). They are again introduced in turn. In this instance, the descriptive statistics are the mean UMACL scores for all male and female musician and male and female non-musician participants ($n=16$), for all male and female and all musician and non-musician participants ($n=32$), and for all participants ($n=64$).

A mixed ANOVA has been carried out which analyses three main effects (TEST, GENDER, MUSICIAN), three two-way interactions (TEST*MUSICIAN,

TEST*GENDER, MUSICIAN*GENDER) and the three-way interaction of TEST*MUSICIAN*GENDER. (Mauchly's Test of Sphericity produced a non-significant value that demonstrated the homogeneity of variance of all the repeated measures data collected during the investigation).

6.6.3.3.1 Control condition - Energetic Arousal (EA)

Each participant completed the UMACL before and after they listened to a selection of accordion music. The UMACL has four dependent variables, and the mean scores of the first dependent variable (Energetic Arousal (EA)) are shown in table 18.

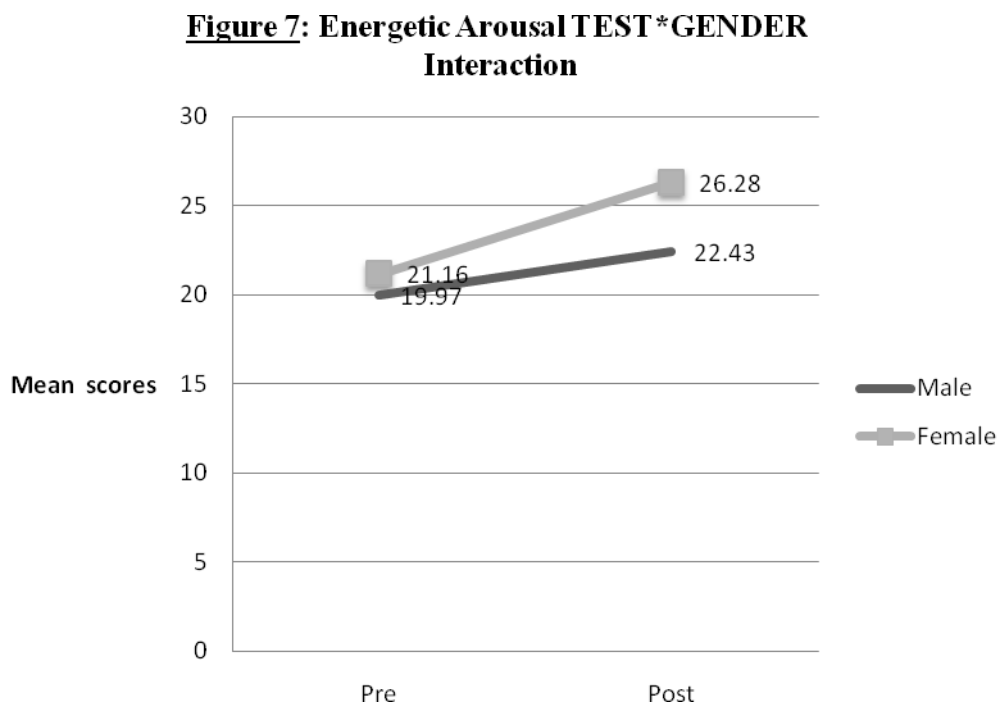
Table 18: Pre & post scores for each participant category & for all participants

<u>EA Pre</u>	Male	Female	Overall
Musician	19.06	22.56	(Musician overall) 20.81
Non-musician (NM)	20.88	19.75	(NM overall) 20.31
Overall	(Male overall) 19.97	(Female overall) 21.16	(All overall) 20.56
<u>EA Post</u>	Male	Female	Overall
Musician	20.56	27.31	(Musician overall) 23.94
Non-musician (NM)	24.31	25.25	(NM overall) 24.78
Overall	(Male overall) 22.43	(Female overall) 26.28	(All overall) 24.34

The results indicated a main effect of TEST ($F(1,60)=38.53$, $p=.000$). The overall post test EA score (mean=24.34) was significantly **higher** than the overall pre test EA score (mean=20.56).

Although the main effects of GENDER ($F(1,60)=3.65$, $p>0.05$) and MUSICIAN ($F(1,60)=.02$, $p>0.05$) were non-significant, the MUSICIAN*GENDER interaction approached a level of significance ($F(1,60)=3.93$, $p=.052$) and there was a significant interaction when GENDER was combined with TEST ($F(1,60)=4.71$, $p<0.05$). Figure 7 shows the TEST*GENDER interaction.

Analysis of the simple main effect indicated that the effect of test was significant at both levels of gender. However, there was an effect of gender on post-test EA scores ($t(62)=-2.7$, $p<0.05$), but not on pre-test EA scores ($t(62)= -.79$, $p=.432$).



The two-way TEST*MUSICIAN interaction ($F(1,60)=1.21$, $p>0.05$) and the three-way TEST*MUSICIAN*GENDER interaction ($F(1,60)=0.24$, $p>0.05$) were both non-significant.

This means that the energetic arousal of both the male and the female participant's increased significantly following the introduction of the control condition, although gender differences were only significant when the post-test scores were compared (figure 7).

6.6.3.3.2 Control condition - Tense Arousal (TA)

Tense arousal (TA) is the second UMACL dependent variable, and table 19 shows the mean (TA) pre and post scores for each participant category.

Table 19: Pre & post scores for each participant category & for all participants

<u>TA Pre</u>	Male	Female	Overall
Musician	15.56	15.63	(Musician overall) 15.59
Non-musician (NM)	14.25	15.31	(NM overall) 14.78
Overall	(Male overall) 14.91	(Female overall) 15.47	(All overall) 15.19
<u>TA Post</u>	Male	Female	Overall
Musician	15.00	14.81	(Musician overall) 14.91
Non-musician (NM)	12.56	14.00	(NM overall) 13.28
Overall	(Male overall) 13.78	(Female overall) 14.41	(All overall) 14.09

There was no main effect of TEST ($F(1,60)=3.50$, $p=0.66$). The main effect of MUSICIAN was non-significant ($F(1,60)=1.27$, $p>0.05$), and the remaining main effect (GENDER), the two-way interactions (TEST*GENDER; TEST*MUSICIAN, MUSICIAN*GENDER) and the three-way interaction (TEST*MUSICIAN*GENDER) were also non-significant (all $F<1$).

This means that there was **little** variation between mean pre-test and post-test scores, and this outcome was not affected by the participant's gender or degree of musicianship.

6.6.3.3.3 Control condition - General Arousal (GA)

General arousal (GA) is the third dependent variable in the UMACL, and table 20 shows the mean GA pre and GA post scores for each participant category.

Table 20: Pre & post scores for each participant category & for all participants

<u>GA Pre</u>	Male	Female	Overall
Musician	25.88	29.13	(Musician overall) 27.50
Non-musician (NM)	26.75	26.81	(NM overall) 26.78
Overall	(Male overall) 26.31	(Female overall) 27.97	(All overall) 27.14
<u>GA Post</u>	Male	Female	Overall
Musician	26.75	31.88	(Musician overall) 29.31
Non-musician (NM)	28.13	30.13	(NM overall) 29.13
Overall	(Male overall) 27.44	(Female overall) 31.00	(All overall) 29.22

The results indicated a main effect of TEST ($F(1,60)=11.66$, $p<0.05$). The overall post test GA score (mean=29.22) was significantly **higher** than the overall pre test GA score (mean=27.14).

The main effect of MUSICIAN ($F(1,60)=0.12$, $p>0.05$), the two-way TEST*GENDER ($F(1,60)=2.45$, $p>0.05$), TEST*MUSICIAN ($F(1,60)=.191$, $p>0.05$) and MUSICIAN*GENDER interactions ($F(1,60)=1.40$, $p>0.05$), and the three-way TEST*MUSICIAN*GENDER interaction ($F(1,60)=.001$, $p>0.05$) were all non-significant. The only other effect to approach significance was the main effect of GENDER ($F(1,60)=3.82$, $p=.055$).

This means that the significant variation between mean pre-test and post-test scores was not affected by the participant's gender or degree of musicianship.

6.6.3.3.4 Control condition - Hedonic Tone (HT)

Hedonic Tone (HT) is the final dependent variable measured using the UMACL. Table 21 shows the mean HT pre and HT post scores for each participant category.

Table 21: Pre & post scores for each participant category & for all participants

<u>HT Pre</u>	Male	Female	Overall
Musician	23.63	26.38	(Musician overall) 25.00
Non-musician (NM)	26.75	25.94	(NM overall) 26.34
Overall	(Male overall) 25.19	(Female overall) 26.16	(All overall) 25.67
<u>HT Post</u>	Male	Female	Overall
Musician	25.94	28.31	(Musician overall) 27.13
Non-musician (NM)	29.56	28.81	(NM overall) 29.19
Overall	(Male overall) 27.75	(Female overall) 28.56	(All overall) 28.16

The results indicated a main effect of TEST ($F(1,60)=21.15$, $p<0.05$). The overall post test HT score (mean=28.16) was significantly **higher** than the overall pre test HT score (mean=25.67).

The other main effects (GENDER ($F(1,60)=0.6$, $p>0.05$), MUSICIAN ($F(1,60)=2.20$, $p>0.05$)), the two-way interactions (TEST*GENDER ($F(1,60)=.021$, $p>0.05$); TEST*MUSICIAN ($F(1,60)=.443$, $p>0.05$); MUSICIAN*GENDER ($F(1,60)=2.12$, $p>0.05$)) and the three-way TEST*MUSICIAN*GENDER interaction ($F(1,60)=.041$, $p>0.05$) were all non-significant.

This means that the significant variation between mean pre-test and post-test scores was not affected by the participant's gender or degree of musicianship.

6.6.4 Discussion

The results demonstrated that listening to this selection of sedative music significantly lowered Energetic Arousal (EA), Tense Arousal (TA), and General Arousal (GA), and surprisingly Hedonic Tone (HT), a measure of happiness, was also reduced. The control condition (accordion music) was included to separate the act of sitting and listening to sedative music from the participant's response to it. Both music conditions had been experienced under similar circumstances (listening passively). When the control condition produced a different reaction (significant increases in EA, GA, and HT, and a surprising reduction in TA that is not easy to explain) it indicated that the calming qualities of sedative music, and not participating in a passive activity, affected the participant's response.

There were four dependent variables in this experiment (EA, TA, GA and HT), and there was either a main effect of TEST (EA), or an interaction with the other variables that involved a simple main effect (TA, GA and HT). In other words, a sub group of participants agreed that each entire piece of music was sedative (TA, GA and HT) and on one occasion they all did so (EA).

This outcome was strengthened by the decision to move the experiment away from the controlled confines of a laboratory, and carry it out under the 'naturalistic' conditions advocated by Sloboda (1989). The music had consistently lowered arousal in a variety of settings.

In chapter 5 of this thesis a discussion of music psychology, ethnomusicology and sociology of music identified structural (form, tempo, volume, melody and harmony), performance (performer skills, performer state), listener (musical expertise, motivational/mood state), and contextual features (location, event) that came together and produced very different emotional reactions to the same musical event. Familiarity and preference are another two factors that ought to be added to this list. Sloboda (2005a) explains their inter-relationship as an inverted-U function: preference is low when music is unfamiliar, increases as it becomes known, and then decreases again when it is over familiar. Consequently it is not surprising that although the mixed ANOVAS found a main effect of TEST, there was an effect of test among female, but not male participants (TA), an effect of musician for male but not female participants (TA and HT), and an effect of musicality on pre- but not post-test scores (GA). Clearly, one or more of these factors was exerting a strong enough

influence to produce responses that differed either according to gender or musicality. Although it is scarce, the literature offers some possible explanations.

Fung (1996) investigated how 449 undergraduate students responded to African, Asian, and Latin American music and suggested that musicians preferred excerpts with complex texture, whereas non-musicians preferred less complex arrangements. Did the style of the musical arrangements affect how the participants responded in this experiment?

Russell (1997) discussed the effect of gender on musical preference, and suggested that gender differences in musical tastes corresponded with general gender stereotypes; whereas, males preferred 'hard' 'tough' music, females enjoyed something 'softer' and more romantic. Were the male participants in this experiment reacting in a similar way to the 'softer' sedative music?

Hadsell (1989) examined 49 female musicians and 42 female non-musicians, and found that the two groups rated pre-categorised sedative music in a significantly different way. She suggested that structural features, especially predictable tempos, rhythms and dynamics, may have influenced their response. Furthermore, Timmers, Marolt, Camuri and Volpe (2006) examined 24 participants as they engaged emotionally with three different performances of a Scriabin etude. They explored the effect of structural features (especially phrasing), performance features (expressiveness, variations in tempo and dynamics, seeing the pianist, the performer's movements) and listener features (musical expertise). When the participants recorded their emotional engagement, non-musicians (n=16) were more influenced by structural features (variations in dynamics and loudness) than musicians (n=8). Does this phenomenon explain different musician and non-musician responses in this experiment?

Finally, an observation about the UMACL used in this experiment. The post-UMACL response appears to be open to bias. It is a self-report measure, rather than one that records expressive behaviour (e.g. facial expressions, body language, vocalisations), or physiological reactions (e.g. skin conductance, temperature, frontal brain activation). Consequently, it is possible that "when a listener reports that he has felt this or that emotion, he is describing the emotion which he believes the passage is supposed to indicate, not anything which he himself has experienced" (Meyer, 1956, p. 8). In other words, unless requested to do so, listeners may be confusing emotions expressed in the music from what they actually feel.

This experiment along with experiments 1 and 2 countered this potential bias by clearly distinguishing between the two emotion modalities (perceived and felt). The participants were instructed to consider how they felt when they completed the UMACL in this experiment. They were given the same instruction when they selected adjectives in experiment 1 and music in experiment 2.

6.6.5 Summary

This experiment found out how the participants responded to the entire selection of sedative music. Although the origin(s) of the differentiated responses were speculative, the pre- and post-UMACL scores demonstrated that the participants were responding to sedative music, and not just reacting to a passive listening experience. This experiment is part of a process that developed criteria for identifying sedative music (PFSM), validated the intrinsic validity of the PFSM, and selected sedative music with rigour and consensus not found in the literature. Experiment 4 is the final stage of that process. It looks at whether individuals without an intellectual disability (the participants in experiments 1, 2 and 3) and the intellectual disability population (the sample under investigation in experiments 5 and 6 that follow) respond to music in the same way.

6.7 Experiment 4: A comparison of how individuals with and without an intellectual disability respond to music placed along the sedative-stimulative continuum

6.7.1 Aim

There is a body of research that looks at the relationship between the musical aptitude, intelligence and cognitive processes of diagnostic subgroups from the intellectual disability population. In particular, it has investigated musical savants, who excel in that field of endeavour, individuals with Autism Spectrum Disorder and people with Williams syndrome. There are two types of investigation.

The first type, asks participants to complete a musical aptitude subtest from the Seashore (1919), Gordon (1965) (1978) or Bentley (1966) standardised psychometric batteries. Each subtest concentrates on relatively simple and short-term perceptual sub-components of musical skill, such as the ability to tell whether the rhythm of two short musical sequences is the same. This research discovered that

people with an intellectual disability did not perform as well as samples without intellectual disability (Braswell, Decuir, Hoskins, Kvet, & Oubre, 1988), or as well as published norms (McLeish & Higgs, 1982).

The second type investigates generative and reproductive music capacity, and asks people from the intellectual disability population to improvise or play back as much of a complete recorded performance as they can. These investigations have allowed Hermelin, O'Connor and Lee (1987), Hermelin, O'Connor, Lee and Treffert (1989) and Sloboda, Hermelin and O'Connor (1985) to conclude that musical savant skill was not a form of mimicry dependent on prodigious feats of memory. Musical savant skill was based on the ability to analyse and understand the rules governing composition, and to use those rules to create music. It represented a high degree of cognitive sophistication, and suggested that musical talent was "independent of general intellectual status" (Hermelin et al., 1989, p. 447). (Hooper et al., 2008b (appendix 2) offers a much fuller discussion of this research).

These two strands of research have informed deliberations about the cognitive profile of the intellectual disability population; however, they appear to have been carried out at the expense of determining their affective response to music. This experiment will address that imbalance.

In experiment 1 of this thesis, 48 adults without an intellectual disability (18-69 years) responded to fifteen different pieces of music: instrumental arrangements of popular songs with PFSM scores that ranged from one (unpredictable/stimulative) to nine (predictable/sedative). The participants selected six adjectives from a list of sixteen. The median distribution and the mean number of positive (aroused) and negative (non-aroused) adjectives were used to determine their response. The aim of this experiment is to compare how individuals with an intellectual disability respond to the same music. This experiment will examine their affective response, and the outcome will demonstrate whether the type of music that relaxes individuals who do not have an intellectual disability will also relax those who have an intellectual disability.

6.7.2 Method

6.7.2.1 Participants

A convenience sample of 48 adults (25-55 years) with mild intellectual disability was recruited from an industrial workshop and drama group. The gender mix (42 male, 8 female) corresponded with that found in both activities. All the participants filled out a consent form. They demonstrated that they understood concepts of arousal and relaxation by correctly identifying photographs of the natural world and of people that showed them in an aroused (stormy sea, two people challenging each other to a fight), and relaxed state (trees reflected in a lake, a man asleep by the fire). There were four people who although they agreed to participate were not recruited because they did not correctly identify the photographs.

6.7.2.2 Procedure

Each participant was brought to a quiet, secluded room and invited to sit in a comfortable chair that offered security and snugness, but not to the degree it would induce sleep. They were told that they would hear fifteen different pieces of music. The music might be familiar because it was arrangements of songs by Abba, The Beatles, Boyzone, Elvis Presley and Elton John. Each piece of music would be played for 30 seconds. While they listened they were to remember the photographs they had looked at, and decide whether the music made them feel calm like the lakeside scene and the man asleep by the fireside, or whether they felt like the stormy sea or the two people ready to fight one another.

The participants were given a response sheet: two drawings for each piece of music (Appendix 26). There was a 'chilled out' man, and a 'move about' man. These drawings were chosen to correspond with how Gaston categorised the effect of sedative and stimulative music (see chapter 5). The 'chilled out' man lies back looking calm and relaxed (the dream like mood Gaston linked with sedative music). The 'move about' man is dancing energetically with a cane in one hand and a top hat in the other (the physical activity Gaston associated with stimulative music).

The pairs of drawings were placed one below another. They were arranged to control for stereotyped responses that occur when the tendency is to endorse a choice on either the right hand or left hand side of a response sheet (Bowling, 1997a). Consequently, a 'chilled out' man was not always the first picture in the pair and the

participants could not fall into the habit of picking a drawing from one side or the other of the response sheet. The participants were asked to circle the ‘chilled out’ man if the music made them feel calm and restful (non-aroused), and the ‘move about’ man if they felt energetic and active (aroused).

To sum up, experiment 4 was similar to experiment 1. It measured whether or not the music calmed participants, and it did so by matching the listening time (30 seconds) and the response sheet to their cognitive ability.

6.7.3 Results

Table 22 lists each music selection and indicates its PFSM score. The next column shows how many participants with an intellectual disability (n=48) selected the ‘chilled out’ man. The final column indicates the number of non-intellectually disabled participants (n=48) who recorded a non-aroused response in experiment 1 by selecting 5 or 6 non-aroused adjectives.

Table 22:

Number of participants with an intellectual disability who selected the ‘chilled out’ man, and the number of non-intellectually disabled participants who recorded a non-aroused response

<u>Song</u>	PFSM Score	Participants with an intellectual disability (<i>‘Chilled out’ man</i>)	Non-intellectually disabled participants (<i>Non-aroused</i>)
No matter what	9	41	38
The long and winding road	9	39	40
Blue eyes	9	38	36
I have a dream (RPO)	8	43	41
Yesterday (James Last)	8	38	41
Ticket to ride	7	42	43
Love me tender	6	41	32
How deep is your love	6	40	28
Michelle	6	40	27
I have a dream (Pop Orch)	5	34	18
Let it be	5	34	15
Money, money, money	4	19	1
Mamma mia	4	12	3
Suspicious minds	2	17	1
Yesterday (12 Cellists)	1	31	14

Spearman’s rho test of correlation was used to determine the relationship between the frequencies in column three and column four. (A non-parametric test was

used after it was established that the data did not satisfy parametric test assumptions. Normality tests produced p-values <0.05 and indicated that the data were not normally distributed). There was a very strong significant positive correlation between the two variables ($\rho=0.831$, $N=15$, $p<0.001$, two tailed). The rho value was well in excess of the critical value (0.654) needed to reject the hypothesis that there was no correlation between the participant groups. This indicated a strong degree of fit between the ‘chilled out’ man responses of those with an intellectual disability and the non-aroused responses of the non-intellectually disabled (see Appendix 27 for the data used in this analysis).

6.7.4 Discussion

The distribution of the participant’s non-aroused (people without an intellectual disability) and ‘chill out’ responses (people with an intellectual disability) offer an interesting and telling insight into the relative sophistication of the two tools devised to gather their responses.

The people without an intellectual disability selected six adjectives from a truncated mood adjective checklist, and the people with an intellectual disability selected one of two pictures. Earlier in this chapter, a paragraph in the results section of experiment 1 (6.4.3) described the steps taken to interpret the number of positive (arousing (A)) and negative (non-arousing (NA)) adjectives participants without an intellectual disability selected for each piece of music. It identified four different responses as the number of non-aroused adjectives fell:

1. 6 or 5 non-aroused adjectives - non-aroused (NA) response.
2. 4 non-aroused adjectives - non-aroused/aroused (NA/A) response.
3. 3 non-aroused adjectives - aroused/non-aroused (A/NA) response.
4. 2 or 1 non-aroused adjectives - aroused (A) response.

These four response levels are reflected in the range of scores that appear in the non-intellectually disabled (non-aroused) column of table 22. There are six non-aroused (NA) scores between 36 and 43 (36, 38, 40, 41, 41 and 43), three non-aroused/aroused (NA/A) scores in the low thirties and high twenties (i.e. 27, 28 and 32), three aroused/non-aroused (A/NA) scores in the ‘teens (14, 15 and 18), and three aroused (A) scores less than five (i.e. 1, 1 and 3).

In contrast, the participants with an intellectual disability recorded their reaction on a dichotomous tool. It did not capture a graduated response like the

truncated mood adjective checklist because the participants were demonstrating either that they were aroused ('move about' man) by a piece of music, or that it was a non-arousing stimulus ('chilled out' man). If the nuances of the recording tool used by the non-intellectually disabled participants are mirrored in the scores recorded in table 22, then so too is the relative simplicity of the response sheet filled out by the participants with an intellectual disability. There were twelve of scores between 31 and 43 (the arousing selections), and three scores between 12 and 19 (the non-arousing pieces of music).

However, whatever the relative merits of the two recording systems, the scores of each group of participants spiked upwards in response to the final selection (Yesterday (12 cellists)). This was an important outcome. It helped establish a strong correlation between people with and without an intellectual disability. It also suggested that the straightforward dichotomous system, used to measure the response of people with an intellectual disability, was as effective a way of gathering the participant's reactions as the more sophisticated mood adjective checklist used with people who do not have an intellectual disability.

This experiment was carried out to compare individuals with and without an intellectual disability, and to determine whether fifteen pieces of instrumental music evoked similar degrees of arousal. The statistically significant correlation identified by the Spearman's rho test of correlation demonstrates a link between the two participant groups, and it shows that they respond in a similar way. It suggests that when individuals with an intellectual disability cannot be involved in the selection process (as was the case in this thesis) it is entirely appropriate to use music identified as sedative by individuals who do not have an intellectual disability. This is particularly so in interventions, like the ones in chapter 7, that are predicated on lowering the arousal levels of the intellectually disabled population.

This experiment was published in a journal (British Journal of Learning Disabilities) that asked the author(s) to write a summary that would explain the outcome to people with an intellectual disability. The correlation between the two participant groups prompted the authors to prepare a summary that put the following observation to the intellectual disability population: "If you have difficulty deciding the type of music that helps you stay calm, ask your parents or carers what music helps them relax when they feel anxious. The type of music they like might help you stay calm too" (Hooper, Wigram, Carson, & Lindsay, 2010). This may be a fair

observation to make, and certainly at times of indecision people with an intellectual disability could turn to their carers for help. However, especially as the responses of disabled and non-disabled people do concur, it may also be justifiable to infer from these results that when they are able to do so people with an intellectual disability can select a sedative stimulus without recourse to their non-disabled counterparts. There may be unexpected choices. When Davis & Thaut (1989) surveyed 18 non-musicians there was a wide variety of musical genres including classical, soft rock, hard rock, folk, Christian and jazz; a variety of dynamic and structural features including tempo, loudness, orientation, rhythm and form; and some selections that defied the more traditional categorisation of music as either sedative or stimulative. However, by and large, as the review of the sedative music literature (1996-2008) in chapter 5 of this thesis demonstrated, the different criteria used to choose sedative music ensured that 'traditional' choices were more likely to be made. This experiment indicated a degree of fit between the disabled and non-disabled participants response to different music selections, and it could be inferred that those with an intellectual disability will be as circumspect as their non-disabled peers when they choose sedative music.

Chapter 7

The effect of sedative music on the disruptive mealtime behaviours of adults with an intellectual disability

“There are few reports on eating disorders related to people with intellectual disability (ID). Nevertheless, there are clear indications that this is a frequent problem (Danfold & Huber, 1981; Gravestock, 2000; Hove, 2004), (and) these individuals may still be in need of treatment” (Hove, 2007, p. 1).

7.1 Introduction

The second chapter of this thesis introduced intellectual disability. It suggested that challenging behaviour associated with the condition was often driven by maladaptive ways of coping with anxiety and anxiety provoking situations. Chapter 3 explored different ways of managing challenging behaviour. It described and discussed methods grounded in the psychodynamic, behaviourist, cognitive, humanistic and psychopharmacological traditions, and it recognised the need for a more natural approach that did not have harmful side effects, and that would not place excessive cognitive demands on participants.

In relation to this, and with a view that music rather than pharmacology could offer such a natural approach, chapter 4 presented an extensive review of literature relating to music and intellectual disability. The results of this review suggested that non-contingent sedative music was an undemanding and 'safe' intervention that met the above criteria. Furthermore, when the participant could not be relied upon to choose the type of music s/he preferred, as was the case with the clinical populations recruited for the studies in this thesis, careful attention had to be paid to the selection of non-contingent sedative music and a procedure needed to be put in place to identify the most appropriate stimulus.

Chapters 5 and 6 described how a tool (the PFSM) to identify sedative music was devised and validated, and how 272 people (224 without an intellectual disability and 48 with an intellectual disability) selected the sedative stimulus for the research in this chapter. There are two investigations in this chapter: a Chief Scientists Office (CSO) funded pilot study (experiment 5), and the main investigation (experiment 6). They examine whether the sedative stimulus affects the disruptive mealtime behaviours of adults with an intellectual disability.

7.2 Eating disorders (EDs) and disruptive eating behaviours

Individual health is affected by nutrition levels. Under-nutrition, for example, leads to impaired immune responses, fatigue, slow recovery from illness, apathy, depression and self-neglect (Malnutrition Advisory Group [MAG], 2000). People with an intellectual disability are nutritionally vulnerable as they may have altered levels of physical activity, they may have behavioural problems, or they may be experiencing difficulty in swallowing (Bryan, Jones, & Russell, 1998). Challenging behaviour, hyperactivity and mealtime agitation have all contributed to under-

nutrition by increasing energy needs, and by making it difficult for sufferers to settle at mealtimes (Lea, 1999; Wood, 1994). Consequently, there are greater numbers of underweight people with an intellectual disability than observed in the general population (K. Cunningham, Gibney, Kelly, Kevany, & Mulcahy, 1990; Lea, 1999; Wood, 1994).

Although increasing attention is being paid to the nutritional status of the intellectual disability population, there is less interest in eating disorders (EDs) and disruptive behaviours that present a ‘challenge’ at mealtimes (Gravestock, 2000). Diagnosable EDs occur among 42% of institutionalised adults with an intellectual disability, and 19% living in the community (Gravestock, 2000). They include pica (persistent eating of non-nutritive substances (World Health Organisation [WHO], 1992)), rumination (regurgitating food before rechewing, reswallowing and digesting some of it (Ollendick & Schroeder, 2003)), psychogenic vomiting (regurgitation without rechewing or reswallowing food (Ollendick & Schroeder, 2003)) and food refusal or loss of appetite (WHO, 1992). Disruptive behaviours include non co-operation, throwing food, physical aggression, verbal aggression and self-injury (Hove, 2007).

The origins of these behaviours are largely unknown (Hove, 2007). It is interesting that O'Brien, Repp, Williams and Christophersen (1991) correlate food refusal with aggressive behaviour. They suggest that it is presumably due to intense eagerness to escape the eating situation. This explanation is reminiscent of the overreaction to anxiety discussed in chapter 2. In the same way people with an intellectual disability who cannot control irrational fear often express phobic anxiety as blind panic, they seem to show their anxiety at mealtimes by displaying food throwing, self-injurious and aggressive behaviours this situation hardly seems to merit.

The classification system put forward for feeding problems in people with an intellectual disability (Jones, 1982), the catalogue of paediatric feeding problems (O'Brien et al., 1991) and the range treatment options possibly shed more light on the aetiology of EDs and disruptive eating behaviours. Likewise, because they are predicated on possible explanations for the onset of disruptive eating patterns, some of the interventions carried out with the elderly, and with older adults who have dementia (hitherto referred to as people who have dementia) provide useful guidelines. Dementia is a “chronic progressive” “disease of the brain” (WHO, 1992)

and intellectual disability “arrested or incomplete development of the mind” (WHO, 1992); however, there are several parallels between them. The ICD-10 Classification of Mental and Behavioural Disorders (WHO, 1992) states that both have an adverse effect on emotional control, on social behaviour and on aspects of cognitive function including memory, comprehension, learning capacity and language. Agitation linked to daily care activities, like mealtimes or bathing, is also common among people who have dementia (Rossby, Beck, & Heacock, 1992).

Jones (1982) proposed a two-dimensional classification system. It described the types of functional and behavioural feeding problems exhibited (e.g. self-feeding, socially inappropriate and self-injurious eating behaviours) and identified their probable causes (e.g. behavioural, oral neuromotor, physical disability and illness). O’Brien et al. (1991), who also put forward a system based on skill areas affected (e.g. eating, self-feeding, social skills) and inappropriate eating behaviours (e.g. food refusal, spitting, excessive spillage), added the eating environment to Jones’ (1982) list of probable causes.

Individuals with an intellectual disability could not take part in psychodynamic or cognitive-behaviour treatments because of their cognitive deficits, and so interventions to address their food refusal and rumination were by and large grounded in the behaviourist tradition (described in chapter 3). These interventions addressed behavioural and environmental causes by including one if not several of the following components: (1) skill teaching methods like backward chaining (Hagopian, Farrell, & Amari, 1996), shaping (Weinman, Haydon, & Sapan, 1990) and social skills training (Matson, Cooper, Mayville, & Gonzalez, 2006); (2) self management (Matson, Ollendick, & Adkins, 1980); (3) an antecedent approach that addressed the factor(s) setting the occasion for the challenging behaviour to occur (Johnson & Babbitt, 1993); (4) a constructional approach that displaced challenging behaviour by using non-contingent reinforcement (Wilder, Normand, & Atwell, 2005), differential reinforcement (DRO) (O’Reilly & Lancioni, 2001), differential reinforcement of an alternative behaviour (DRA) (Kahng, Tarbox, & Wilke, 2001), or contingent events (Dellatan, 2003; Riordan, Iwata, Finney, Wohl, & Stanley, 1984).

In general these techniques were effective. Riordan et al. (1984), for example, used social praise, access to preferred food and brief periods of toy play with four disruptive children who refused food, and increased the amount they ate. Hagopian et al. (1996) used backward chaining to shape drinking from a cup, and increased the

quantity of water consumed by a 12-year-old boy with autism and intellectual disability.

Despite these successes, the antecedent interventions could perhaps be criticised for being uninventive. Chapter 3 of this thesis indicated that as well as logistical changes (moving from institutional settings into community-based residential provision, relocating staff, rescheduling an individual's timetable), introducing music was one of the practical steps that had substantially reduced challenging behaviour (other practical steps included increasing social contact, and introducing toys and visual stimuli).

The intellectual disability and music review (chapter 4) identified only one investigation that adopted an antecedent approach and introduced music into the mealtime environment. Ayres (1987) compared the oral functions and the elapsed times spent eating when six severely handicapped people dined in a school cafeteria with unpredictable noise, and in an environment where unpredictable noise was less intrusive and music was played. The music condition relaxed high muscle tone and improved oral function. Although the elapsed feeding times were longer during the music condition, the feeder's perceptions that they were either shorter or unchanged, suggested that the music had calmed the feeders, and they had not felt rushed. This thesis has criticised the lack of specific information about the music used in investigations. Ayres (1987) gave no indication of the music played, or of the criteria used to choose it. Dellatan (2003) was the only other study to address either an ED or disruptive eating behaviours with music. Dellatan (2003) used a constructional approach. The participant's favourite children's music tapes were used as a contingent-interrupted stimulus. The music tapes reduced food refusal behaviours and increased the food consumption of a five-year-old boy with autism.

Music has been used to target disruptive eating behaviours displayed by people who have dementia. The one example from psychiatry (Courtright, Johnson, Baumgartner, Jordan and Webster (1990)) identified three sources of stress that contributed to an increase in aggressive behaviour: (1) transferring from low-demand routine to moderate-demand mealtime activity, (2) changing from free living spaces to a more structured dining room environment, and (3) moving from a background of music or television in the living area to cafeteria noise. Courtright et al. (1990) played relaxing music loud enough to mask the background noises that contributed to irritability and aggression. They tallied the aggressive behaviours of 109 psychiatric

participants towards others, the environment and themselves, and there was a reduction in disruptive mealtime behaviour.

Table 23 summarises the investigations carried out with people who have dementia. In each instance music was used to ease mealtime agitation exacerbated by the stresses of physical discomfort (hunger), group proximity and heightened activity and noise (Denney, 1997). People who have dementia are less able to interpret, process, and adapt to environmental stimuli, and they become agitated when they cannot cope with a situation (Roy, 1984). Music helps create a less demanding milieu. It is used (1) to mask disruptive noise and buffer the general noise level coming from various sources, (2) to lessen environmental demands by creating a consistent, less startling environment, and (3) to soothe an agitated individual (Denney, 1997).

Table 23:

Summary of studies examining how relaxing music effects the mealtime agitation of people who have dementia

	Goddaer and Abraham (1994)^a	Denney (1997)^a
<i>Participants</i>	29/Dementia/Nursing home	9/Dementia/Specialised Care Unit (SCU)
<i>Measure</i>	Modified CMAI (29 behaviours)	Modified CMAI (19 behaviours)
<i>Outcome</i>	“Significant reductions (63.4%) on the cumulative incidence of total agitated behaviors”.	“A reduction in the incidence of agitated behaviors”.
<i>Music/ Selection criteria</i>	Not identified / slow tempo; slow, irregular rhythm; linear melody; degree of homogeneous monotony; no variation in intensity; bass register.	Relax with the Classics: Vol. 1 Largo, Vol. 2 Adagio (recordings LI-501 & LI-502, the Lind Institute, San Francisco, CA/ sleeve notes characterised music as quiet and relaxing.
	Richeson and Neill (2004)^a	Hicks-Moore (2005)^b
<i>Participants</i>	27/Dementia/Nursing home	30/Dementia/SCU
<i>Measure</i>	Modified CMAI (19 behaviours)	Modified CMAI (29 behaviours)
<i>Outcome</i>	“Agitation decreased & percentage of food eaten increased with the music intervention”.	“Agitated behaviours decreased in the weeks music was played in comparison to the weeks when music was not played”.
<i>Music/ Selection criteria</i>	<i>Pure Relaxation</i> from New World Music, <i>Sleep</i> from the Mind, Body & Soul Collection, The Best of Classics for Relaxation / quiet music.	Relax with the Classics: Vol. 1 Largo, Vol. 2 Adagio (recordings LI-501 & LI-502, the Lind Institute, San Francisco, CA/ sleeve notes characterised music as quiet and relaxing.

^a "Index" of agitated behaviour for each participant. ^b Catalogue of agitated behaviours displayed.

Previous investigations may have examined the value of using music as a relaxing influence for some populations who become agitated and distressed during mealtimes because of a number of potential causes. However, there is clearly a need for a more focussed study which can use music that has been pre-selected based on the use of systematic criteria.

7.3 Experiment 5: CSO funded pilot study

7.3.1 Purpose and research question

Each study summarised in table 23 played relaxing music at mealtimes and reduced agitated behaviour. In the same way people who have dementia over react to the stresses associated with mealtimes, it seems safe to assume that poor coping mechanisms and irrationality associated with intellectual disability (see chapter 2) raise levels of arousal, and underlie the ‘challenge’ presented by their disruptive eating behaviours.

Several authors, who used relaxation treatments to reduce agitated and disruptive behaviour often displayed by people with intellectual disability, demonstrated that higher arousal levels caused them to behave in that way. Lindsay and Baty (1986) used Behavioural Relaxation Training (BRT). BRT concentrated on observable relaxation. An instructor demonstrated relaxed and unrelaxed states in ten body areas, and then helped the person copy the relaxed behaviour. This technique reduced muscle activity, enabled the individual to relax in any part of their body, and culminated with overall relaxed posture and quiet mood (Lindsay & Baty, 1986). McPhail and Chamove (1989) found that, compared with storytelling (control condition), relaxation training calmed participants and decreased aggression and verbal disruption.

Snoezelen regimes have also reduced agitation and disruption, and promoted relaxation. Snoezelen, from the Dutch “snufflen” (to seek out, explore) and doezelen (to doze), adapts lighting effects, colour, sounds and music to provide a multi-sensory or single-sensory experience (Lancioni, Cuvo, & O’Reilly, 2002). When Hutchinson and Haggart (1991) introduced fourteen individuals with profound intellectual disability to a Snoezelen facility, nursing staff reported that all clients were calmer.

Hooper and Lindsay (1991) investigated the effects of calming background music on a woman who became extremely agitated before bedtime. They discovered

that playing soft background music reduced behaviour problems, and sleep onset was less problematic. This investigation tests the hypothesis that sedative music will help alleviate mealtime stress, affect the disruptive behaviours displayed by adults with an intellectual disability during this daily activity, and address nutritional problems by increasing the amount of food they consume.

This investigation will address methodological shortcomings of the studies in table 23. First, it will record mealtime behaviours in a different way. Denney (1997), Goddaer and Abraham (1994) and Richeson and Neill (2004) provided "an index" (Goddaer & Abraham, 1994, p. 154) of the agitated behaviours exhibited by each participant. Hicks-Moore (2005) catalogued the type of behaviour, by focusing on neither "the number of times the behavior was demonstrated, (n) or who demonstrated the behavior" (p. 28). Instead, when Hicks-Moore (2005) stated that "as a group in Week 1 (no music), there was on average 9.85 incidences of agitated behaviour seen per day" (p. 30), she was indicating that less than ten different types of behaviour had been displayed by all the participants. Consequently, neither the "index" nor the catalogue recorded the *incidence* and with it the intensity of mealtime agitation.

Second, table 23 includes details of the music and the criteria used to choose it. This table shows (1) the inconsistent information provided by research teams, (2) the absence of criteria for relaxing music based on clear statements about a range of musical factors, and (3) an over reliance on the researcher's opinion. In each case, the researchers selected the music without consulting anyone else. When they identified the selection criteria they were either guided by sleeve notes (Denney, 1997; Hicks-Moore, 2005) or they made an inadequate statement about the quality of the music. Richeson and Neill (2004) simply commented that the music was "quiet". Goddaer and Abraham (1994) did not base their choice on clear statements about all the elements. Finally, Goddaer and Abraham (1994) did not identify the music used during their investigation. In complete contrast to this level of reporting, Chapter 6 described how clearly defined criteria (PFSM) and 224 participants were used to choose the music for this investigation.

7.3.2 Method

7.3.2.1 Participants

A convenience sample of 38 adults (29-67 years) with moderate intellectual disability participated in this study. They were drawn from five different settings and monitored in seven separate groups (n=3 to n=8). The majority was male (29 or 75%), and this corresponded to the gender mix in the hospital and community facilities they lived in. None of the participants had a reported hearing loss, and although around 50% occasionally needed their food cut up for them they all ate without further assistance.

The investigation adhered to comprehensive ethical guidelines put in place to protect individuals with an intellectual disability. An information sheet and consent form was sent to their guardian (usually a parent, brother, or sister). The guardian was given the opportunity to ask questions, and assured that care would proceed as normal should s/he decide to withdraw a relative from the investigation after agreeing to their participation. An independent advocate was contacted when a participant did not have a guardian.

Provision was made for a participant to indicate non-consent once the investigation had begun. It was acknowledged that participants might behave in a way that showed non-acceptance, and the study protocol stated that the intervention would be ended in a setting if any participant directed unequivocal expressions or signs of anxiety towards the sedative music.

Finally, there were occasions when some of the participants were absent at mealtimes. Consequently, although this study aimed for 100% attendance the final overall attendance was 91.02%. All the data was collected during April-August 2003.

7.3.2.2 Design

All the participants were monitored for three weeks (Monday to Friday) in a within participants design. There was a baseline phase (week one), after which seventeen (13 male, 4 female) received music in week two and non-music in week three of the study (Group A), and twenty-one (16 male, 5 female) received non-music in week two and music in week three (Group B).

A within participants design acknowledged the multiple and complex origins of intellectual disability and challenging behaviour. Each participant's behaviour was

attributable to a unique combination of different causes, and consequently difficult to match for control.

A short period was chosen for each phase as it was assumed that music would have an immediate, as opposed to a lagged effect, and it would also exclude potential time-related confounds. The participants were not monitored during the weekends. The weekends which served as passive washout periods were an opportunity for the effects of treatment, if there were any, to wear off. In addition, the washout periods guaranteed that any statistical analysis was valid as they ensured that each phase (a week) and the values recorded in each phase were independent.

7.3.2.3 Sedative music

For the purpose of selecting appropriate music, table 24 gives comprehensive information about the choice of music generated by the validation of the PFSM. In doing so, it addresses criticisms in chapter 5 of this thesis which have been levelled at the way other investigations reported the choice of non-contingent music.

Table 24: Sedative music

<i>Title</i>	<i>Album title</i>	<i>PFSM score</i>	<i>Catalogue No</i>	<i>Duration</i>
Yesterday (James Last)	The very best of James Last & his orchestra	8	529556-2	2:54
No matter what	Julian Lloyd Webber plays Andrew Lloyd Webber	9	PHILIPS 468362-2	3:49
I have a dream (RPO)	The Royal Philharmonic Orchestra plays Abba	8	EMPR CD585	4:45
The long and winding road	From Yesterday to Penny Lane Göran Söllscher plays The Beatles	9	459692-2	2:33
Blue eyes	HMV The Greatest Orchestral Pop Collection	9	7243 53543129	3:38

7.3.2.4 Dependent measures

Three dependent measures were recorded, and nursing staff completed a questionnaire.

7.3.2.4.1 Food and fluid inventory

A weighed food and fluid inventory (Appendix 28) was used to calculate the amount of food and drink a participant consumed each mealtime. Each plate of food and each cup of drink were weighted before they were served to the participants, and they were then weighed again at the end of a meal. The second weight was subtracted from the first weight to determine the weight of the food and fluid consumed. The amount of food and fluid each participant consumed was then calculated as a percentage of that served. The daily percentages were added together, and then divided by the number of mealtimes attended, to determine a participant's average daily percentage for each week.

7.3.2.4.2 Inter-session response

The disruptive mealtime behaviours displayed by adults with an intellectual disability were predicated on anxiety (an emotional state consisting of psychophysiological responses to the anticipation of real or imagined danger (Seligman, Walker, & Rosenhan, 2001)). Consequently, a number of agitation scales used to observe and record behaviours that manifested a state of anxiety were looked at to find a suitable dependent measure. Corrigan (1989), for example, has developed the Agitated Behaviour Scale (ABS), Finkel, Lyons and Anderson (1993) the Brief Agitation Rating Scale (BARS), the Pittsburg Agitation Scale (PAS) was the work of Rosen et al. (1994), and Yudofsky, Kopecky, Kunik, Silver and Endicott (1997) drew up the Overt Agitation Severity Scale (OASS). These tools were developed for rehabilitation, elderly, psychiatric and dementia patients respectively. These scales were not considered for this study. Some were overlooked because they were incompatible with the participants under investigation, others focused on one aspect of agitation at the expense of the diffuse range of symptoms and problem behaviours that typify the condition.

This thesis acknowledged the emotional difficulties that may underlie challenging behaviour; however, the ABS included a lability subscale that incorporated symptoms not immediately associated with intellectual disability and

with their dysfunctional behaviour at mealtimes. The symptoms were rapid, loud or excessive talking, sudden changes of mood, easily initiated or excessive crying and/or laughter. It also reflected its target client group (rehabilitation patients) by including disinhibitive actions like pulling at tubes, restraints etc., and wandering from treatment areas.

The OASS assessed vocalisations, oral/facial movements, upper torso and extremity movements, and lower extremity movements. As such, it reflected Yudofsky's belief that agitation should be conceptualised only in terms of vocal and motor behaviours. The PAS focused on just four behaviours: aberrant vocalisation, motor agitation, aggressiveness, and resistiveness to care. Finally BARS was a little unclear. It included behaviours without indicating whom they were directed towards (item 1: 'hitting') and two pairs of items appeared to overlap (item 6: 'restlessness' overlapped with item 4: 'pacing or aimless wandering'; item 7: 'screaming' overlapped with item 9: 'making strange noises').

In contrast to the agitation scales just described, the Cohen-Mansfield Agitation Inventory (CMAI) (Cohen-Mansfield, Werner, & Marx, 1989) was chosen as the starting point for the dependent measure used in this investigation because it included items that matched behaviours displayed by people with an intellectual disability. The CMAI assessed 29 different agitated behaviours that were grouped into five categories: (1) aggressive (spitting, cursing, hitting, kicking, grabbing onto people, pushing, biting, scratching, tearing things and destroying property), (2) physically non-aggressive (pacing or aimless wandering, inappropriate dressing or disrobing, trying to get to a different place, handling things inappropriately, repetitious mannerisms and general restlessness), (3) verbal (complaining, constant requests for attention, negativism, screaming and repetitious questions or sentences) (4) hiding and hoarding (hiding and hoarding), and (5) others (intentional falling, eating inappropriate substances, throwing things, hurting self or others, verbal sexual advances, physical sexual advances and strange noises).

The CMAI was used to review an individual's behaviour during the previous fortnight. Each item on the inventory was assessed against a seven-point Likert scale that was a graduated statement of how frequently an individual had displayed the behaviour. (1=Never, 2=Less than once per week, 3=1-2 per week, 4=Several times per week, 5=Once or twice per day, 6=Several times per day, 7=Several times per hour).

Denney (1997) and Goddaer and Abraham (1994) used a CMAI modified to record the presence or absence of different behaviours. The modified CMAI grouped nineteen behaviours into four categories: (1) aggressive (hitting, kicking, pushing, scratching, tearing things and cursing), (2) physically non-aggressive (pacing, inappropriate robbing/ disrobing, repetitious questions or sentences, trying to get to a different place, general restlessness, handling things inappropriately and repetitious mannerisms), (3) verbal (complaining, constant requests for attention, negativism and repetitious questions or sentences) (4) hiding and hoarding (hiding and hoarding). (They did not explain why repetitious questions or sentences appeared in both the physically non-aggressive and verbal categories). These nineteen behaviours were the starting point for the inventory used in this investigation to record disruptive mealtime behaviour.

The inventory (Appendix 29) was developed in consultation with nursing colleagues who were familiar with the participants and with the disruptive behaviours they exhibited at mealtimes. Eleven behaviours were trimmed from the modified CMAI. Some were removed because they were not displayed by the participants (tearing things, negativism, hiding and hoarding), others because they overlapped (general restlessness encompassed pacing and trying to get to a different place, and these two items were excluded from the physically non-aggressive category). Repetitious sentences or questions was only included as a verbal behaviour. Finally four specific behaviours (hitting, kicking, pushing and scratching) were withdrawn. This left eight items:

- (1) Cursing (changed to 'shouting/swearing' which is item 3 in the dependent measure used in this thesis)
- (2) Inappropriate robing/disrobing (changed to 'stripping' which is item 4 in the dependent measure used in this thesis)
- (3) General restlessness (changed to 'restlessness (e.g. pacing, in and out of seat)' which is item 5 in the dependent measure used in this thesis)
- (4) Handling things inappropriately (changed to 'handling objects inappropriately (e.g. throwing food, cutlery, crockery, overturning furniture and banging implements)' which is item 7 in the dependent measure used in this thesis)
- (5) Repetitious mannerisms (item 9 in the dependent measure used in this thesis)
- (6) Complaining (item 10 in the dependent measure used in this thesis)

(7) Constant requests for attention (changed to ‘requests for attention’ which is item 11 in the dependent measure used in this thesis)

(8) Repetitious sentences or questions (changed to ‘verbal repetition’ which is item 13 in the dependent measure used in this thesis)

Five behaviours were added to the eight that remained: physical harm (item 1 in the dependent measure used in this thesis), grabbing food (item 2), refusing food (item 6), self-injury (item 8), and vocalisations (item 12).

Physical harm replaced four specific behaviours from the modified CMAI (hitting, kicking, pushing and scratching) and it was accompanied with the instruction to “record each incidence against staff and peers”. Grabbing food and refusing food were added because they were specific to the mealtime setting. Self-injury had been identified at the start of this chapter as a disruptive eating behaviour commonly displayed by people with an intellectual disability. Vocalisations (e.g. shouts, screams, shrieks, wails) present a ‘challenge’ because they hardly seem appropriate behaviour at mealtimes. (Chapter 2 discussed how context and social acceptability determined the appropriateness of behaviour, and influenced judgements about what was, or was not, a challenging behaviour).

The final list of thirteen behaviours was grouped into three sub-categories: aggressive (physical harm, grabbing food and shouting/swearing), physically non-aggressive (stripping, restlessness, refusing food, handling objects inappropriately, self-injury and repetitious mannerisms), and verbal (complaining, requests for attention and vocalisations and verbal repetition).

All the behaviours were carefully defined so that their frequency could be recorded (e.g. refusing food (record each refusal within a series and each isolated occurrence)). A participant’s average daily frequency of disruptive behaviour was determined for each week of the investigation. It was calculated by adding together all the behaviours recorded on the inventory, and then dividing the total number of behaviours by the number of mealtimes attended.

7.3.2.4.3 Intra-session response

The inventory devised for this experiment captured any change that occurred in the incidence of disruptive mealtime behaviours from one mealtime to another. Developments during each mealtime were charted by asking one member of the nursing team to record his/her perception of each participant's level of agitation immediately before and immediately after a meal. (The disruptive mealtime behaviours displayed by adults with an intellectual disability were predicated on anxiety). S/he used a five point Likert Scale to indicate whether the participant was minimally, somewhat, moderately, very or extremely agitated. Any change was calculated by subtracting the pre-mealtime score from the post-mealtime score. In each week of the study, the average daily change was the sum of the differences between pre- and post-mealtime scores divided by the number of mealtimes.

7.3.2.4.4 Staff questionnaire

Members of the nursing staff who had observed the pilot study were invited to complete a questionnaire (Appendix 30). It examined their perception of the music chosen. It asked how they had responded to the music and how the participants reacted to it. Each respondent indicated whether they strongly agreed, agreed, neither agreed or disagreed, disagreed or strongly disagreed with nine statements. Three statements were about the music, three were about the patient's response and three were about the participant's response. Five statements were expressed in the negative to control for stereotyped responses that occur when the tendency is to endorse the choices on either the far right-hand or left-hand side of the questionnaire (Bowling, 1997). The respondents could also add comments at the end of the questionnaire.

7.3.2.5 Procedures

7.3.2.5.1 Pre-intervention data collection

Sedative music was being introduced to mask disruptive noise and lessen the environmental demands of the mealtime situation; consequently it needed to be heard above the background noise in each dining room. The average noise level was calculated after three randomly chosen lunchtimes were monitored with a decibel meter. This stage of the preparation served a second purpose. A Hawthorne Effect (Landsberger, 1958) occurs when participant behaviour changes in response to being

studied, and not because of any particular experimental manipulation. This was less likely to happen in this case because the observer had become a familiar presence in the dining room.

7.3.2.5.2 Intervention data collection

During the three-weeks of trials an observer used the inventory to record the aggressive, physically non-aggressive and verbal behaviours that disrupted mealtimes. The observer, who was visible to the participants, took up a position off to the side and did not interact with participants or staff. A second observer monitored the participants during twelve (20%) of the mealtimes. The inter-observer agreement (86%) was remarkable for an investigation that asked the observers to record behaviours as they occurred, and without the benefit of reviewing video footage. The observer also completed the food and fluid inventory, and collected scores from members of the nursing team who recorded the intra-session response.

The sedative music was played on a tape player positioned on a table at one side of the dining room. It was played five decibels (dB) above the background noise after several staff had confirmed that this level was audible in all areas of the dining room. The music was turned on five minutes before the participants entered the dining room, and it was not switched off until all the participants had left at the end of their meal.

7.3.3 Results

7.3.3.1 Food and fluid inventory

Table 25 shows average food and fluid consumption. The first three rows are arranged by phase. Row one shows the average food and fluid consumption for Group A (n=17). It gives the figures at baseline, and then with (music) and without sedative music (non-music). Row two shows the average food and fluid consumption for Group B (n=21). It gives the figures at baseline, and then without (non-music) and with (music) sedative music. Row three shows the average food and fluid consumption for all participants (n=38). It combines the response of Group A and Group B at baseline and then with (music) and without sedative music (non-music).

Row four shows each week of the study. Week 1 is the baseline measure for both groups, Week 2 combines Group A's response with music and Group B's

response without music, and Week 3 combines Group A's response without music and Group B's response with music.

Table 25 shows the results of one-way (repeated measure) ANOVAS testing the null hypothesis that the amount of food and fluid consumed was unaffected by the introduction of sedative music.

Table 25: Analysis of average food and fluid consumption

	Average food and fluid consumption (%)						p value
	B/L	89.76	M	86.78	NM	87.93	
Group A (n=17) by phase	B/L	89.76	M	86.78	NM	87.93	p=0.440 (df 2,32)
Group B (n=21) by phase	B/L	91.74	NM	90.14	M	91.06	p=0.850 (df 2,40)
All (n=38) by phase	B/L	90.85	M	89.15	NM	89.15	p=0.570 (df 2,74)
All (n=38) by week	Wk 1	90.85	Wk 2	88.64	Wk 3	89.66	p=0.488 (df 2,74)

B/L=baseline; M=music; NM=non-music.

When the results arranged by phase were analysed, the null hypothesis was upheld. The already very high baseline measures were not significantly affected by the introduction of sedative music. When the results arranged by week were analysed, the absence of any significant difference confirmed that the results were not subject to a period effect, and it was not the passage of time but rather than the introduction of sedative music that had an effect on the outcome.

7.3.3.2 Inter-session response

The analysis of the inter-session response groups all the behaviours together, looks at the three sub-categories (aggressive, physically non-aggressive and verbal), and finally considers each behaviour.

(i) *13 observed behaviours grouped together*

Table 26 shows the average daily frequency of disruptive mealtime behaviour for each phase and week of the study. It is organised in the same way as table 25.

Table 26 shows the results of one-way (repeated measure) ANOVAS testing the null hypothesis that the incidence of disruptive mealtime behaviour was unaffected by the introduction of sedative music

Table 26: Analysis of average (av.) daily frequency of disruptive mealtime behaviours

	Av. daily frequency of disruptive behaviours						p value
	B/L	5.24	M	5.58	NM	5.39	
Group A (n=17) by phase	B/L	5.24	M	5.58	NM	5.39	p=0.852 (df 2,32)
Group B (n=21) by phase	B/L	5.16	NM	6.14	M	3.57	p=0.039 (df 2,40)
All (n=38) by phase	B/L	5.19	M	4.47	NM	5.81	p=0.100 (df 2,74)
All (n=38) by week	Wk 1	5.19	Wk 2	5.89	Wk 3	4.39	p=0.054 (df 2,74)

B/L=baseline; M=music; NM=non-music.

This analysis indicates that the null hypothesis was upheld for the participants in Group A, and for all the participants. However, the introduction of sedative music did significantly reduce the disruptive mealtime behaviour of Group B. There was an outlying value in Group B, and Table 27 shows that the result was still significant when it was excluded.

Table 27: Analysis of average (av.) daily frequency of disruptive mealtime behaviours (without outlying value)

	Av. daily frequency of disruptive behaviours					p value	
	B/L	3.88	NM	4.70	M		3.26
Group B (n=20) by phase	B/L	3.88	NM	4.70	M	3.26	p=0.014 (df 2,38)
All (n=37) by phase	B/L	4.50	M	4.33	NM	5.02	p=0.170 (df 2,72)
All (n=37) by week	Wk 1	4.50	Wk 2	5.10	Wk 3	4.24	p=0.069 (df 2,72)

B/L=baseline; M=music; NM=non-music.

Finally, both table 26 and table 27 have an analysis of the results by week. In each case, the overall increase in week two and the subsequent decrease in week three approaches a significant level. This outcome suggests a period effect, and with it the possibility that any positive changes in the frequency of disruptive behaviours were the result of chance rather than the introduction of sedative music.

(ii) 3 sub-categories

Table 28 shows the number of behaviours recorded in the three sub-categories during each phase of the study. Some participants were not present during every mealtime, and the frequency of the behaviours was proportionally increased. The actual number of behaviours recorded during each phase is in brackets. The percentages in the music (M) column show how the figures recorded during the introduction of sedative music compared with baseline (B/L) (e.g. aggressive +10.9%) and with non-music (NM) (e.g. aggressive +26.3%).

Table 28: Number of behaviours recorded in the three sub-categories

Sub-category	B/L	M	(%)	NM
Aggressive	82 (72) ¹	91 (83) ¹	+ ² 10.9/+26.3 ³	72 (67) ¹
Physically non-aggressive	655 (617) ¹	536 (476) ¹	- ² 18.2/-41.9 ³	768 (678) ¹
Verbal	249 (224) ¹	223 (198) ¹	- ² 10.4/-14.3 ³	255 (239) ¹

B/L=baseline; M=music; NM=non-music.

¹ Actual figure (in brackets).

² Comparison of music (M) to baseline (B/L).

³ Comparison of music (M) to non-music (NM).

Table 28 shows that the introduction of sedative music increased aggressive behaviours, and reduced the frequency of physically non-aggressive and verbal

behaviours. (It was the reaction of one person, and nothing more pervasive, that caused the increase in aggressive behaviour). However, the results in table 28 were not statistically significant. A Friedman test (table 29, below) indicated that in each sub-category (aggressive, physically non-aggressive and verbal) the three phases (B/L, M and NM) were equal, and the null hypothesis was upheld. The amount of food and fluid consumed was unaffected by the introduction of sedative music.

Table 29: Analysis of the three sub-categories

Sub-category	Mean Rank			Chi square	df	Significance
	B/L	M	NM			
Aggressive	1.88	2.13	1.99	2.22	2	.330
Physically non-aggressive	2.03	1.83	2.14	2.32	2	.314
Verbal	2.04	1.95	2.01	0.24	2	.886

B/L=baseline; M=music; NM=non-music.

(iii) *13 separate behaviours.*

A Friedman test was used to analyse the adjusted frequencies (i.e. proportionally increased for participants not present at every mealtime) during each phase of the study.

Table 30: Analysis of each behaviour

Sub-category	Mean Rank			Chi square	df	Significance
	B/L	M	NM			
Physical harm	1.91	2.04	2.05	3.364	2	0.186
Grabbing food	1.89	2.13	1.97	5.091	2	0.078
Shouting	2.03	1.97	2.00	0.167	2	0.920
Stripping*	2.00	2.00	2.00	-	2	-
Restlessness	2.04	1.74	2.22	6.911	2	0.032 ¹
Restlessness (n=37)	2.04	1.76	2.20	5.753	2	0.056 ²
Refusing food	2.01	2.08	1.91	2.457	2	0.293
Handling inappropriately	1.95	1.92	2.13	2.923	2	0.232
Self injury	1.99	1.99	2.03	0.250	2	0.882
Mannerisms	1.97	2.07	1.96	0.330	2	0.848
Complaining	2.04	1.95	2.01	1.040	2	0.595
Attention	2.00	1.95	2.05	0.941	2	0.625
Vocalisations	2.03	2.03	1.95	0.333	2	0.846
Repetition	2.04	1.97	1.99	0.412	2	0.814

B/L=baseline; M=music; NM=non-music.

* There were no recorded instances.

This analysis shows that sedative music significantly reduced restless behaviour ($\chi^2=0.032$)¹. A further analysis of restlessness was carried out that took a more cautious position. It excluded the outlying value in Group B and still found a reduction approaching significance ($\chi^2=0.056$)².

Table 31 shows the results of a Wilcoxon Signed Ranks test. It was carried out to detect the source of the significant result. It paired the music/baseline and music/non-music phases, and tested the null hypothesis that they had same distribution.

Table 31: Analysis of each behaviour pairing music/baseline & non-music/music

Behaviour	Pair	Significance	Pair	Significance
Physical harm	M/BL	.336	M/NM	.705
Grabbing food	M/BL	.023 ³	M/NM	.230
Shouting	M/BL	.552	M/NM	.857
Stripping*	M/BL	1.000	M/NM	1.000
Restlessness	M/BL	.255	M/NM	.036 ¹
Refusing food	M/BL	.796	M/NM	.435
Handling inappropriately	M/BL	.181	M/NM	.022 ²
Self injury	M/BL	.414	M/NM	.750
Mannerisms	M/BL	.872	M/NM	.904
Complaining	M/BL	.197	M/NM	.750
Attention	M/BL	.394	M/NM	.324
Vocalisations	M/BL	.930	M/NM	.792
Repetition	M/BL	.611	M/NM	.512

B/L=baseline; M=music; NM=non-music.

* There were no recorded instances.

Table 31 indicates that the music/non-music comparison was the source of the significant decrease in restlessness¹ ($T=-2.100$, $N=25$, $p<0.05$). The music/non-music comparison also produced a significant decrease in inappropriate handling² ($T=-2.297$, $N=14$, $p<0.05$), and the music/baseline comparison revealed a significant increase in grabbing food³ ($T=-2.271$, $N=6$, $p<0.05$).

The latter two results may be less important because they did not show up in the Friedman test. However, the significant increase in grabbing food does indicate that the intervention could have a negative as well as a positive effect on disruptive mealtime behaviours.

7.3.3.3 Intra-session response

Table 32 shows the average daily difference between the pre-mealtime and post-mealtime scores. It is organised in the same way as tables 25 and 26.

Table 32: Analysis of average daily difference between pre & post-mealtime scores

	Average daily difference between pre- & post-mealtime scores				p value		
Group A (n=17) by phase	B/L	.0784	M	-.1618	NM	-.0059	p=0.203 (df 2,32)
Group B (n=21) by phase	B/L	-.1167	NM	-.1500	M	-.0380	p=0.566 (df 2,40)
All (n=38) by phase	B/L	-.0294	M	-.0935	NM	-.0961	p=0.237 (df 2,74)
All (n=38) by week	Wk 1	-.0294	Wk 2	-.1533	Wk 3	-.0343	p=0.672 (df 2,74)

B/L=baseline; M=music; NM=non-music.

The figures represent very small reductions in perceived agitation levels. Furthermore nursing staff detected a drop in agitation without the introduction of sedative music. Consequently, these one-way (repeated measure) ANOVAS show that the introduction of sedative music did not significantly affect the intra-session response.

7.3.3.4 Staff questionnaire

Twenty people filled out the questionnaire and their responses were given a numerical value. (There is an explanation of the conversion system below table 33). A Likert type scale, like the one used in this questionnaire is not an interval measure, and it could be considered an inappropriate step to calculate means from the respondent's scores. Nevertheless, in this instance the scores were totalled and then divided by the number of replies (twenty). It gave an average score for each statement and demonstrated strength of opinion. The score for each statement is shown in Table 33.

Table 33: Average score for each statement on the staff questionnaire

	Statement	Av. Score
	<i>About the music:</i>	
1	I liked the choice of music	2.8
2	The music contributed to a pleasant eating environment	3.79
	<i>About the patient's response:</i>	
3	It helped the patients to have music played at mealtimes	3.4
4	The patient's disruptive behaviour's decreased	3.6
5	The amount of food consumed increased	2.8
6	Patients were easier to care for	3.55
	<i>About their response:</i>	
7	I found it a welcome distraction	3.85
8	I feel more relaxed caring for patients at mealtimes	3.5
9	I was often more accepting of disruptive behaviour	2.85

N.B. In this table, statements that appeared in the negative in the questionnaire to control for an acquiescence response (1,3,6,7,8) or that were written in a way that would obscure the research questions (4,5), are either expressed in the positive (1,3,6,7,8) or they state the research questions (4,5). Consequently, whereas statements 2 & 9 were scored as follows (strongly agree – 5, agree – 4, neither disagree or disagree – 3, disagree – 2, and strongly disagree – 1), this system was reversed for these seven statements.

There were average scores of less than 3 in Table 33. They indicated that the nursing staff did not like the music chosen for the study (average score 2.8 - statement 1). They did not agree that playing sedative music at mealtimes increased the amount

of food consumed (average score 2.8 - statement 5), and they did not agree that it helped them accept disruptive behaviour (average score 2.85 - statement 9).

There were also average scores of at least 3.4 and often approaching 4. In these instances it appeared that the staff tended to agree that sedative music was as a valuable intervention (average score 3.85 - statement 7) and that it helped their patients at mealtimes (average score 3.4 - statement 3). They also agreed that sedative music contributed to a more pleasant eating environment (average score 3.79 - statement 2) and that it helped them to feel more relaxed (average score 3.5 - statement 8). Furthermore, it decreased their patient's disruptive mealtime behaviours (average score 3.6 - statement 4) and eased caring for them (average score 3.55 - statement 6).

Overall there were no strong average scores (the highest was 3.85) and nursing staff appeared unconvinced by background sedative music.

7.3.4 Discussion

The results of the study indicated that sedative music did not reduce disruptive mealtime behaviours, or increase the amount of food consumed by people with an intellectual disability. The analysis of average daily scores in each phase of the investigation provided just one instance (inter-session response, Condition B) when sedative music significantly reduced a dependent variable. Otherwise, inter-session response, food and fluid consumption and intra-session response were not affected by the introduction of sedative music.

When parametric tests examined the frequency of separate behaviours and of each sub-category the intervention did significantly reduce restless and inappropriate handling behaviour, and it also lowered the number of behaviours in the physically non-aggressive and verbal sub-categories. However, the sub-category reductions were not statistically significant, and a statistically significant increase in grabbing food, as well as the suggestion of a period effect, detracted from these more positive outcomes. Furthermore, both questionnaire results and the intra-session analysis were disappointing. In the questionnaire the nursing staff appeared unconvinced by the intervention, and when they recorded the intra-session response they generally observed greater reductions in agitation during the phases of the study when there was no sedative music.

Some important methodological issues have arisen from this study that ought to be addressed by further investigations.

First, the dependent measure used to record the inter-session response highlights one aspect of the design that ought to be reconsidered. Cohen-Mansfield et al. (1989) developed the CMAI to review behaviour during the previous fortnight. Each item on the inventory was assessed using a seven-point Likert scale that graduated instances of behaviour from none to several per hour. When Goddaer and Abraham (1994) changed the CMAI from a Likert to a dichotomised 0 or 1 scale their modified version of the CMAI was used to either index an individual's agitated behaviours or to catalogue the agitated behaviours displayed by a group.

In this investigation the decision was made to record the frequency of disruptive behaviour, rather than just the occurrence. In order to record the disruptive behaviour in this way the dependent measure had to be used with small groups rather than a single sample. This introduced two confounds that were not present when participants were recruited from a single setting; the participants were eating in different dining rooms, and were being served different food. Furthermore, when this investigation introduced music for one time period, and the non-music condition for another, there were different levels of physical discomfort (hunger), group proximity, activity and noise during the two separate intervention periods. It is possible that these different setting conditions, rather than the introduction of sedative music, contributed to any changes in a participant's response. Another investigation ought to control for all these confounds. It could do so by combining the no music and music conditions through the use of headphones.

Second, it was interesting to read that when Clark, Lipe and Bilbrey (1998) detected changes in behaviour they wondered if those changes were a direct effect of the music, or whether the nursing staff's response to a sedative stimulus had an indirect effect on the outcome. They had examined how recorded, preferred music affected the aggressive behaviour of Alzheimer's patients when they were being bathed. A similar observation was made in some of the music and mealtime studies. Ayres (1987) found that nurses were more relaxed during the music condition. Ragneskog, Kihlgren, Karlsson and Norberg (1996) observed feeding taking place at a calmer pace. Denney (1997) suggested that any effect on staff was a significant variable, as it was "likely (to be) communicated to patients during care giving activities" (p. 21). In this investigation, some of the statements made by nurses who

filled out the open questionnaire appeared to confirm that members of staff were quieter. One person wondered whether levels of disruptive behaviour differed when music was played at mealtimes and jotted down the following comment: “because there was a change in the way meals were handled – staff quieter?”. Another respondent remarked: “my behaviour changed when music was played at mealtimes” and went on to write, “I think staff were quieter, and more attentive to residents”. Headphones would also eliminate this potential confound.

Third, when Wigram (1993a) examined whether Vibroacoustic Therapy (VAT) reduced the anxiety and challenging behaviour of individuals with an intellectual disability (VAT is explained in chapter 4) it “became apparent that some behaviours that had been initially identified as ‘anxiety provoked’ were more likely habit-formed, or driven by institutionalised activity” (p. 183). As a consequence, Wigram (1993a) identified behaviours that were indicative of habitual, perseverative, or manneristic activity, and not necessarily provoked by anxiety (a cause typically associated with some agitation behaviours). In any future investigation of music and disruptive mealtime behaviour it would improve the quality of the data collected if each participant’s behaviours were categorised before that investigation began. In that way, ‘anxiety provoked’ disruptive mealtime behaviours could be distinguished from habitual, perseverative, or manneristic ones. Furthermore, video rather than real-time observation would improve the accuracy of the data collected. Video analysis would provide opportunities to review passages of time and it could be used to measure the duration of each behaviour.

Finally, after recording four dependent measures (food fluid inventory, inter-session response, intra-session response, staff questionnaire) attention ought to focus on the disruptive mealtime behaviour (the inter-session response) of the participants. The stated hypothesis of this experiment was in two parts. The first, that sedative music would help alleviate mealtime stress and affect the disruptive behaviours displayed by adults with an intellectual disability during this daily activity. The second, that the intervention would address nutritional problems by increasing the amount of food consumed. This experiment has demonstrated that the second part of this hypothesis does not merit further investigation. The average daily food consumption was exceptionally high before the intervention was introduced (90.85%), and this left little room for improvement.

7.4 Experiment 6: Main investigation

The second half of this chapter reports the main investigation. This investigation addresses the various methodological issues identified at the conclusion of the CSO funded study. The main investigation strips away several layers of data collection, and focuses on testing a single hypothesis. It examines whether sedative music will affect the disruptive mealtime behaviours displayed by adults with an intellectual disability by alleviating mealtime stress.

7.4.1 Method

7.4.1.1 Participants

A convenience sample of 30 adults (29-67 years) with mild (n=15), moderate (n=10) or severe intellectual disability (n=5) was recruited for this study from the intellectual disability population cared for by NHS Tayside, Scotland. There were two experimental conditions, and at least 15 participants were needed in each condition for a strong effect size of approximately 0.75 based on Goddaer and Abraham (1994) and achieving the desired power of 80% using a t-test at the 5% level (Cohen, 1988).

The experimenter encountered some recruitment problems. Every person with mild intellectual disability who was approached was very happy to participate in the investigation (they liked the idea of listening to music on an MP3 player during lunch). However recruiting the rest of the sample was a greater challenge. Care managers did not want to involve their community facilities in the investigation, those that did ruled out people who they knew would not tolerate headphones, and when someone was identified their next of kin often did not reply to the letter asking them to consent on their behalf. (The procedure for recruiting people unable to give informed consent is described later in this section of the chapter). All these recruitment issues contributed to the imbalance between the numbers of participants with different degrees of intellectual disability.

The sample was either observed at home or in the community. Twenty participants were recruited from four facilities in Dundee for small groups of people with an intellectual disability, and the remaining ten attended day care services in either Perth or Dundee. They were either recruited in pairs, in a group of three and in one group of four. The majority were male (27 or 90%), and this corresponded to the

gender mix in their homes and in the community facilities they attended. None of the participants had a reported hearing loss, and although around 10% occasionally needed their food cut up for them they all ate without further assistance.

This investigation adhered to comprehensive ethical guidelines put in place to protect individuals with an intellectual disability. An information sheet was drawn up explaining the procedures that would be followed during the research. It was read to the people with mild intellectual disability, who if they were happy to participate signed or marked the consent form attached to the information sheet in the presence of a witness.

Provision was made for those with moderate and severe disability unable to consent on their own behalf. They were only recruited after the information sheet and a consent form were sent to their guardian (usually a parent, brother, or sister), and a signed consent form was returned. An independent advocate was contacted when a participant did not have a guardian. The guardian/independent advocate was given the opportunity to ask questions, and assured that care would proceed as normal should s/he decide to withdraw a relative from the investigation after agreeing to their participation.

Finally, any participant could withdraw once the investigation had begun if s/he wished to do so. S/he could demonstrate that s/he either did not like the music or the MP3 player that was being used to deliver the sedative stimulus (see 7.4.1.5.2 intervention data collection) by removing the MP3 player headphones.

7.4.1.2 Design

The participants were videoed eating their lunch in the dining room. Two, three and on one occasion four participants were monitored as they sat together at the one table. It is a potentially sensitive matter ethically using a video camera to collect clinical or research data from people with an intellectual disability. However, eating lunch is an everyday activity. Furthermore, in order to address issues of potential sensitivity the data collection was carried out overtly with the video camera mounted on a tripod in full view of the participants. The video recording did not interfere with the participant's lunchtime routine or their usual seating arrangements, and care was taken to ensure that only those taking part in the investigation were recorded on video tape.

The participants were videoed on two consecutive days. The music and non-music conditions were introduced simultaneously. On the first day, half the table (or, when three were monitored, a single participant) were randomly allocated to the music group and the other half (or, when three were monitored, a pair) to the non-music group. The participant(s) allocated to the non-music group completed their meal without being exposed to music, and those allocated to the music group sat alongside or across from them and listened to the calming music through headphones. The next day, the group membership at the table was reversed to give a counter-balanced, within-participants, crossover design in which each participant provided data for both the music and the non-music condition.

A within participants design acknowledged the multiple and complex origins of intellectual disability and challenging behaviour. Each participant was a unique combination of the different causes, and consequently difficult to match for control. A single day was chosen for each phase as it was assumed that music would have an immediate, as opposed to a lagged effect, and it would also exclude potential time-related confounds.

7.4.1.3 Sedative music

The selection of sedative music used in the CSO funded pilot study was played to each participant. Table 34 reports that selection for a second time.

Table 34: Sedative music

<i>Title</i>	<i>Album title</i>	<i>PFSM score</i>	<i>Catalogue No</i>	<i>Duration</i>
Yesterday (James Last)	The very best of James Last & his orchestra	8	529556-2	2:54
No matter what	Julian Lloyd Webber plays Andrew Lloyd Webber	9	PHILIPS 468362-2	3:49
I have a dream (RPO)	The Royal Philharmonic Orchestra plays Abba	8	EMPR CD585	4:45
The long and winding road	From Yesterday to Penny Lane Göran Söllscher plays The Beatles	9	459692-2	2:33
Blue eyes	HMV The Greatest Orchestral Pop Collection	9	7243 53543129	3:38

7.4.1.4 Dependent measure

The behaviour inventory (Appendix 29) devised for the CSO funded pilot study reported earlier in this chapter was also used in this investigation.

7.4.1.5 Procedures

7.4.1.5.1 Pre-intervention data collection

Before the investigation began, a meeting was held with nursing staff. It was an opportunity to explain the nature and purpose of the research, to emphasise that mealtime care ought to be provided as usual during data collection, to answer any questions and to discuss how the participants behaved. It was a chance (1) to distinguish ‘anxiety provoked’ disruptive mealtime behaviours from habitual, perseverative or manneristic ones, and (2) to produce data collection guidelines for each participant.

7.4.1.5.2 Intervention data collection

All data was collected during March-June 2007. Data collection followed the same routine. Before the participants entered the dining room, two steps were taken. The first of these steps (ten minutes before the meal) gave the participants an opportunity to try out the MP3 player (photo 1) and headphones. The MP3 player was turned on and hung around their necks. The headphones, similar to iPod earbuds (photo 2, overleaf), were placed directly into their ears.

Photo 1: MP3 player



(Photograph from Tesco.com: <http://direct.tesco.com/product/images/?R=204-6985>)

Photo 2: iPod earbuds



(Photograph from Wikipedia.com: http://en.wikipedia.org/wiki/Headphones#Inear_headphones)

It was never the intention to add a new stressor to the mealtime environment, and this step was a chance to identify people who did not like the equipment. Anyone who refused to use the equipment (R), by removing the MP3 from around their neck, by pulling the headphones out, or by pushing the player and headphones away, was not considered for either the music or non-music intervention. When they were recruited in tandem with one other person, their partner was also withdrawn (W) from the investigation. A participant at ease with the MP3 player and headphones during this introductory period was told that when they went for lunch they would have another chance to use the headphones and to listen to the music.

The second preparatory step dealt with the video camera. It was placed in full view of participants, and was positioned so that it only recorded those taking part in the study. The camera was switched on just before the meal started to video the participants from the moment they sat down at the dining table.

When the participants sat down at the dining table, those in the music condition were introduced to the sedative stimulus. An MP3 player was hung around their necks and earphones were placed into their ears. If necessary, the volume level of the MP3 player was adjusted. The researcher then withdrew, leaving the video camera running. The video camera remained switched on until all the participants

left the table at the end of their meal. The researcher approached the participant(s) with the MP3 player(s), removed the MP3 player(s) and thanked him/her for helping.

The footage from each mealtime was then viewed by the researcher using the dependent measure to record the incidence and determine the duration of the disruptive mealtime behaviours. Duration was calculated by subtracting the video counter minute:second reading at the start of each behaviour from the minute:second reading at the end of the behaviour. A colleague viewed 60% (n=12) of the mealtimes and the inter-observer reliability was 94%. A small number of very distinct behaviours had occurred, and the opportunity to review footage clearly contributed to a high level of agreement.

7.4.2 Results

Table 35 demonstrates the prevalence of disruptive mealtime behaviour among the sample. It shows the participant's reaction to the MP3 equipment and with it their level of comfort with the device. Finally, it charts the effect of sedative music on the disruptive mealtime behaviours that were displayed. Table 36 is a breakdown of these behaviours.

Table 35: Incidence and duration (in seconds (s)) of disruptive mealtime behaviours displayed by each participant (P) during non-music (NM) and sedative music (M)

P	Level	NM	M	P	Level	NM	M
1	Mild	0	0	16	Mod	0	0
2	Mild	0	0	17	Mod	0	0
3	Mild	0	0	18	Mod	0	0
4	Mild	0	0	19	Mod	18 (52 s)	8 (54 s)
5	Mild	0	0	20	Mod	0	0
6	Mild	0	0	21	Mod	35 (183 s)	8 (31 s)
7	Mild	0	0	22	Mod	0	0
8	Mild	0	0	23	Mod	0	0
9	Mild	0	0	24	Mod	0	0
10	Mild	0	0	25	Mod	W	W
11	Mild	0	0	26	Severe	R	R
12	Mild	8 (19 sec)	2 (3 sec)	27	Severe	R	R
13	Mild	0	0	28	Severe	R	R
14	Mild	0	0	29	Severe	R	R
15	Mild	0	0	30	Severe	R	R

P = Participant

Level = Level of intellectual disability (Mod = moderate)

NM = Non-music condition

M = Music condition

R = Refused the equipment

W = Withdrawn

Table 36: Breakdown of the incidence and duration (in seconds (s)) of behaviours displayed by the three participants who were disruptive at mealtimes

Behaviour	Participant 12 (Male)		Participant 19 (Male)		Participant 21 (Male)	
	NM	M	NM	M	NM	M
Physical harm	0	0	0	0	3 (3s)	0
Grabbing food	0	0	0	0	0	0
Shout/swearing	8 (19s)	2 (3s)	7 (14s)	0	0	0
Stripping	0	0	0	0	0	0
Restlessness	0	0	1 (8s)	5 (33s)	12 (118s)	6 (27s)
Refusing food	0	0	0	0	0	0
Handle inapprop.	0	0	0	0	0	0
Self injury	0	0	0	0	0	0
Mannerisms	0	0	0	0	0	0
Complaining	0	0	0	0	6 (19s)	0
Request attention	0	0	1 (15s)	1 (15s)	0	0
Vocalising	0	0	9 (15s)	1 (2s)	12 (17s)	2 (4s)
Verbal repetition	0	0	0	1 (4s)	2 (26)	0
<i>Totals</i>	<i>8 (19s)</i>	<i>2 (3s)</i>	<i>18 (52s)</i>	<i>8 (54s)</i>	<i>35 (183s)</i>	<i>8 (31s)</i>

Three men were disruptive at mealtimes (participants 12, 19, and 21). This is 10% of the sample recruited, and 12.5% of those who participated in the experiment.

All the participants with severe intellectual disability either pushed the MP3 player aside, or removed the headphones. All those with mild and moderate levels of intellectual disability tolerated the device. (Participant 25, a young woman with moderate intellectual disability, was withdrawn from the investigation because the participant she was paired with had removed the ear phones. Participant 25, like the rest of those with moderate intellectual disability, had not refused to use the audio equipment). Indeed, the participants with mild and moderate levels of intellectual disability more than tolerated the MP3 player. They were often recorded fiddling with the headphones. They were doing this not because they wished to remove the headphones from their ears, rather they wanted to make sure that the headphones stayed in place when they slipped out a little.

The investigation detected a floor effect, and because there were so few examples of disruptive mealtime behaviour it was not possible to carry out any meaningful inferential analysis. However, table 36 did show that sedative music affected disruptive mealtime behaviours. It eliminated physical harm (participant 21), shouting/swearing (participant 19), complaining (participant 21) and verbal repetition

(participant 21). It reduced the incidence of shouting/swearing (participant 12), restlessness (participant 21) and vocalising (participant 19, participant 21). It also appeared to lessen the intensity of behaviour as the average duration of restless behaviour (participant 21) decreased from 9.83 seconds to 4.5 seconds.

Although the incidence of disruptive behaviour decreased for each participant, the duration of behaviour did increase in one case (participant 19). The elimination of shouting/swearing behaviour (from 7 (14 seconds) to 0 (0 seconds)) and the virtual elimination of vocalising (from 9 (15 seconds) to 1 (2 seconds)) helped reduce the incidence of disruptive behaviour. However, this was offset by more restless behaviour (from 1 (8 seconds) to 5 (33 seconds)) and by the emergence of verbal repetition (from 0 (0 seconds) to 1 (4 seconds)). These new behaviours combined to increase the duration of disruptive behaviour by 29 seconds, and carry it just beyond the figure recorded during the non-music phase of the investigation. It is not uncommon to find at least one participant who does not match the general pattern of results. This also occurred in some of the sedative music and dementia investigations. Ragneskog, Asplund, Kihlgren and Norberg (2001) found that two out of four participants responded in the manner hypothesised, Casby and Holm (1994) two out of three and Gerdner and Swanson (1993) four out of five. Clearly conformity seldom happens, even in the smallest of samples.

7.4.3 Discussion

This investigation was the first of its kind undertaken with people who have an intellectual disability. It tested the hypothesis that sedative music would help alleviate mealtime stress, and affect the disruptive behaviours displayed by adults with an intellectual disability during this daily activity.

The results were presented in three different categories.

1. The prevalence of disruptive mealtime behaviour among the sample.
2. The participant's reaction to the MP3 equipment and with it their level of comfort with this type of device.
3. The effect of sedative music on the disruptive mealtime behaviours that were displayed.

The discussion will consider each category in turn. It will then discuss methodological issues that arose during the investigation, and conclude by considering some directions for future research.

1. The prevalence of disruptive mealtime behaviour among the sample

The prevalence rate of any type of condition tends to be variable. This can be illustrated by remaining within the eating disorders (ED) field, and by taking a brief look at some pica studies. Six studies, carried out between 1982 and 1995, found pica among 9% (McAlpine & Singh, 1986), 10% (Tewari, Krishnan, Valsalan, & Roy, 1995), 15% (G. O'Brien & Whitehouse, 1990), 16% (Lofts, Schroeder, & Maier, 1990), 26% (Danford & Huber, 1982) and 31% (Kinnell, 1985) of adults and children with intellectual disability. The reasons for these variations include different samples, different levels of physical health and dependency, different eating environments, varying appetites and opportunities to access food and other broader lifestyle, socio-cultural and economic factors (Fujiura, Fitzsimons, & Marks, 1997).

So, why was the rate of disruptive mealtime behaviour in this sample just 12.5%, especially when it can be compared with 18% reported by Reid, Ballinger and Heather (1978), and with the much higher prevalence rates discovered by Matson, Gardner, Coe and Sovner (1991) (27%), Reid and Ballinger (1995) (33%) and Dudley, Ahlgrim-Delzell and Calhoun (1999) (45%)? A look at the lunchtime behaviour of the three disruptive participants offers a possible answer that should have a bearing on the day-to-day management of mealtimes for this client group as a whole.

Casual observation at the time of data collection, and closer examination of the video footage, demonstrated that this sample was comforted and motivated by food: to put it simply, they loved eating. Time and time again a review of the video footage showed the participants sit down, eat without hesitation in virtual silence, stand up and leave the table. Occupational therapy colleagues have channelled this 'passion' for food. They have used meal preparation and the reward of eating the prepared meals to encourage development. Chapter 4 described how Music Activity Therapy (MAT) used predetermined activities to improve adaptive behaviour. For example, a client could be encouraged to walk in time to recorded music to help coordinated his/her gross body movements. In the same way, occupational therapy colleagues recognised that learning the sequencing and timing of dishes might increase an individual's cognitive skills.

The participants had a variety of lunchtime routines. Some queued for their meal and others were 'waited on' by carers. Some only entered the dining room when the meal was ready and others found themselves sitting at the table waiting for their

food to arrive. Participants 12, 19, and 21 all fell into the last category. During both the music and the non-music condition they found themselves sitting at a table waiting for their food. They were not like their peers who were also waiting for their lunch (participants 10, 11, 20 and 22). They did not remain calm. Their agitation was probably driven by hunger (one of stresses Denney (1997) believed exacerbated mealtime agitation), and it was expressed in disruptive behaviours. Chapter 2 described how people with an intellectual disability, not constrained by the same fear of social embarrassment, often dealt with anxiety in a maladaptive manner. Just as someone frightened by escalators might jump over the side and off a moving escalator (Lindsay & Olley, 1998), they might shout and swear (participant 12, participant 19) or lash out at a peer (participant 21) because they are overcome with hunger-driven anxiety.

A closer look at the participants in this investigation has demonstrated that different environmental factors may have contributed to the disruptive behaviours that did emerge. Was the rate of disruptive behaviour higher in the other investigations because more participants were sitting waiting for their food? It is not possible to make a judgement about this, but this element of the discussion does carry a salutary lesson for service providers and carers. It reminds them that careful thought needs to be given to the organisation of mealtimes to eliminate any possible setting conditions for disruptive behaviour.

Clearly a more careful selection procedure which detected participants with demonstrable disruptive mealtime behaviours would ensure future investigations gained a clearer perspective on the prevalence issues discussed in this section of the thesis.

2. The participant's reaction to the MP3 equipment and with it their level of comfort with this type of device

It is generally agreed that if music is expected to be an effective treatment it needs to coincide with personal preference. People often prefer a certain piece of music not because of specific structural features, but because it has a special meaning for them. Mitchell, MacDonald and Brodie (2006) reached this conclusion after they looked at the type of music forty-four participants selected when they wanted to be distracted from the sensation of pain and from the accompanying negative feelings. Mitchell et al. (2006) reported the participant's choices and whether they were made by a male or female in a separate appendix. The music selected covered a broad range

of styles “including rock, pop, dance, classical, folk, jazz, easy listening and hip-hop” (p. 349). Familiar music has a distracting effect that helps pain management (Mitchell et al., 2006), and reduces agitation (Gerdner, 2000). There is a physiological explanation for this phenomenon. Fukui (1996) found that cortisol levels which increased stress were decreased by a person’s favourite music.

Clair and Bernstein (1994) looked at how no music, stimulative background music (Glen Miller’s Greatest Hits) and sedative background music (Hoffman “Music for Mellow Minds”) affected the agitated behaviours of twenty-eight adults with dementia. They found that although there was less agitation during the sedative music there were times when a stimulative stimulus was more effective. This is not an uncommon outcome. Chapter 4, for example, provided an example of an indirect correlation between the volume of music and vocal behaviour. The vocalisations of seventeen people with severe intellectual disability decreased when instrumental jazz-rock music was played loudly in the group room and increased when it was played softly (Cunningham, 1986).

Clair and Bernstein’s (1994) provided an interesting explanation of this outcome. First, because the participants were hospitalised veteran military personnel they were familiar with the big band instrumental music of Glen Miller but not with the choice of sedative music. Consequently, they may have either have been irritated rather than calmed by such an unusual stimulus, or it may have been so novel that it did not hold their attention at all. (There is an inverted-U relationship between familiarity and preference. Sloboda (2005a) suggested that preference was low when music was unfamiliar, increased as it became known and decreased again when it is over familiar). Second, although staff indicated that they could hear the music, it may not have been loud enough for the participants. The participants were not able to say whether or not they could hear the music, and the extent to which they processed auditory input at normal levels remained unknown because they could not participate in hearing tests. Third, the same music was used with all the participants. Consequently some people may have liked and others disliked a particular piece or type of music. The music may either have helped provide predictability and security, or it may have been an irritant that created an uncomfortable and insecure environment.

This investigation has addressed two of the difficulties encountered by Clair and Bernstein (1994).

Clearly, it is important to choose music that is familiar to the participants. Clair and Bernstein (1994) suggest that it is key, not just to commanding attention, but also to creating the secure and comfortable environment a calming intervention is predicated on. Chapter 6 described how 48 people with an intellectual disability were involved in the selection of sedative music for this investigation.

Headphones are one way of being a little more certain that music is heard by each participant. The discussion of the prevalence of disruptive mealtime behaviours carried a salutary lesson for carers and service providers, and music therapists ought to be interested in the outcome of the decision to use an MP3 player and earbud headphones in this investigation.

Five participants, all with severe intellectual disability, refused to use the audio equipment. Following conversations with carers, it became clear that their degree of disability was not the primary reason for their refusal; rather, other factors had prompted their negative response.

Participant 26 enjoyed using headphones, and frequently spent time listening to sedative music away from his peers in a quiet setting. Infact, he had just come from that activity. When he refused, was he taking issue with having the MP3 player hung around his neck, or having to use earbud headphones as his headphones usually covered his ears?

When participants 27, 28 and 30 were recruited their carers commented that, as they were preparing for bed, calming music was often played in their rooms on a tape recorder. These carers weren't sure how the participants would react when asked to use headphones. Was their negative response prompted by a change from free field listening to using headphones? Finally, participant 29 already used an MP3 player with earbud headphones to listen to music. So, when he took the headphones out, removed the MP3 player from around his neck and handed them back, did he simply not like the music?

Chapter 4 of this thesis describes how a music therapist develops a relationship with each client. Fundamentally, music therapy is about the individual and his/her response to music. The five participants who refused to use the MP3 player and earbud headphones are a reminder that although research methodology demanded a consistent approach to the delivery of sedative music, everyone is unique and a music therapist needs to carefully consider how best to deliver this type of intervention. There really is no substitute for matching music experiences, whether

active or receptive, to each individual and their needs. Indeed, there may even be no substitute for the presence of a music therapist during active and receptive interventions.

Cohen-Mansfield and Werner (1997) believed that under stimulation and sensory deprivation caused verbally disruptive behaviours (VDB) associated with dementia. When they tested that theory by introducing sixty-five nursing home residents to background music, direct social interaction and indirect social interaction (a videotape of a family member talking to the older person), VDB decreased by 56% during direct social interaction, by 46% during the videotape and by 31% during background music. The most effective interventions involved an element of interaction, whether direct or indirect.

The outcome of Cohen-Mansfield and Werner (1997) will remind the reader of two questions that were asked at the end of chapter 4. First, would background music command the attention of individuals with an intellectual disability (we know from personal experience just how easy it is to tune out music even when it is being played through headphones)? Second, the attention of an individual plays an important role encouraging a positive response, so would background music really be any substitute for the presence of a music therapist?

Chapter 4 directed the reader's attention to a series of controlled case studies (Hooper and Lindsay (1990; 1991; 1997)). They not only demonstrated that sedative music lowered anxiety levels. When Hooper and Lindsay (1990) and Hooper and Lindsay (1997) compared the effect of recorded and live music (singing to the participants) they found that the participants "respond(ed) better to the attention of an individual" (Hooper & Lindsay, 1997, p. 173).

3. The effect of sedative music on the disruptive mealtime behaviours that were displayed

Chapter 4 of this thesis began by alluding to the long history of associating music with healing. The healing power of music has been a common theme in philosophy, and in literature on music theory, since the Egyptian civilisation (3150BC) described it as the "psychic of the soul" (Podalsky, 1954). This opinion still persists in popular culture. Today, when they refer to the power of music, people tend to say, "music has the charm to soothe the savage breast"; a line spoken by Almeria in Act 1, Scene 1, of William Congreve's (1670-1729) *The Mourning Bride* (The word "breast" is often misquoted as "beast"). For example, a publication

demonstrating the value of using active music therapy techniques with adults who had an intellectual disability appeared under the by-line “Music hath charms...” (Hooper, 1991).

This thesis is predicated on the notion that sedative music will exercise some ‘power’ over behaviours often driven by maladaptive ways of coping with anxiety and anxiety provoking situations. However, perhaps the stimulus was faced with behaviours it did not have sufficient power to ‘charm’.

Chapter 3 of this thesis discussed different behavioural techniques used to address challenging behaviour. The principle tenet of the behavioural approach is that behaviour is both shaped and maintained by antecedent personal and environmental stimuli and by its consequences. This notion is the bedrock of the antecedent, constructional and contingency interventions it employs. Chapter 2 of this thesis discussed sensory integration theory and the belief that restlessness, repetitive mannerisms, vocalisations and self injury are often carried out to modulate hypo-reactive or hyper-reactive sensory systems. So even though sedative music may be powerful enough to modify these types of challenging behaviours which have a physiological component and which are motivated by internal processes, it simply will not influence dimensions of the physical and social world that shape and maintain some challenging behaviours. It could not influence certain bio-behavioural states (e.g. fatigue, illness, hunger) or the preceding interactions that contributed to the disruptive behaviours displayed by the participants at mealtimes.

Denney (1997) observed that “quiet music...does not eliminate all the behaviours all the time. If the causes of agitated behaviour are multiple and complex, effective interventions are likely to be equally so” (p. 22). This was certainly the case during this investigation. Shouting/swearing (participant 12), restlessness (participant 21) and vocalising (participant 19 and participant 21) were reduced but not extinguished by sedative music, and the incidence, if not the intensity, of restlessness (approximately eight seconds per each occurrence during both the conditions of the investigation) increased during the music condition (participant 19).

4. Methodological issues

After discussing the three different categories of results (the prevalence of disruptive mealtime behaviour, the participant’s reaction to the MP3 equipment and the effect of sedative music on disruptive mealtime behaviour), this section considers methodological issues.

Thirty people were recruited in this counter-balanced, within-participant, investigation. The experimenter intended to pool the data that was collected, and to then use inferential tests to determine whether sedative music decreased the incidence and duration of disruptive mealtime behaviour. Table 35 (the incidence and duration of disruptive mealtime behaviours displayed by each participant during non-music and sedative music), and the subsequent shift of focus on to just three participants in table 36, shows how the low prevalence of the phenomenon under investigation changed data reporting and analysis. It may be that future experiments would be better served if they used single subject research design to determine whether sedative music decreases disruptive mealtime behaviour.

The video counter was used to calculate the duration of the disruptive behaviours. The minute:second reading at the start of each behaviour was subtracted from the minute:second reading at the end of the behaviour. In the CSO funded pilot study (Lindsay, Hooper, Cocking, Parry, & Ogston, 2004) the researcher observed the participants while they ate, and recorded each disruptive behaviour on a scoring sheet. It was undoubtedly better practice to eschew direct observation in this investigation and to use video footage instead; it gave the opportunity to review each participant's behaviour. However, without the immediacy of real time observation it was difficult to establish the content, and with it the tenor, of a participant's vocal interjections. A raised voice, and someone shouting, could be categorised as shouting/swearing without any hesitation, a wordless scream, shriek, or wail (vocalising) was also easy to detect, but when the vocal interjections were more hushed, and harder for the video camera microphone to pick up, it was difficult to distinguish between a complaint, a request for attention and verbal repetition. It was often necessary to rely on a carer's response, or lack of it, to categorise these interjections. S/he assuaged a complaint, answered a request for attention, or often ignored perseverative verbal repetition because it was an attention seeking device rather than a form of communication. Indeed, such were the difficulties encountered during the video analysis stage of this experiment that this element of interpretation accounted for some of the 6% slippage in inter-observer reliability. Any future investigations might avoid this element of interpretation by grouping complaining, requests for attention, and verbal repetition into a single 'verbal utterances' category.

5. Recommendations for future research

As well as further developing the research design and the dependent measure there are some recommendations for future research.

First, it seems that the impact of sedative music may be dependent on timing as much as anything else. It lacked 'power' to affect change in the dining room because there were setting conditions outside that environment it did not have the opportunity to influence. When Gerdner and Swanson (1993) discussed how music affected five confused and agitated elderly people, they acknowledged how important it was to "implement individualized music before the peak level of agitation to prevent the increase of agitated behaviors, thus causing a reduction in agitation" (pp. 289-290). Likewise, after using quiet music, Denney (1997) wondered whether, "similar to the administration of some medications", the mealtime agitation of elderly, institutionalised patients would be "more effectively controlled by an early or anticipatory mode" (p. 22). In order to answer Denny's question it would be interesting to conduct an investigation that introduces sedative music at different intervals (e.g. 15 minutes, 30 minutes, 1 hour) before mealtimes. It would help determine the point at which the music intervention needs to be introduced so that the setting conditions for disruptive mealtime behaviour do not reach such a peak that they negate the effectiveness of the intervention.

Second, some participants preferred not to use the MP3 player and earbud headphones. It might be useful to determine the most effective way of introducing sedative music to the intellectual disability population by comparing the use of headphones alone, headphones with music and music in the room. Furthermore, investigations of individual preference should extend beyond the mode of delivery to the music itself. When Gerdner and Swanson (1993) looked at the effects of music on elderly people, they noticed the greatest reduction in agitated behaviours when music had played a very important role in the person's life. Gerdner and Swanson (1993) suggested that careful assessment of personal preference was a "critical factor (and that)...specificity regarding preferred song titles, musical instruments, and performers may increase the probability of a positive response by the patient" (p. 289). Music preference is not incorporated into an individual's admission assessment; though perhaps it should be. This information could be gleaned from each person and from his/her family during, or shortly after, admission. It is very important to identify what

types of music are most effective, and future investigations might compare the participant's preferred music with the music used in this investigation.

Finally, future research might investigate long-term effect. Hooper, Lindsay and Richardson (1991), for example, found that a daily singsong affected a woman's behaviour when she returned to her ward (see chapter 4). It would be useful to examine the duration of any behaviour change, and if individual circumstances call for it to use single subject research design to find out whether sedative music has an indirect effect on outcomes such as nutritional status.

7.4.4 Conclusion

12.5% (n=3) of the participants disrupted mealtimes. The outcome of the experiment supported the hypothesis tested. Sedative music reduced the incidence of disruptive behaviour (although in one case a more persistent behaviour increased and the duration of disruption rose). The discussion suggested that sedative music had not eliminated the disruptive behaviours because they were complex, and it did not have the power to 'charm them'.

The interpretation of the results ought to inform those who want to improve the mealtime experiences of the people in their care, and it should also encourage music therapists to remain focused on the particular needs of each individual. The final chapter of this thesis, which follows, will consider the general relevance and value of these results to the field and scientific knowledge.

Chapter 8

Discussion of the main findings, limitations, clinical relevance and future research

“I train staff in how to use music in the environment and reduce noise pollution ... music therapists could be overall advisers, recommending the best musical intervention for the particular healthcare environment but also being open to whether music modalities other than music therapy might be most effective in a particular setting. Different ways of using music may be important in different settings and music therapy may not always be the most appropriate choice. Perhaps sometimes we limit ourselves in our definitions of our role as music therapists? The focus should always be on what the patients and organisation need from music rather than on a protectionist approach to professional identities” (Moss, 2008, p. 86).

8.1 Introduction

Four hundred and twenty-seven people participated in the six studies described in this thesis. These studies informed the methodology used to identify sedative music for receptive music therapy interventions (experiments 1, 2, 3 and 4), and examined (experiments 5 and 6) how a receptive music therapy technique (non-contingent background music) affected the challenging behaviour of adults with intellectual disability (a term synonymous in the US with ‘developmental disability’ and the stigmatising ‘mental retardation’, and in the UK with ‘learning disability’).

The first four experiments examined whether a tool (Predictable Factors in Sedative Music (PFSM)), devised to quantify the sedative quality of music, selected an appropriate stimulus for two investigations with adults from the intellectual disability population. Experiments 1 and 2 demonstrated the intrinsic validity of the PFSM. Experiments 3 and 4 confirmed that the PFSM had identified an appropriate stimulus. The first of two investigations with adults with an intellectual disability (the CSO funded pilot study) tested whether that selection of sedative music helped alleviate mealtime stress. It examined whether sedative music affected the disruptive behaviours displayed by adults with an intellectual disability during this daily activity, and addressed nutritional problems by increasing the amount of food they consumed. The second (the main investigation) tested a similar hypothesis to that proposed in the pilot study. It examined whether sedative music alleviated mealtime stress. However it only looked at the effect on the participant’s disruptive mealtime behaviours; it did not consider the impact on their nutritional status.

This chapter sets out to re-state and then discuss the findings from the thesis as a whole. It is important to mention that there are separate discussions of each of the experimental studies in this thesis in the preceding chapters. Consequently, this discussion addresses more general issues to give an overview of the implications from the studies, and highlight important aspects of the research such as limitations and clinical applicability. Future research direction in this area is also included.

8.2 Main findings

The findings reported in this thesis follow a line of enquiry that leads from a comprehensive exploration of existing research into a series of studies that build on

and are supported both by that scientific foundation and also by the results reported in each study.

Chapters 2 to 4 establish a strong framework of existing research in intellectual disability. They consider current non-music therapy and music therapy interventions used with the intellectual disability population and focus particularly on interventions that address challenging behaviour.

The empirical and experimental studies in this thesis originate in chapter 5. The subsequent experimental studies with non-clinical and clinical populations are reported in chapters 6 and 7. In chapter 5, a literature review focused on the years 1996-2008 and searched the keywords 'sedative music', 'soothing music', 'calming music' and 'music for relaxation'. The forty-four papers identified by that search demonstrated how individual researchers or research teams often disregarded scientific expectations and practices when they reported the choice of music and when they outlined the criteria and degree of consensus used to select sedative music for their investigations. When they outlined the choice of music they only provided a general description of the music (e.g. White, 1999) or a general description with an example (e.g. Sidani, Brooks, Graydon, & Hall, 2004). White (1999) was the most extreme example of how the criteria used to select sedative music were often under reported. In this case there was a two page description of how various physiological measures were collected, yet only a four word description of the sedative stimulus ("investigator selected classical music"). Finally, in over half the cases (24 out of 44) no consensus of opinion was sought and the individual researchers or research teams selected music themselves (e.g. Iwanaga, Ikeda, & Iwaki, 1996; Owen-Buckley, 2004). There are examples of studies where researchers have documented musical criteria in more detail (Erdonmez Grocke, 1999; Spintge, 1993; Wigram, 2004; Wigram, Pedersen, & Bonde, 2002). Each example was not identified by the keywords used in the search, but they will be discussed later in this chapter.

Empirical research should be replicable, and to this end the method section of any paper that describes an experiment should include relevant information about the materials and equipment used in the study (American Psychological Association [APA], 1994). Although more a recommendation than a finding, this thesis addressed the issue of under reported music choices by documenting relevant technical information in a more detailed and comprehensive manner. In every experiment it named each music selection and stated the catalogue number of the compact disc it

came from. By reporting the choice of music in this way any reader, who may wish to repeat these experiments, will be able to accurately identify and use the same sedative stimulus.

This thesis also took steps to deal with the lack of consensus and with the inconsistent criteria used to identify sedative music. Certainly, it more than compensated for the dependence on one person or a small group of people when choosing a sedative stimulus. In experiment 3 the response of 224 people without an intellectual disability, and in experiment 4 the response of 48 with an intellectual disability, confirmed that this researcher had indeed selected music pre-defined as sedative.

One element of this research examined the participant's response to fifteen pieces of instrumental music placed along a sedative/stimulative continuum (experiment 1 - people without an intellectual disability; experiment 4 - people with an intellectual disability). It demonstrated a significant correlation between the responses of these two participant groups, and the implication of this outcome was discussed in chapter 6 (section 6.7.4).

Experiment 1 and experiment 3 looked at how gender and musicality affected the response of participants without an intellectual disability. In experiment 1 they reacted in the same way to the fifteen pieces of instrumental music irrespective of their gender, and whether or not they were musicians. In experiment 3 gender and musicality did affect how the participants responded to a selection of sedative music.

The literature review in chapter 5 indicated that most researchers or research teams did offer some information about the criteria they used to select sedative music (they might describe the quality of the music, identify an individual factor, or cite Everett Thayer Gaston's description of sedative music). However, they had not chosen sedative music in an organised, systematic and comprehensive way, and in a way that took account of the complete range of musical factors (i.e. form, tempo, volume, melody and harmony). A tool was developed in this thesis (The Predictable Factors in Sedative Music (PFSM)) to bring that degree of rigour. The PFSM provided a very specific set of criteria for choosing sedative music. It categorised six musical factors as predictable or unpredictable. There were ten items on the PFSM as one factor (melody) was divided in five subsections. A score of '0' was recorded when the factor was unpredictable and '1' was scored when the factor was predictable.

The PFSM was introduced in chapter 5. Two of the experiments in chapter 6 (experiment 1 and 2) confirmed the intrinsic validity of the PFSM (i.e. it evaluated the designated trait). Experiment 1 demonstrated that a score of at least six (i.e. six predictable factors) was needed from across the range of possible scores (0 to 10) for music to be categorised as sedative. The discussion section of experiment 1 suggested that predictable and unpredictable musical factors, rather than any memories and experiences linked with the music, were driving the participant's responses. In experiment 2, twenty-five participants were asked to provide one example of a piece of music that made them feel calm and relaxed (sedative), and one example of a piece of music that made them feel energetic (stimulative). Although the PFSM incorrectly identified 16% (four out of the twenty-five) of stimulative choices as sedative, it successfully categorised often very musically complex selections and this confirmed the value of developing a tool that made separate judgements about the predictability or unpredictability of each musical factor.

In this thesis, clinical research was carried out with people who have an intellectual disability. Over one million people in the UK have an intellectual disability. It is a condition associated with aggression, destructiveness, self-injury and stereotyped mannerisms. These behaviours are collectively known as 'challenging behaviour' because they 'challenge' intellectual disability services and 'challenge' others to manage and tolerate them. Chapter 2 reported how the incidence and frequency of challenging behaviour in people with an intellectual disability is quite variable and inconsistent. It then described the natural history of challenging behaviour, and identified the complex mix of factors that contributed to its onset: biological (an association with specific syndromes), physiological (pain, discomfort, sensory impairment), psychological (frustration of the need for self expression and self-esteem), social (rejection, isolation) and finally, because they often suffered from a co-morbid mental illness, maladaptive ways of dealing with anxiety.

There are different ways of treating challenging behaviour. Chapter 3 examined five interventions: psychodynamic (psychotherapy), behaviourist (reinforcement schedules), cognitive (cognitive behaviour therapy (CBT)), humanistic (gentle teaching) and psychopharmacological (anti-psychotics, anti-depressants, hypnotics and anti-manics). It argued that although each was effective to some degree, behaviourist techniques could be costly in terms of time and money, there were ethical concerns about gentle teaching and psychopharmacology, and

psychotherapy and CBT were too cognitively demanding for many people with an intellectual disability. Chapter 3 suggested that because this was the case commercially recorded non-contingent sedative music (background music, for short) could be considered as an alternative. Background music was a low-tech, easily used intervention, it demanded a level of attention akin to unconcentrated openness rather than anything intellectual, and, providing it was used in a manner sensitive to the needs of the intellectual disability population, it raised few ethical concerns.

The review of music therapy and intellectual disability literature (1943-2008) that followed in chapter 4 of this thesis looked at descriptive, philosophical and experimental writing. It allayed the misconception that little material had been published (636 documents were identified). Overall, this body of work used case study writing, and to a lesser extent research, to demonstrate the positive social, cognitive, physical, emotional and psychological outcomes of engaging people with an intellectual disability in music therapy. The literature review also confirmed that the investigations carried out with the intellectual disability population in chapter 7 of this thesis were unique. A handful of experimental studies had looked at how music therapy affected challenging behaviour, but researchers were reluctant to consider whether music therapy exerted an influence in areas of daily life removed from the treatment room.

There are studies examining how sedative music affects the mealtime behaviour of the elderly (Denney, 1997; Goddaer & Abraham, 1994; Hicks-Moore, 2005; Richeson & Neill, 2004) and of people with mental illness (Courtright, Johnson, Baumgartner, Jordan, & Webster, 1990). Furthermore, the literature identifies disruptive mealtime behaviour as something that presents a 'challenge' to those caring for people with an intellectual disability (Lea, 1999; Wood, 1994). It appears to be an anxiety driven behaviour exacerbated by three sources of stress: hunger as mealtime approaches, proximity to others when eating and the general activity and noise level in the dining area (Denney, 1997). However, there was no comparable investigation with members of the intellectual disability population. Ayres (1987) had examined the everyday situation (mealtimes) chosen for this thesis, but the setting (a sound controlled environment) and the eating abilities of the participants (they needed physical assistance) were both different.

The Chief Scientist Office (CSO) funded pilot study (experiment 5) and the main investigation (experiment 6) are both reported in chapter 7 of this thesis. (The

main investigation addressed study design and data collection issues from the pilot study. It introduced headphones and video analysis). Experiment 5 and experiment 6 tested the same hypothesis; namely, that by masking disruptive noise and creating a less startling environment background sedative music would alleviate anxiety and decrease the incidence of behaviours that 'challenge' service providers and carers. The CSO funded pilot study also considered whether sedative music would address nutritional problems by increasing the amount of food the participants ate. When it discovered a ceiling effect, this aspect of the research was not included in the main investigation.

In both experiment 5 and experiment 6 disruptive mealtime behaviour was not as prevalent as anticipated. For example, only 12.5% (n=3) of the twenty-four participants in the main investigation disrupted mealtimes compared with reported rates of between 18% (Reid, Ballinger, & Heather, 1978) and 45% (Dudley, Ahlgrim-Dezell, & Calhoun, 1999). Nevertheless, the intervention often lowered any disruptive mealtime behaviour that did occur. In the pilot study, a period effect (the suggestion that the passage of time rather than the intervention brought about the changes observed) and a statistically significant increase in grabbing food are a source of concern. However, the results demonstrated that the intervention significantly reduced restlessness and lowered the participant's inappropriate handling of food. Furthermore, while the data collected during the main investigation did not lend itself to parametric analysis, the incidence if not the duration of the three disruptive participant's behaviour decreased by just over 50% in one case, and by over 75% in the other two cases. During the main investigation the pattern of the disruptive behaviour that did emerge reminded carers to carefully plan mealtime routines, and the participant's reaction to the introduction of headphones reinforced the need for music therapists who use a receptive intervention to not only respect an individual's choice of music, but also to carefully consider how s/he prefers it to be delivered.

8.3 Discussion

A common thread ran through almost all the experiments in this thesis whether these experiments were determining the choice of sedative music for experimental research, or investigating how that stimulus affects the mealtime agitation of the intellectual disability population. It emerged that in spite of large participant groups the emphasis ultimately shifted away from composite reactions to focus on the

variability of response, and on the individual. This may have much to do with the design of experiments structured to determine male/female, musician/non-musician responses; it certainly accounted for the variations discussed in chapter 6. However, the same conclusion was even reached at the end of chapter 7 (namely, that the research question would be best served by single subject research design) when the pilot study and the main investigation were not designed to explore sub-group responses.

8.3.1 Experiment 1

Experiment 1 was the only investigation that identified a uniform response unaffected either by gender, or by the level of musicianship. The uniform response of the male and female participants concurred with a much earlier experiment (Sopchak, 1955). There are two possible explanations for the uniform response of musicians and non-musicians that contradicted the discussion of their music perception and music processing skills in chapter 5 of this thesis.

First, the participant's degree of musicianship was not being examined. Experiment 1 was asking for an emotional evaluation rather than an understanding of musical structures.

Second, the uniform music/non-musician response can be explained by returning to the earlier discussion of music and emotion (see chapter 5, section 5.4 and chapter 6, section 6.4.4).

Emotional judgements of music are not straightforward. It has become increasingly clear that the strong emotions evoked by music vary between individuals, and within individuals on different occasions. In a review of the music mood induction literature, Vastfjall (2002) suggested that people resist cultural pressures for homogenisation of taste, and they continue to respond to music in ways that individuate and differentiate them. Sloboda (1991) found that when over 90% of survey respondents cried to certain music it was not a consistent reaction. Music would move a person to tears on one occasion, but not on another.

Both Meyer (1956) and Cooke (1959) placed emotion firmly within the musicological agenda. Meyer (1956) used musical structure to analyse musical emotion (e.g. the intensity of emotion aroused by a dominant seventh chord depended on the length of time that passed before it was resolved). Cooke (1959) developed a lexicon equating particular emotions with specific scale steps and patterns of motion

between them. However, the study of emotion remained on the periphery of contemporary music psychology until Sloboda and Juslin writing in 2001 “sense(d) an increased interest”. They suggested that “today, it is almost fashionable among music scientists to move into the emotion field” (Sloboda & Juslin, 2001, p. 81). Certainly, Strong Experiences in Music (SEM) studies carried out by Sloboda (1989) and Gabrielsson (1989) that asked people to describe the strongest most intense experience of music they ever had, the content analysis of their accounts, and the classification and elaboration of the ideas generated by these investigations (Juslin & Sloboda, 2001; Sloboda, 2005b) have helped identify the complex interaction of external factors that determine emotional reactions to music.

Chapter 5 and chapter 6 have already discussed the type of external factors that may influence how people respond to music, and that contribute to inter- and intra-variability of emotional reaction. These factors include how they appraise music, their prevailing mood, the degree to which their attention and concentration are engaged on a piece of music and their familiarity with the music in question. Perhaps, as suggested in chapter 6 of this thesis, the undifferentiated response of musician/non-musician and male/female participants in experiment 1 did strengthen the case for the PFSM and the experimenter’s choice of music using that tool. However, bearing in mind the evidence documented above, it is probably more likely that the sample size as much as anything else accounted for the outcome of experiment 1. It was too small for the anticipated differences to occur as in this instance there were only twenty-four participants in each category. It was only in experiment 3, when there were eighty people in each category that a differentiated musician/non-musician and male/female response emerged.

8.3.2 The CSO funded study: The issue of individual response

The outcome of the CSO funded pilot study (experiment 5) “investigating the effect of background mealtime music in the agitation and food consumption of adults with a learning disability” is not yet published in a peer reviewed journal. There is a one-page summary under the title ‘Focus on Research’ that can be found at the Scottish Executive Health Department Chief Scientist Office website (Lindsay, Hooper, Cocking, Parry, & Ogston, 2004). Table 37 shows how experiment 5 differed from the main investigation (experiment 6).

Table 37: Main features of experiment 5 (CSO funded pilot study) and experiment 6 (main investigation)

Experiment 5 (CSO funded pilot study)	Experiment 6 (main investigation)
38 participants (29-67 years) moderate (mod.) intellectual disability	24 participants (29-63 years)* mild/mod./severe intellectual disability
<i>Observation period:</i> 3 weeks	<i>Observation period:</i> 2 days
<i>3 conditions:</i> BL/music/non-music	<i>2 conditions:</i> music/non-music
<i>Design:</i> 17 participants: Week 1 - BL (Group A) Week 2 - Music Week 3 - Non-music 21 participants: Week 1 - BL (Group B) Week 2 - Non-music Week 3 - Music	<i>Design:</i> Day 1: Participant A - Music Participant B - Non-music Day 2: Participant A - Non-music Participant B - Music <i>Music & non-music introduced at the same time as the participants sit together.</i>
<i>Music:</i> Yesterday (529556-2) No matter what (PHILIPS 468362-2) I have a dream (EMPRCD585) The long and winding road (459692-2) Blue eyes (724353543129)	<i>Music:</i> Yesterday (529556-2) No matter what (PHILIPS 468362-2) I have a dream (EMPRCD585) The long and winding road (459692-2) Blue eyes (724353543129)
<i>Presenting music:</i> Free field	<i>Presenting music:</i> MP3 player & earbuds
<i>Dependent measures:</i> 1. Food & fluid inventory (calculates amount consumed as % of that served). 2. Agitation inventory (13 behaviours). 3. Intra session agitation (record pre- and post- meal level on Likert scale). 4. Staff questionnaire (20 respondents answer questions about music, patient's response, their response).	<i>Dependent measure:</i> 1. Agitation inventory (13 behaviours). <i>Only record 'anxiety provoked' disruptive behaviours. They had been distinguished from habitual, perseverative, or manneristic ones.</i>
<i>Data collection (Agitation inventory):</i> Each incidence of agitation as it occurred.	<i>Data collection (Agitation inventory):</i> Recorded incidence & duration from video analysis.

*30 participants were recruited

The separate music and non-music conditions of the CSO funded pilot study produced a quasi-experimental research design. The participants in group A were observed for one week without any music being introduced (A), followed by a week listening to sedative music while they ate (B), before the investigation concluded with a week-long withdrawal phase without background music (A). This generated an ABA format and a design that can underpin single subject research. This type of design can be criticised for carry-over effects (results from the previous phase carry-over into the next phase), for order effects (the ordering (sequence) of the intervention or treatment affects the results) and for ethical problems (withdrawing treatment in the withdrawal phase). However if plausible rival explanations are unlikely single subject

research is a moderately strong way of determining the impact of an intervention (Bowling, 1997b).

The issue of the relevance of individual differences and individual responses now becomes important. Much quantitative research collects numerical scores, and is not designed to report relevant individual responses. Music therapy places significant emphasis on the individual. There are statements on the websites of the various professional associations and made by individual music therapists that attest to the humanism of the intervention.

On the American Music Therapy Association website (www.musictherapy.org) music therapy is defined as “the clinical and evidence based use of music interventions to accomplish individualised goals with a therapeutic relationship”. The Australian Music Therapy Association (www.austma.org.au) states that a music therapist “develops goals for the music therapy programme which are specific to the client”, and in the UK the Association of Professional Music Therapists (APMT) (www.apmt.org) answers the question “what is music therapy?” as follows:

“Music-making forms the basis for the communication in (the client and therapist) relationship...The music played covers a wide range of styles in order to complement the individual needs of the client...

Much of the music is improvised, this enhancing the individual nature of each relationship”.

There are entries from around the world on Voices: A World Forum for Music Therapy website (www.voices.no) that express similar opinions. The only music therapist in Mongolia (a landlocked Asian country bordered by Russia and China) believes that “the current role of music therapy in Mongolia lies in training social workers” who are taught to “be aware of human diversity, and respect human dignity and worth” (Chamberlain, 2009). In Qatar (a small middle-eastern country in the Persian Gulf) music therapists at the Shafallah Center for Children with Special Needs “concentrate (their) energy on finding the right music that will be most therapeutic for the child. Each child is different and will respond in various ways to different music applications” (Elwafi, 2005). Finally, in countries as far apart as Mexico and Lithuania music therapy models are based on humanistic psychology (Campos, 2003) and afford disabled people the opportunity to show their capabilities (Aleksiene, 2004).

Music therapy not only emphasises the individual during the music-making interventions discussed on the APMT website, it also does so during receptive, music listening methods. For example, *Receptive Methods in Music Therapy: Techniques and clinical applications for music therapy clinicians, educators and students* (Grocke & Wigram, 2007) describes the special preparations often required for Vibroacoustic Therapy (VAT). A physically handicapped patient may need to be supported in the appropriate position by pillows and/or wedges. When treatment begins the therapist's role will vary from client to client as it may be appropriate to stay in the room with some people, whereas others respond best when given some privacy. Finally, the intensity of the treatment will also differ from patient to patient, and following VAT the therapist may have to reassure, guide and support those people who have fallen asleep or moved into altered states of consciousness (Grocke & Wigram, 2007).

In relation to this, there is an interesting individual reaction in the CSO pilot study. One of the Group A participants (a 53 year-old woman with moderate intellectual disability) displayed disruptive mealtime behaviours that clearly 'challenged' her carers, and a look at her responses within the ABA framework demonstrates the impact of background sedative music. This middle-aged woman was very restless and extremely vocal (shouting, complaining). Furthermore, her food refusal and attention seeking behaviours meant that she sometimes ate after her peers had finished their meal, or dined apart from them in a corridor or in the lounge. During the two non-music (A) periods of the investigation she displayed 11 of the 13 different behaviours recorded and each day averaged 10.1 instances of disruptive behaviour. In comparison, during the week when sedative background music was played (B) she displayed 5 of the 13 different behaviours recorded and a daily average of 4.6 disruptive behaviours. Overall her carers found her easier to manage during these mealtimes. She dined with her peers and while at times was a little restless and prone to attention seeking behaviour she never refused food and was not as vocally disruptive. A weekly chart of her behaviours suggested that the introduction of sedative background music had reduced the level of disruption she displayed during mealtimes: a daily average of 11.8 instances during week one (non-music), fell to 4.6 instances when music was introduced in week 2, and increased to only 8.4 instances in week 3 when the background music was withdrawn and the non-music condition was reinstated. A short discussion with her carers eliminated other possible

explanations. Psychotropic medication had not played a part because her psychopharmacologic treatments had not been changed during the investigation. It did not seem possible that outside influences had influenced her response. During the course of the experiment her daily routine had not been altered by surprise visits or unexpected treats. Finally, the food served might have caused the change observed (there was not a fixed weekly menu) but this seemed unlikely as no one could identify her favourite foods.

This thesis has already put forward arguments in favour of single subject research design. Chapter 4 concluded the section looking at experimental investigations of active music therapy by suggesting that music therapists should consider single subject research because it is a methodology that (1) retains the flavour of music therapy sessions, (2) takes account of the individuality of treatment, and (3) acknowledges how recruitment difficulties and the complex nature of intellectual disability make it difficult to create homogeneous control and experimental groups. In chapter 7, part of the discussion of the main mealtime investigation suggested that single subject research design might be the most appropriate way to determine whether sedative music decreases disruptive mealtime behaviour: the low prevalence of the phenomenon under investigation had shifted the focus from the entire sample on to just three participants. The interesting response from the pilot study, that has just been described, demonstrates how important it is to remember the emphasis music therapists clearly place on the individual. It is worth trying to focus on each person, remembering their specific needs and aiming to retain the individuality of treatment during the research process.

Chapter 4 highlighted the concern Lawes and Woodcock (1995) felt when their experimental design interfered with the therapeutic process. When Lawes and Woodcock (1995) compared the behaviour of four females with severe intellectual disability during music therapy, a therapist interaction condition and in their everyday environment they commented that “the experimental design ... required (the therapist) to deviate from his normal mode of working” (p. 271)).

Other research teams that used controlled experiments to evaluate active music therapy may not have expressed this degree of apprehension because they did not lose sight of the individual during the research process. Aldridge, Gustroff and Neugebauer (1995a), for example, evaluated Creative Music Therapy with waiting-list controls. They described the type of intervention they were investigating as “based

primarily on the musical relationship where a child is encouraged to play, while accompanied by a therapist, a variety of instruments, and also to sing or vocalise” (p.199). They stressed that “each participant’s single weekly music therapy session was composed according to the individual” (p. 200). In another instance, when Oldfield and Adams (1990) randomly recruited four participants they identified therapeutic goals and created a behavioural index for each goal. The measures they used were different for each individual, and they were based on specific aims identified as appropriate for each person. Random, time-sampled, video analysis provided frequency and duration measures that determined each individual’s progress.

So, a look at the response of one of the thirty-eight adults with an intellectual disability recruited to the CSO funded pilot study illustrates that while the value of a receptive music therapy intervention like background sedative music could be evaluated by aggregating the results of a large sample, it is worth remembering that any music therapy activity, receptive or active for that matter, ought essentially to be an intervention “composed according to the individual” (Aldridge et al., 1995a, p. 200). Music therapy after all is a humanistic treatment that meets the human needs of an individual and helps that person realise his/her full potential, and because of this researchers could also consider focusing on single cases.

8.3.3 Personal music preference and individual response

Chapter 5 described how preference, familiarity or past experiences might determine the relaxation/anxiety reduction potential of music, and it stressed the importance of considering a client’s unique musical preferences and background when selecting music.

In both the CSO funded pilot study and the main investigation reported in chapter 7 of this thesis it was not possible to implement individual preferences because the participants were observed in pairs or small groups. A compromise was reached by using representatives of the participant group in the final stage of a process which first developed criteria for identifying sedative music (PFSM), next validated the intrinsic validity of the PFSM and then, only after these two steps were completed, selected an appropriate stimulus. However, even if the participant group is involved in the process, it is still possible that without the opportunity to use someone’s preferred music the stimulus will not be powerfully enough associated with that individual to affect any change.

Chapter 7 of this thesis described how Gerdner and Swanson (1993) had looked at the effects of music on elderly people, and had noticed the greatest reduction in agitated behaviours when music played a very important role in the person's life. They suggested that careful assessment of personal preference might increase the probability of a positive response. Obviously, music chosen on the participant's behalf could have some kind of negative association and adversely affect their response. However, the incidence of disruptive mealtime behaviour never increased among participants in the main mealtime investigation, and they did not appear to react negatively to the sedative music. In addition, there is also the possibility that something powerfully associated with the stimulus, rather than or as well as the stimulus itself, is producing any positive or negative response that might be recorded during an investigation. Nevertheless whether it was the music itself, something associated with it, or a combination of the two, the pilot study participant described earlier responded in a way that, despite the overall result reported on the CSO website, appeared to affirm the value of the intervention, and that supported the argument advanced in this thesis to focus on the individual and consider a single subject approach to music therapy research.

8.3.4 The main investigation

The main mealtime investigation (experiment 6) provided an interesting insight into the prevalence of disruptive behaviour, and with it the nutritional status of the sample.

When chapter 7 of this thesis described the persistence of eating disorders (EDs) it referenced studies carried out by Reid, Ballinger and Heather (1978) and Reid and Ballinger (1995). Reid et al. (1978) looked at a sample of 100 institutionalised UK adults. Reid and Ballinger (1995) re-examined 67 survivors from the original sample. (Forty were still institutionalised. The remaining twenty-seven lived in nursing homes). They detected feeding disorders among 18% of the original sample and among 33% of those monitored on the second occasion. Drs. Andrew H. Reid and Brian R. Ballinger were learning disability consultants practising in Tayside, Scotland, and as such drew a sample from much the same population as that recruited to the investigations in chapter 7 of this thesis. However, there was a major difference between Reid and Ballinger's 1995 sample and the one in the main investigation of this thesis, namely their living environment.

In the past twenty years, there have been changes in policy and attitudes towards people with a disability in general, and in particular towards those with an intellectual disability (Watson, 2002). The evolving terminology used to name this client group (see chapter 2, section 2.2.1) shows how language has reflected the radical shift in attitude (Sinason, 1992). However, perhaps a more tangible illustration is the emphasis placed on helping people with an intellectual disability live in and enjoy equal access to their community (Mansell & Ericsson, 1996). It is a policy that has been adopted worldwide and with the on-going transfer of people with an intellectual disability from institutions to community care it appears to have marked the end of the long-stay hospital. In Scotland, for example, the reduction of the number of people in long-stay facilities from 6,000 in 1980 to around 700 by 2003 (Lawson, 2003) continued a pace, and personal experience has seen the recommendation to deinstitutionalise people with an intellectual disability and resettle them in the community being all but met, along with the closure of all long-stay hospitals.

Chapter 2 of this thesis highlighted the adverse effect of institutionalisation. It was a congregate living system of care that disempowered generations of people with intellectual disability, and that contributed to the development of mental illness (Beacock, 2003). Consequently, researchers were quick to evaluate the process of moving people with an intellectual disability into a community setting; they wanted to show that changing their living conditions improved quality of life. They looked at different community options (Emerson et al., 2000), assessed the staffing and day care issues that created quality services (Rose, 1999) and established the prevalence of severe challenging behaviour, mental health problems and offending (Gravestock, 1999; Murphy & Fernanado, 1999). They found that relocation increased social, cognitive and language skills (Fernando, Kohen, Sebaratnam, & Mathew, 1997; Kim, Larson, & Lakin, 2001; Molony & Taplin, 1990). However, from a negative perspective, it often increased the incidence of behaviour disturbance (Nottestad & Linaker, 2001; Nottestad, Stromgren, & Linaker, 2000; Young, Ashman, Sigafos, & Grevell, 2001), it did not broaden an individual's social networks (Ager, Myers, Kerr, Myles, & Green, 2001; Jahoda, Cattermole, & Markova, 1990) and it did not appear to improve physical health (Dunt & Cummins, 1990). In particular, research in the US revealed an increase in mortality (Shavelle & Strauss, 1999; Strauss & Kastner,

1996; Strauss, Shavelle, Baumeister, & Anderson, 1998) and dieticians did not detect any effect on nutritional problems.

People with an intellectual disability are nutritionally vulnerable. They may have altered levels of physical activity, they may have behavioural problems, or they experience difficulties swallowing (Bryan, Jones, & Russell, 1998), and each of these factors contribute to higher levels of under-nutrition and obesity than observed in the general population. There is evidence that weight distributions polarise in this way among the intellectual population living in long-stay hospitals in South Africa (Molteno, 2000) and Spain (Sanches-Lastres, Eiris-Punal, Otero-Cepeda, Pavon-Belinchon, & Castro-Gago, 2003). In Great Britain, this polarisation has continued despite relocation (Cunningham, Gibney, Kelly, Kevany, & Mulcahy, 1990; Jolly & Jamieson, 1999; Lea, 1999; Wood, 1994).

Reid and Ballinger (1995) carried out their follow up study as the intellectual disability population were still in the process of experiencing whole scale changes to their living environments. The resettlement process, and with it the move from ward based to small unit living, had still to really gather pace and almost two-thirds of their sample (n=40) were still institutionalised. In marked contrast, the sample participating in the main experiment in chapter 7 of this thesis were all deinstitutionalised, and they were either observed in their homes or while they attended a day care service.

Although chapter 7 of this thesis states that the nutritional status of the intellectual disability population remains a concern for dieticians, the literature does not describe the type of developments reported among the elderly nursing home population who also challenge carers with their disruptive mealtime behaviour. In this instance, journal articles explain how lighting, acoustics and visual stimulation, have all been adapted or altered to create better designed dining rooms for people who have dementia (Calkins & Brush, 2002; Ott, Readman, & Backman, 1990).

During data collection, the experimenter experienced very functional dining areas that were not carefully designed to enhance the dining experience. This suggested that a change to eating together in smaller numbers brought about by deinstitutionalisation, rather than a concerted effort to improve eating environments, had somehow contributed to the 12.5% rate of disruptive mealtime behaviour reported in this sample compared with the 33% prevalence rate discovered by Reid and Ballinger (1995). A reduced level of disruptive mealtime behaviour appears to be

another benefit of a process that, according to Beacock (2003), changed how people with an intellectual disability were treated. Furthermore, although the main investigation in chapter 7 of this thesis did not look at the participant's nutritional status, the general absence of behavioural problems that can disrupt the dining process suggests that, in common with those who participated in the CSO funded pilot study, this sample were not underweight.

As this thesis reviews three major areas of literature (one area, music therapy and intellectual disability has been reported more comprehensively in Hooper, Wigram, Carson and Lindsay, 2008a, 2008b (see appendices 1 and 2)) and includes six experimental studies, this discussion has picked out some of the main issues worthy of debate and not included all aspects that could be considered. There are separate discussions at the end of each experiment, and to prevent repetition the more salient points were selected for inclusion in this discussion. It is inevitable that there will be limitations in experimental studies, and those limitations will now be looked at both to contextualise the findings and to critique this thesis.

8.4 Limitations

The research process is rarely straightforward. The design might need to be refined to take account of potentially confounding variables, it is often difficult to recruit participants, and even if data collection is completed results are often negative or inconclusive. It is important to identify and acknowledge factors that limit the outcome of an investigation.

8.4.1 The CSO funded study and the main investigation

Earlier in this chapter table 37 showed how the design of the main investigation differed from the design of the CSO funded pilot study. As well as using video analysis the main investigation used MP3 players to simultaneously present the music and non-music conditions. In this way the main investigation tried to ensure that the participants heard the music and those around them were not aware of it. This was not just a token gesture towards technology. It refined current practice and provided a baseline methodology that could be further adapted or improved. However, perhaps the main investigation was conducted in conditions that were too tightly controlled, and that bore little resemblance to common practice. The participants in the main investigation either lived in group homes or attended day care

services. They ate their meals together, and under these circumstances it would be more usual to play background music 'free field' than to issue everyone with MP3 players.

The use of headphones has proliferated among the normal population. People on public transport, for example, often use in-ear music as they try to reduce the stress of travelling, and as they deal with the irritation and discomfort of the noise levels they have to put up with on trains and buses. It may be beneficial to encourage greater use of headphones among some people from the intellectual disability population. However, the response of those participants with severe intellectual disability suggests that this idea needs to be carefully considered. All the non-participants who refused to use the MP3 players differed from the rest of the sample because their degree of disability was more severe. This limitation created a sample that was not representative of the target population and reduced external validity.

In the experiments that examined how sedative music affected the mealtime behaviour of the elderly and of people with mental illness (chapter 7, section 7.2, table 23) music was introduced for one time period, and the non-music condition was introduced afterwards for another. However under these circumstances the presence of a stressor in one period of time, but not in the next, may have affected the incidence and/or level of disruptive mealtime behaviour. This may have been the factor that contributed to any changes in a participant's response rather than the introduction of sedative music. Furthermore, it remained unclear during these investigations whether changes in behaviour were a direct effect of the music, or whether the nursing staff's response to the background music had an indirect effect. The main investigation in this thesis controlled for both these confounds by presenting the music via an MP3 player and by combining the non- music and music conditions in a manner not observed in parallel projects. However, after the CSO funded pilot study discovered a low incidence of disruptive mealtime behaviour, it was perhaps an oversight to limit each participant's involvement in the main investigation to a single observation in each condition and in doing so reduce the possibility of recording the behaviour under investigation.

The main investigation was carried out to examine a representative sample of people with an intellectual disability. The CSO funded pilot study had recruited individuals with a moderate intellectual disability, and the main investigation broadened the sample and included those with mild and severe degrees of the

condition. In chapter 7, the method section of the main investigation described how difficult it was to recruit people with severe intellectual disability, and the results section showed that all these participants refused to use the listening equipment. Subsequently, the research question remained unaddressed among people with severe intellectual disability. This is a group that was more likely to exhibit the type of disruptive mealtime behaviour being investigated because of their degree of intellectual disability.

Chapter 7 has already identified a factor that limited the success of the dependent measure devised to record disruptive mealtime behaviours. The main investigation used video analysis to monitor each participant's behaviour, and an element of interpretation was needed to categorise their hushed interjections as either a complaint, a request for attention, or verbal repetition.

On top of the reservations just expressed about the design of the main investigation and about the recruitment and observation of those who participated in that particular experiment, the main investigation did not incorporate individual music preference. There were mitigating reasons why preferred music was not used during the CSO funded pilot study. The sedative music stimulus was presented to small groups of participants, and you cannot respect individual preference when more than one person is listening. However, should this limitation have been addressed during the main investigation when the use of MP3 technology allowed the music to be played directly to each individual? It was actually correct to use the music selected for the CSO funded pilot study with everyone and to err in this way on the side of caution. First, it avoided a confounding variable (i.e. different pieces of music). Furthermore, the participants with mild intellectual disability would almost certainly have been able choose the music they wished to listen to, but as long as music preference is not included in each person's admission assessment it may have been difficult to gather this type of information from the remainder of the sample.

Finally, neither experiment 5 nor experiment 6 were randomised controlled trials (RCTs) in which two differently treated groups (experimental, control) were randomly assigned to an intervention and control group. This design minimises the risk of extraneous variables confounding results and increases the probability that the experimental variable accounts for any differences (Bowling 1997b). Black (1996) and Greenfield (1989) have identified situations when RCTs may be inappropriate; for Black (1996) it was instances when a rare event was being investigated and for

Greenfield (1989) when there was an inadequate sample size. However, even though these circumstances do apply to experiment 5 and experiment 6, the results of both these experiments need to be interpreted with some caution, in particular because they may not generalise and apply to the intellectual disability population as a whole.

8.4.2 Experiment 1 and the PFSM

The first four experiments in this thesis were devised to identify an appropriate sedative stimulus for receptive music therapy. This was a rather labour intensive process, added to which the reliability and validity of experiment 1 carried out as part of this process was threatened by mood bias and by an unresponsive measuring instrument.

Mood bias commonly occurs in health and health services research. It is when low-spirited people underestimate their health status, their level of functioning and the amount of social activity they are engaging in (Bowling, 1997b). Although the participants in experiment 1 were being asked to record how music made them feel, and not how they were feeling, current mood state may have affected their response. It is possible that an individual's low spirits, or for that matter their elevated mood state, blocked an accurate evaluation. The outcome of experiment 1 might have been more reliable if each participant had completed an affect assessment, and only undertook the experiment when self-assessment revealed a balanced mood state.

The Profile of Mood States – Short Form (POMS-SF) (Curran, Andrykowski, & Studts, 1995) is commonly used to measure subjective mood states. When a brief measure is needed POMS-SF is considered a workable alternative to the original 65-item Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1971). It would take each participant 3 to 7 minutes to rate 30 adjectives on a 5-point Likert scale. They calculate their Total Mood Disturbance Score (POMS TMD) by summing the tension, depression, anxiety, fatigue and confusion subscale scores, and subtracting the score for vigour. A higher score indicates greater mood disturbance, and each participant would only complete the task when a lower score indicated a degree of equilibrium.

A measuring instrument ought to be responsive to change and it should capture changes that occur over time. Experiment 1 asked the participants to choose six adjectives from the energetic arousal and tense arousal subscales of the University of Wales Institute of Technology Mood Adjective Checklist (UMACL). They were

asked to select adjectives that best described how each piece of music made them feel. This was considered a practical way of gathering the data required as it would be too invasive, time consuming and labour intensive to use physiological measuring devices. However, unlike the physiological measures, this method was not responsive to change and it could not capture moment-by-moment reactions.

In experiment 1, the participants were instructed to base their response on an overall impression, and not a reaction to the opening moments of a composition. The participants completed the experiment at home with only written instructions to guide them. The many instances when participants altered choices on their scoring sheets suggested that they had followed those instructions, and recorded a considered and careful response to the entire composition. However this may not always have been the case, and allowing unmonitored participation in this way is a limitation of the design that may have affected the outcome of the experiment.

The PFSM may need some refining. When it was used in experiment 2 it identified some of the participant's stimulative selections as sedative. Chapter 6 has already discussed the obvious concern that patient anxiety/stress may be increased, rather than decreased, if stimulative pieces have a chance of being selected as a sedative stimulus. Therefore a PFSM with a weighted rating system might be more helpful than a non-weighted one. It would reduce the possibility that inaccurate conclusions were reached about some music selections. For example, if a composition is predictable in all melody aspects, has a constant rhythm and tempo, maintains the same meter, has a predictable form but has strong dissonant harmonies, it would score eight using the current PFSM scoring system. This would denote a sedative piece of music. However, it would not be accurate as even the most naïve listener is likely to find that jarring, dissonant harmonies have nothing in common with the serene and calming quality of sedative music.

The issue of developing a weighted PFSM scoring system will be addressed in the forthcoming section on future research directions (8.6). An example of how this might look is presented. The process of weighting the PFSM is based on knowledge gained from empirical studies examining the relationships between structural factors (e.g. tempo, pitch, loudness, interval distribution, melodic range) and perceived expression.

8.5 Clinical relevance

While there are certain limitations about the methods used to identify a selection of sedative music for receptive music therapy, these investigations attended to some important aspects of the process in a way that ought to affect clinical practice.

The non-disabled participants were asked to record how the music “made you feel” (experiments 1, and 2) or to choose music that “makes you feel calm and relaxed (sedative), and music that makes you feel energetic and want to move or dance (stimulative)” (experiment 3). These particular instructions ensured that the participants distinguished between the emotions expressed in the music, and what they were actually feeling. This is an important consideration as clinical practice should respect personal preference in individual work and search for some common responses in group work.

Second, experiment 2 used a control condition and this eliminated any possibility that changes in arousal level were caused by sitting down and listening to music, rather than by a selection of sedative music. This is something that always needs to be considered in clinical assessment to gain a true measure of response.

Third, the work of Everett Thayer Gaston (1901-1970) was discussed in the course of chapter 5 (section 5.5.2.3). Gaston categorised stimulative and sedative music by differentiating between its melodic and rhythmic qualities. Stimulative music exhibited an unrestrained quality, and contained brief, staccato melodies, a clear underlying beat and percussive rhythms that encouraged physical activity. Sedative music produced a calming effect by using more legato melodic motives, nonaccented beats and unclear rhythmic pulses. Gaston also described its effect on the listener, and differentiated between physical activity on the one hand (stimulative) and a dreamlike mood on the other (sedative).

Experiment 4 found out which sedative music the participants (people with an intellectual disability) preferred. An accessible way was devised for them to record their reaction to different pieces of music. The response sheet used in this experiment placed two drawings side-by-side. The drawings corresponded to how Gaston described the effect of sedative (a ‘chilled out’ man) and stimulative music (the ‘move about’ man).

Previous research with this client group had either used subtests from the Seashore (1919), Gordon (1965) (1978) and Bentley (1966) standardised psychometric batteries to assess their musical aptitude, or it had looked at their

improvisation and reproduction skills to discover the relationship between musical aptitude, intelligence and cognitive processes (see chapter 6, section 6.7.1 and appendix 2). The recording tool devised for experiment 4 enabled people with an intellectual disability to document how different pieces of music made them feel, and it helped identify the music they liked listening to when they wanted to relax. It provides a systematic and consistent method of assessment that will lead to appropriate clinical judgements.

The PFSM also has clinical relevance and applicability for music therapists that extends beyond simply being a tool for receptive music therapy and being a way of identifying a sedative stimulus. It impacts on the standardisation of assessment processes in music therapy, and on those using improvisation with their clients.

There is no shortage of assessment tools developed by music therapists for music therapists (Baxter et al., 2007; Bruscia, 1994; Lee, 2000; Oldfield, 2004; Pavlicevic, 1994; Wigram, 2007b). They focus on various aspects of the music therapy process. For example, qualitative tools like Lee's nine-stage method of evaluating improvisations (Lee, 2000) and Bruscia's Improvisation Assessment Profiles (Bruscia, 1994) evaluated changes that occurred during active music therapy sessions. However, "very few general models let alone 'standardised models of assessment have been developed" (Wigram, 2004, p. 216); apart from the Nordoff-Robbins scales, those that have been developed have not been used in a systematic or widespread way and their reliability has not been examined. A review by Wilson and Smith (2000) which looked at the tools used by music therapists illustrated the inconsistency and lack of replication that pervaded quantitative music therapy research. Wilson and Smith (2000) found that in forty-one studies only three out of the sixteen named assessments were used more than once.

A systematic assessment tool (The Individualised Music Therapy Assessment Profile (IMTAP)) has recently been published (Baxter et al., 2007). IMTAP is an in-depth protocol with a sophisticated numerical and graphic scoring system. It produces a comprehensive guide to an individual's abilities and impairments across ten domains including their motor, sensory and perception skills, their communication and cognitive abilities and their musicality. The scoring system has yet to be standardised and it still needs to be tested on a general child and adolescent population to detect norms.

IMTAP came out after the major part of the work on this thesis had already been undertaken. It was developed by six AMERICAN music therapists, and this is something that merits comment. In *A comprehensive guide to music therapy: Theory, clinical practice, research and training* the authors (Wigram et al., 2002) wrote from a European perspective. They put forward some reasons why reliable and validated assessment methods, the hallmarks of other professions, were largely absent from music therapy. They suggested that the stricture of drawing up and administering a standardised tool was uncomfortable for European music therapists. As students, European music therapists were encouraged to grow and develop their own style, and once qualified worked with great flexibility and creativity in a climate of active music therapy. This individuality is less noticeable in, for example, the USA where training encourages practicing therapists to use and adhere to tools that have been developed and validated, and this may explain the origins of IMTAP.

However, in Europe the rather weak interface between the humanism of music therapy and the systematic element of the natural sciences, ought now to be set against signs of change and in particular of microanalysis being applied to research. Microanalysis is a detailed analysis of a small but relevant amount of data that might be drawn from a moment (one minute of a session), an event (five minutes of one session) or an episode (one clinical improvisation, or one complete session) of music therapy (Wosch & Wigram, 2007). Microanalysis might focus on the client, the therapist, the client-therapist interaction, or the music (Wosch & Wigram, 2007).

Holck (2007), for example, recorded communication behaviour and musical patterns during a music therapy event and an episode of music therapy. Holck used a combination of observational analysis and microanalysis of video material, and recorded the gestural and facial movements that took place between client/therapist above and below a line of music. She commented on the correlation between the music interplay and non-verbal exchanges of the therapist and the client. This approach revealed the weak social and communicative initiatives of clients with communication difficulties, it identified clinical habits (appropriate as well as inappropriate) that influenced the therapist's interaction with the client and finally it informed future interventions.

Wosch (2007) used a micro-analysis method to locate changes from one emotion to another during clinical improvisation. In one example, forty-one people heard a bongo (client) / piano (therapist) improvisation that lasted 6 minutes and 55

seconds. It was from the twelfth of twenty-four sessions with a woman with bulimia. They used a computerised version of an Emotions Questionnaire (EQ). They clicked below lists of words with a computer mouse to indicate which emotion group or groups (interest, anxiety, anger, sadness and joy) was being expressed by the music they were listening to at that moment. This type of analysis identified micro-transitions in emotion that up until it was carried out “were not fully clear to the therapist” (p. 238).

Some music therapists have formalised and written about the process of identifying a suitable sedative stimulus. Spintge (1993), for example, put forward quite imprecise parameters to differentiate ‘anxiolytic’ music (see chapter 4, section 4.4) from relaxing music. On the one hand, he described ‘anxiolytic’ music as very high or low frequency music (20Hz to 10,000 Hz) with a ‘floating’ quality and absolutely no rhythmic contrast. On the other, relaxing music fell between 600 and 900 Hz and it had a ‘constant’ rhythmic quality.

Shoemark (2004) used quite a straightforward but nonetheless it would seem quite an effective method to find out which compact discs and single tracks could be played in paediatric hospital rooms to calm patients. Sedative music was categorised as music with minimum range/minimum change in all/most musical elements.

Erdozmez Grocke (1999) devised the Structural Model for Music Analysis (SMMA); a very useful tool that standardised phenomenological descriptions of music. The SMMA summarised the main features of a piece of music (e.g. part of Erdozmez Grocke’s description of the slow second movement of Beethoven’s violin concerto in D major, Op.61 reads as follows: “Its structure is simple, comprising two themes with variations”). It also identified soothing elements (e.g. from the same description Erdozmez Grocke writes: “The harmonic structure of the work is constant, and the melodic line and harmonic sequences are predictable”). However, the SMMA did not evaluate the overall sedative worth of a stimulus. It remained “a short, effective and inclusive way of describing almost all aspects of the music, without going on to undertake further, more detailed analysis” (Wigram, 2004, p. 227).

Finally, Wigram (2004) outlined the Potentials in Stimulatory and Sedative Music (PSSM). These ideas provided the starting point for the tool (PFSM) developed in this thesis. They first appeared in *A comprehensive guide to music therapy: Theory, clinical practice, research and training* (Wigram et al., 2002) and were then adapted in *Improvisation: Methods and techniques for music therapy*

clinicians, educators and students (Wigram, 2004). Although the PSSM echoed the emphasis the SMMA (Erdonmez Grocke, 1999) placed on the predictability of sedative music, it went one step further than the SMMA by answering a narrower question; namely, “not how can one describe the music, but is it stimulatory or sedative in style?” (Wigram, 2004, p. 216). However despite its strengths the PSSM, like the SMMA before it, did not provide a system for evaluating the sedative worth of a stimulus.

The PFSM (not to be confused with the PSSM) is described in chapter 5 of this thesis. It does not strictly fall into the category of microanalysis and demand moment-by-moment scrutiny. However, by asking the listener to evaluate ten separate musical factors, it does bring the degree of systematic analysis that has hitherto been absent to the process of identifying sedative music for receptive music therapy. The PFSM is a standardised and validated tool (experiment 2). There was a degree of reliability between the experimenter and the two other musicians who used it. Furthermore, the development of the PFSM ought to have important implications for clinical practice. It is not too complicated for music therapists and musicians to use it effectively, and it quantifies quite a "slippery" and idiosyncratic concept (sedative music) by way of quasi-microanalysis, and by using accumulated knowledge about how emotions are expressed and perceived in music.

It is also relevant to consider how the PFSM could be applied in the analysis or use of music in improvisational music therapy; the live use of music making that is widely used in European music therapy. Improvisation is a major method in music therapy. It became a cornerstone of the profession, and its strategies and techniques have been tested, developed, formalised and communicated, sometimes through theory (Bruscia 1987) or research (Edgerton, 1994; Pavlicevic 1994), but also in a practice-based manner through working with clients and teaching students (Wigram, 2004).

Improvisation has a clear clinical intent: to meet a client's ‘in the moment’ musical needs. Each therapist has to manipulate elements such as dynamics, rhythm, tempo and/or tonality so that familiar music moves and shifts with variability and flexibility. It is a great skill to be able to vary and balance musical elements in this way (Wigram, 2004). For example, although it is often relevant and empathic to create a dissonant frame when a client is playing random melodic material, the therapist needs to be aware that dissonance is a stimulating musical element, and

dissonant music may not be effective empathically with a disturbed client and his/her upset feelings. The pulse of an improvisation also needs to be carefully managed. People with disabilities, affective disorders, illnesses and mental disturbance have often 'lost' a sense of pulse and tempo in their daily life, and this is reflected in their music (Wigram, 2004). An improvising music therapist ought to be aware how breaking up rigid pulses or establishing a stable pulse affects people, and s/he has to choose the stimulating effect of one and the sedative quality of the other depending on the needs of his/her client. These are just two examples of how an improvising music therapist must manipulate individual musical elements; it is not what they play but how they play it that is important (Wigram, 2004).

The PFSM, like the SMMA and the PSSM before it, is more than just a tool for analysing music. The PFSM can also play an important role in active music making. The two examples given above demonstrate that music therapists "need to learn how the balanced and effective use of (the different musical) elements can be made in a very sensitive and subtle way to engage and help patients" (Wigram, 2004, p. 216). The PFSM can provide a frame for creating music that will match some clients need for safety, stability and predictability (e.g. people with psychotic disturbance). Conversely, the PFSM can help frame unpredictable musical experiences that will help other patients develop the ability to cope with an unpredictable world (e.g. people with autism, learning disability, or anxiety neuroses). These issues will become important for any future research that arises out of the results of the experiments documented in this thesis.

8.6 Future research

Chapter 7 has already identified some new research directions. It suggested further exploring the impact of background music on the disruptive mealtime behaviour of the intellectual disability population by investigating different ways of delivering the music listening condition (headphones alone, headphones with music and music in the room), by looking at the timing of the intervention and by considering the long-term effect.

As well as these new research avenues, single subject research design might also be used to determine what types of background music are most effective reducing disruptive mealtime behaviours. Music psychologists have, for example, looked at the effect of different kinds of music on storage and memory recall. Kirkweg (1998)

examined the effect of classical music, heavy metal music and white noise on the memory of 60 undergraduate students. Kirkweg found that the white noise group made least errors and the classical music group made the most. Music education research has considered how different music affects teenage moods and study habits. Sousou (1997) investigated the effect of melody and lyrics, and found that 137 undergraduate students were not influenced by lyrics but were affected by whether the music was happy or sad. Medical research has suggested that designer music, created to facilitate mental and emotional balance, is a more effective way of increasing mood, vigour and mental clarity than classical, new age and grunge rock (McCarty, Barrios-Choplin, Atkinson, & Tomasino, 1998). Music therapists found dissimilar physiological responses when they compared how premature infants responded to sedative and stimulative music (Lorch, Lorch, Diefendorf, & Earl, 1994). Music therapists also discovered that mental health clients behaved inappropriately more frequently when they listened to hard rock rather than easy listening or country music (Harris, Bradley, & Titus, 1992). These are just a few examples from a very extensive area of research. It might be useful to add to these investigations by following the clinical studies in this thesis with a comparison of how preferred music and contemporary relaxation-type music affects the mealtime agitation of adults with an intellectual disability. This would offer a useful opportunity to examine the suggestion that music with a particular significance has the greatest impact.

Second, sedative background music was an effective intervention when the participants did display frequent disruptive mealtime behaviour. Future studies need to recruit a sample with clearly defined and frequent disruptive behaviour patterns so that it is really possible to evaluate how the intellectual disability population react.

Third, as suggested earlier, a future study needs to carefully consider whether or not to use MP3 players with the intellectual disability population. If MP3 technology was ignored it would be more in line with common practice. Furthermore, four of the participants with profound intellectual disability appeared to be disturbed by different aspects of the MP3 players (see chapter 7) and 'free field' rather than in-ear exposure to background music would remove that stressor.

Fourth, future research might examine how using background sedative music affects caregiver's perception of mealtimes and of their charges. Two people, who completed a questionnaire during the CSO funded pilot study, commented that their behaviour and their attitude to those in their care were affected by the intervention,

and this impression could be examined in more detail. It would be useful to explore and perhaps establish a secondary benefit of this type; especially, after the overall results of experiment 5 and experiment 6 failed to provide statistically significant evidence that introducing background sedative music into the mealtime environment of the intellectual disability population was an effective way of controlling their disruptive behaviour.

Finally, the PFSM needs to be refined. A weighted system might eliminate mis-categorisation. A future investigation could invite a group of music therapists (rather than just two people) to use a weighted form of the PFSM to evaluate the music selected for experiment 2 and reported in appendix 24.

Some studies have examined the relationships between structural factors (e.g. tempo, pitch, loudness, interval distribution, melodic range) and perceived expression, and they provide important guidelines for a weighted system. Lindström (1997) manipulated the rhythm, melodic contour and direction of Frère Jacques, and a multivariate analysis of 19 psychology student's responses found that harmonic, followed by rhythmic and melodic factors, most affected emotional expression. Hevner (1937) found that the relative weight of musical factors in the serene emotion cluster was tempo followed by harmony, pitch, mode and finally rhythm.

Gundlach (1935), and Tillman and Bigand (1996) also identified the musical factors that most affected judgements about emotional expression. Gundlach (1935) asked participants to listen to 40 musical phrases from different classical compositions. They indicated the mood or attitude the composer had succeeded in expressing by choosing one or more out of 17 descriptive terms. Gundlach (1935) analysed the data collected and concluded that speed (tempo) was by far the most important factor for perceived expression, followed by rhythm, interval distribution, orchestral range, loudness, mean pitch and melodic range. Finally, Tillman and Bigand (1996) concluded that musical form had little or no effect on perceived expression. They divided compositions by Bach, Mozart and Schoenberg into 6-second segments, and found few significant differences when university students scored original and backward versions on emotion-related scales.

As table 38 demonstrates, all these investigations have been used to propose a weighted version of the PFSM. In the future this version could be used in studies where an assessment of sedative music is needed, or in everyday clinical work where music is used as a calming or relaxing influence.

Table 38: Possible weighted PFSM scoring system

Musical factor	Score	Explanation
Form	5	The lowest because Tillman and Bigand concluded that musical form had little or no effect on perceived expression.
Tempo	45	The highest because both Hevner and Gundlach identified it as the most important musical factor for perceived expression.
Volume	15	If Gundlach's musical factor order was scored starting with '7' for the highest placed factor (tempo) and falling to '1' for melodic range, the average score of the melodic elements would be 3.6 (i.e the sum of rhythm ('6') + interval distribution ('5') + orchestral range ('4') + mean pitch ('2') + melodic range ('1') divided by the number of factors (5)). This average score places the melodic factors ahead of loudness (volume) that scores '3' by falling fifth in Gundlach's musical factor order. Although perhaps a little convoluted, this calculation lead to the decision to score volume lower than melody.
Texture	15	The original intention was to use a graduated scoring system that moved from 40 for harmony, to 30 for melody, to 20 for volum and finally 10 for texture. However, when there was no evidence indicating the relative importance of melody and texture, they were both give the aggregate (15) of their graduated scores (20 and 10).
Melody -Line	6	The total score for melody is 30 (i.e. 5 factors x score of 6). It places this factor third in order of importance and acknowledges that Hevner found pitch, one of the five elements of this factor, the third most important musical factor in the serene cluster.
- Line	6	
- Timbre	6	
- Pitch	6	
-Accents	6	
Harmony	40	Second to tempo because Hevner weighed musical factors in this order.

The weighted PFSM also has a dichotomous yes/no scoring system. The researcher or practitioner who uses it would first consider the factors that define sedative music strictly in terms of predictability (tempo, volume and texture), and answer either 'yes' or 'no' to each of these questions.

1. Does the tempo remain stable with only gradual increases (accelerandos) or decreases (ritardandos)?
2. Does the volume remain stable with only gradual increases (crescendos) or decreases (diminuendos)?
3. Is the texture stable with subtle changes in style or instrumentation?

A single listening should be enough to reach these decisions. After listening a few more times, s/he should then be able to answer ‘yes’ or ‘no’ to the next seven questions about melody, harmony and form.

4. Is there repetition within the melodic line?
5. Is the melodic line unembellished so that there are no unexpected changes, pauses or breaks?
6. Is the timbre of the melodic line gentle, and is the melody subtly passed between instrument families?
7. Are there gradual changes in the pitch of the melody?
8. Are any accents in the melody adding expression rather than energy?
9. Do the harmonies remain consonant and predictable so that there are no interrupted cadences, unexpected modulations, or dissonance?
10. Is there either a verse and chorus structure, or is the music in introduction, verse and chorus form?

In each case, a score of 0 is recorded when the answer is ‘no’ (i.e. this factor is unpredictable) and the full score assigned to a particular musical factor is recorded when the answer is ‘yes’ (i.e. this factor is predictable). PFSM scores can range from 0 (where there are no predictable factors) to 150 (when all the factors are predictable). A composition that is sedative will have a total PFSM score ranging from 111-150. A composition with a score of 110 or below is stimulative. This will ensure that dissonant music, and music with unpredictable tempo (the two most important determinants of perceived expression), can never be sedative. A composition with different combinations of the other predictable factors can be sedative, but even if all the other factors are predictable a composition that is dissonant will score 110 (i.e. 150 minus 40) and music with unpredictable tempo will score 105 (i.e. 150 minus 45).

Just as in chapter 5 (section 5.6) a performance of Piano Sonata No.14 in C-sharp minor “Quasi una fantasia”, Op. 27, No. 2 by Ludwig van Beethoven, widely known as the “Moonlight” Sonata (Beethoven Sonaten, Daniel Barenboim, Deutsche Grammophon #419602), will demonstrate how the weighted PFSM might be used to evaluate a piece of music included in the “Most Relaxing Classical Music in the Universe” collection (Denon Records, Catalogue No. 17232).

A first listening will establish the predictability of the tempo (question 1 answered ‘yes’ – score of 45) and the volume (question 2 answered ‘yes’ – score of 15), and it will help identify a composition that eschews the versatility of the

instrument and presents the same texture throughout (i.e. harp-like broken chords accompanying song-like themes, and firm grounding octaves in the bass) (question 3 answered ‘yes’ – score of 15).

There is repetition within the melodic line. The movement is in binary, two-part song form. It does match the statement about form in the PFSM (question 10 answered ‘no’ – score of 0). It presents an opening theme (0:27/bar 5) and a second theme (1:24/bar 15). The opening theme recurs (although not repeated verbatim) (3:55/bar 42) and it is followed by the same second theme (4:47/bar 51). Finally, the rhythm of the first three notes of the accompanying song (bar 5) is used in the bass of a short coda (5:37-6:31/bars 60-69) (question 4 answered ‘yes’ – score of 6).

The melodic line is unembellished (question 5 answered ‘yes’ – score of 6) and the timbre is gentle as the “Moonlight” Sonata is performed, in accordance with Beethoven’s own superscription, in a sonorous and delicate manner (question 6 answered ‘yes’ – score of 6). There are no sudden changes of pitch. The melody, which is occasionally accented for expression (question 8 answered ‘yes’ – score of 6), gently undulates, and any larger intervals (e.g. 2:07/bar 23) are bridged by the accompaniment (question 7 answered ‘yes’ – score of 6).

Finally, the composition’s very predictable harmonies are interspersed with strategically placed dissonances, and these dissonances form harmonic suspensions which quickly resolve to create a gentle sensation of tension and relaxation very common to relaxation programmes (e.g. 1:26/bar 16, 1:38/bar 18). Otherwise, the harmonic content is consonant and predictable and there are no interrupted cadences or unexpected modulations (question 9 answered ‘yes’ – score of 40). The “Moonlight” Sonata matched almost all the requirements of sedative music set out in the weighted PFSM. It scored 145 out of a possible 150, and in doing so it would seem to justify being included in a collection of the most relaxing classical music in the universe.

Chapter 4 discussed how music therapy in medicine used background music during medical treatment, and ‘canned music’ is also played by medical and dental practitioners, hospital clinics and out-patient departments to calm anxious patients. The PFSM was developed to analyse music and to identify sedative music selections, but should music therapists use it to guide and advise others as they choose music for these different areas? The closing comments that follow answer this question.

8.7 Closing comments

Every chapter in this thesis has been headed with a quotation, and this chapter is no different. In this instance it is taken from a paper that explored the relationship between music therapy, and arts and healthcare work. The author (Hilary Moss) reflects on her experiences of “these two distinct but related practices” (Moss, 2008, p. 83). She gives three examples of how music activities, which are not music therapy per se, have been used in healthcare settings to “bring many benefits to service users” (p. 83). One example is a receptive intervention. She writes about the Women’s Health Unit of a hospital gynaecology department that used recorded music in the treatment rooms to create a softer, more relaxing atmosphere, and “the MRI scanning department of the same hospital, (where) patients are routinely invited to bring their own favourite CD to listen to whilst having a scan” (p. 84). Moss then encourages music therapists to reconsider their role. She suggests that they need to be more flexible and less protectionist. She reminds them that the focus should always be on what the patients and organisation need from music; even if it means that it may be more appropriate to employ a performer, rather than a music therapist. Indeed, the music therapist ought to “be involved in ensuring that the selected musicians are of a high quality and able to be sensitive to the needs of patients rather than excluding (him/herself) from the process because “it’s not music therapy” (p. 86).

The review of music and intellectual disability (chapter 4) found literature biased in favour of descriptive writing. By and large, music therapists who worked with this client group appeared reluctant to go beyond recounting moments or periods of treatment, and delineating therapeutic goals. There were experimental investigations of active and receptive music therapy, but generally they were carried out with a small number of participants. Furthermore, individual researchers or research teams were unwilling to examine whether the different interventions affected everyday life outwith the music therapy room. For example, there were experiments looking at how sedative background music affected the mealtime agitation of people who have dementia and of adults with mental illness, but, until the experiments in this thesis, no comparable had been work carried out with the intellectual disability population.

It would seem that the comments Moss (2008) made are justified. Music therapists working with the intellectual disability population ought to set themselves broader aims than just exploring the therapeutic nature of music through encouraging

client participation in sessions. They must also endeavour to raise awareness of the value of music among staff and carers, and use music to enhance the environment in a way that will meet the aims of an organisation, and address the patient's needs.

Both the CSO funded pilot study (experiment 5) and the main investigation (experiment 6) reported in chapter 7 of this thesis tested the same hypothesis; namely, that by calming the anxiety that drives challenging behaviour, sedative music would affect behaviours that disrupt mealtimes and that 'challenge' service providers and carers. The CSO funded pilot study also considered whether sedative music would address nutritional problems by increasing the amount of food the participants ate. The response of the middle-aged woman in the pilot study referred to earlier in this chapter (section 8.3.2), and of the three people in the main investigation, upheld the first hypothesis. In each instance, background sedative music reduced the frequency, if not always the duration, of their disruptive behaviours. However, these examples were extracted from the samples as a whole, and this strengthens the argument for using single subject research design, rather than randomised controlled trial methodology to test this hypothesis.

This researcher can perhaps be forgiven for persisting with a methodology that aggregated disruptive behaviour, as nothing approaching the floor effect observed in the final investigation was observed during the pilot study. Although, by way of an explanation, correctly categorising behaviours during the main investigation distinguished anxiety provoked disruptive mealtime behaviours from habitual, perseverative or manneristic ones, and lowered the number of disruptive behaviours that could be recorded. This researcher could not have anticipated the low prevalence rate of disruptive mealtime behaviour that occurred as a result. It frustrated any attempts to aggregate scores, and under these circumstances the design of the main investigation could not detect a statistically significant result, or otherwise. Nevertheless, the incidence of disruptive behaviour offered an insight into the effect of deinstitutionalisation, and a suggestion was made that carers should carefully plan mealtimes to eliminate or at least reduce waiting periods that appeared to be a setting condition for disruptive behaviour.

The main investigation should also influence future decisions to engage the intellectual disability population in a receptive music therapy intervention, and evaluate their reaction to it. Chapter 7 argued against a consistent and uniform approach to delivering receptive music therapy in favour of offering a unique and

individual music listening experience. The deliberations in this chapter suggest that in some instances it is best to use single subject research design to evaluate receptive music therapy. Finally, and perhaps most importantly, the clinical investigations in this thesis ought to encourage music therapists working with the intellectual disability population to be creative and flexible about how they use music in their workplace. They should not to limit their roles; rather, they should think about addressing the social needs of their clients, and consider how music can enhance the environment, and the lives, of their clients beyond the treatment room.

Chapter 9: English summary and Dansk resume

9.1 English summary

“The primary mission of music therapy is to help clients to achieve health through music... We must be prepared to use all facets of music to the advantage of the client” (Bruscia, 1995, pp. 72-73).

9.1.1 Introduction

The studies in this thesis investigate the effects of receptive music therapy on disruptive mealtime behaviours displayed by adults with an intellectual disability. The aetiology of challenging behaviour suggests that it is driven by mental state, as much as anything else. The poor coping mechanisms (Wayment & Zetlin, 1989) and irrationality (Lindsay & Olley, 1998) associated with intellectual disability exacerbated stresses associated with mealtimes, and raised arousal levels (O’Brien et al., 1991). The main research question examined whether using non-contingent sedative music (hereafter referred to as sedative music) to mask disruptive noise, to create a less startling environment and to soothe agitation would affect this type of challenging behaviour. The definition and application of recorded music for sedative purposes is also investigated as part of the main study.

9.1.2 Predictable Factors in Sedative Music (PFSM)

Receptive music therapy always involves listening (Wigram et al., 2002), and one of the first requirements of any investigation that uses music in this way is to make a selection suited to the individual, their situation and the purpose for which it is to be used.

A reliable tool (Predictable Factors in Sedative Music (PFSM)) was developed in order to define the sedative effect of music. The PFSM is grounded in previous research (Erdonmez Grocke, 1999; Shoemark, 2004; Wigram, 2004) equating sedative music with predictability. The PFSM brought a degree of systematic analysis to the process of selecting a sedative stimulus, identifying and defining six musical factors in terms of predictability (Table 1). One factor (melody) is divided into five subsections, so the listener evaluates ten separate elements and gives each piece of music a PFSM score that ranges from zero (unpredictable/non-sedative) to ten (predictable/sedative).

Predictable Factors in Sedative Music (PFSM)

<i>Musical factor</i>	<i>Description of predictability</i>
Form	Verse & chorus or introduction, verse & chorus structure.
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).
Texture	Remaining stable with subtle changes in style or instrumentation.
Melody -Line	Repetition of material.
- Line	Little embellishment, no unexpected pauses or breaks.
- Timbre	Gentle sound with gradual changes within and between instrument families.
- Pitch	Gradual changes between registers.
-Accents	Few – used to add expression rather than energy to a melodic line.
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.

9.1.3 Assessing the intrinsic validity of the PFSM

Four hundred and twenty-seven people participated in the six experiments described in this thesis. The first two experiments used non-disabled people to select sedative music and assess the intrinsic validity of the PFSM.

In *experiment 1*, forty-eight adults (18-69 years) received a cassette tape with fifteen, two-and-a-half minute pieces of music: instrumental arrangements of contemporary songs. This experiment identified a sedative stimulus for ensuing clinical investigations by determining the level of agreement between the participant's evaluations and the experimenter's pre-scores of the pieces against the PFSM.

Experiment 1 utilised the Energetic Arousal and the Tension Arousal subscales of the University of Wales Institute of Technology Mood Adjective Check List (UWIST-MACL), or UMACL for short, devised by Matthews et al., (1990). The participants were given a response sheet with sixteen of the original twenty-four UMACL words. Eight words measured an aroused response and eight measured a non-aroused one. The participants were asked to select six adjectives that best described how each extract "made them feel". The mean number of arousing and non-arousing adjectives chosen for each music selection was calculated. There was a very strong significant positive correlation between the subjective PFSM score and the objective mean score ($\rho=0.870$, $N=15$, $p<0.0005$, two tailed). It demonstrated that the PFSM scores were an accurate assessment of the sedative quality or otherwise of

the various music selections, and identified the five highest scoring as appropriate sedative stimuli. An interpretation of the number of arousing and non-arousing adjectives chosen for each music selection indicated that the cut off for sedative music on the PFSM was a score of at least six.

In *experiment 2*, twenty-five participants (18-59 years) received two blank compact discs (CDs). They recorded a single piece of music on each CD, and identified their choice by coding the CD (e.g. 24678). The recordings were classical, folk and popular music, and they were performed by instrumentalists and vocalists.

The experimenter gave each selection a PFSM score, and then compared the outcome of that assessment with the participant's information. The blind evaluations identified all the sedative selections, and twenty-one of the stimulative choices (the remaining four were incorrectly placed in the sedative category). This outcome indicated that the PFSM can distinguish between sedative and stimulative music, and confirmed the intrinsic validity of the tool ($X^2_{Yates}=32.84$, $df=1$, $p<0.001$).

9.1.4 Identifying an appropriate sedative stimulus

Experiment 3 was carried out to find out if the stimuli could be consistently perceived as sedative. There were 224 non-disabled participants (18-69 years). Of these participants, 160 listened to the five highest scoring selections sequenced together in full into seventeen minutes and thirty-nine seconds (17:39) of sedative music. The remaining 64 participants listened to eighteen minutes and twenty-five seconds (18:25) of accordion music. They controlled for the possibility that simply sitting to listen to music changed arousal levels.

The UMACL measured four dimensions (energetic arousal (EA), tense arousal (TA), hedonic tone (HT) and general arousal (GA)), and the participants completed the UMACL before (pre) and after (post) they listened to the music.

Mixed ANOVAs were used to analyse EA, TA, HT and GA. As well as a repeated measures element (pre and post dependent variables) there was a between-participant's design with four gender/musical ability combinations (male/musician; male/non-musician; female/musician; female/non-musician).

The sedative music significantly lowered all the dependent UMACL variables (EA: $F(1,156)=16$, $p<0.05$; TA: $F(1,156)=19.76$, $p<0.05$; HT: $F(1,156)=6.67$, $p<0.05$; GA: $F(1,156)=47.65$, $p=.000$) and the control condition produced a different reaction (it increased three dependent variables). This indicated that the calming qualities of

sedative music, and not participating in a passive activity, affected the participant's response. The participants had recorded their reactions at their leisure and in the comfort of their own home. The decision to eschew a laboratory setting and to carry out the experiment under 'naturalistic' conditions strengthened the outcome. The discussion conjectured that familiarity, preference, gender differences and structural musical features may all have contributed to different sub-group responses.

9.1.5 Comparing how people with and without an intellectual disability respond to music

Preference plays a crucial role determining how people are effected by music; favourite music is often more influential. Despite the work carried out in experiments 1, 2 and 3 the challenge remained to balance this factor with the awareness that adults with intellectual disability often cannot make choices.

In *experiment 4*, 48 adults (25-55 years) with an intellectual disability were played the same fifteen instrumental arrangements of popular songs as the participants in experiment 1. Experiment 4 (which also measured the participant's arousal response) matched the listening time (30 seconds) and the response sheet to their cognitive ability. They were asked to choose from two drawings: 'chilled out' man lying back looking calm and relaxed (non-aroused response), or 'move about' man dancing energetically with cane in one hand and top hat in the other (aroused response).

There was a very significant result ($\rho=0.831$, $N=15$, $p<0.001$, two tailed) when the number of participants with an intellectual disability who selected the 'chilled out' man for each arrangement was correlated with the non-disabled participants who recorded a non-aroused response in experiment 1. The two participant groups had responded in a similar way, and therefore the non-disabled could choose sedative music for the intellectually disabled population.

9.1.6 Overview of experiments 1, 2, 3 and 4

A review of sedative music literature published between 1996 and 2008 looked at forty-four papers and discovered shortcomings in the criteria used to determine a sedative stimulus, in the level of consensus obtained to support the final choice and in the way the final choice of music was reported. Experiments 1, 2, 3 and 4 dealt with the first two of these limitations. The final one can be addressed by

providing detailed information about the sedative music. Along with the name of the composition, details of the compact disc are needed to replicate a receptive music therapy investigation. The five arrangements identified as sedative by experiments 1, 3 and 4 were: *No matter what* (PHILIPS 468362-2), *The long and winding road* (459692-2), *Blue eyes* (724353543129), *I have a dream* (EMPRCD585) and *Yesterday* (529556-2).

9.1.7 The effect of sedative music on the disruptive mealtime behaviours of adults with an intellectual disability.

9.1.7.1 Background

The experimenter set out to ethically identify a situation that people with an intellectual disability found stressful, and to use sedative music to alleviate anxiety and distress in a controlled study. Mealtimes were identified as a source of stress. It appeared that disruptive eating behaviours (non-cooperation, throwing food, physical aggression, verbal aggression and self injury) were anxiety driven behaviours exacerbated by hunger, by the heightened activity and noise levels of dining rooms and by the close proximity of other diners (Denney, 1997).

9.1.7.2 Experiment 5 and experiment 6

Experiment 5 (pilot study) and *experiment 6* (main investigation) were carried out to determine the effect of the sedative music identified by the PFSM, and experiments 3 and 4, on the disruptive mealtime behaviours of adults with an intellectual disability.

Experiment 6 addressed various methodological issues that had been identified at the conclusion of experiment 5. Ear bud headphones were used to simultaneously monitor participants with and without sedative music, and to control for the possibility that their behaviour was changed by different circumstances during separate experimental conditions, rather than by the introduction of sedative music. The quality of data collection was improved by distinguishing ‘anxiety provoked’ disruptive behaviours from habitual, perseverative, or manneristic ones. Finally, four dependent measures were reduced to one. Part of the original hypothesis (would sedative music increase the amount of food consumed) did not merit further investigation. Experiment 6 focused on testing whether sedative music would help

alleviate mealtime stress and affect the disruptive behaviours displayed by adults with an intellectual disability during this daily activity.

9.1.7.3 Results and discussion

In both experiments, disruptive mealtime behaviour was not as prevalent as anticipated; for example, only 12.5% (n=3) of the twenty-four participants in experiment 6 disrupted mealtimes compared with reported rates of between 18% (Reid et al., 1978) and 45% (Dudley et al., 1999). Nevertheless, the intervention often lowered any disruptive mealtime behaviour that did occur. In experiment 5, it significantly reduced restlessness ($X^2=6.911$, $df=2$, $p<0.05$), and decreased inappropriate handling of objects including food, cutlery, crockery and furniture ($T=-2.297$, $N=14$, $p<0.05$). In experiment 6, one of the three cases of disruptive mealtime behaviour decreased by over 50% and the other two decreased by over 75%.

There was also a very interesting individual reaction in experiment 5, where the pattern of responses of a 53 year-old woman demonstrated the impact of sedative music. A daily average of 11.8 disruptive mealtime behaviours during week 1 (non-music), fell to 4.6 when music was introduced in week 2, only to increase to 8.4 in week 3 when the background music was withdrawn and the non-music condition was reinstated. Case study research may more effectively investigate these phenomena.

In experiment 5, the intervention did not have a statistically significant effect on twelve of the thirteen behaviours analysed, and in experiment 6 the response of one of the three disruptive participants did not match the general pattern of results. Although the intervention was proposed on the basis that it would help reduce disruptive mealtime behaviours, sedative music was only powerful enough to modify challenging behaviours that had a physiological component, and that were motivated by internal processes (restlessness, for example, modulates hypo- or hyper-reactive sensory systems); it did not influence dimensions of the physical and social world causing some challenging behaviours.

Two very practical considerations emerged from experiment 6. The pattern of the disruptive behaviour should encourage carers to carefully plan mealtimes without waiting times, and participant's reactions to the introduction of headphones suggests a need to carefully consider how each person prefers receptive music to be delivered.

9.1.8 Limitations

The final two sections of this summary (limitations, directions for future research) look at the six experiments as a whole.

The PFSM was devised with considerable care. However, inaccurate conclusions were reached during experiment 2 when some of the participant's stimulative selections were identified as sedative. A weighted rating system might be more helpful than the non-weighted one used in this thesis. In experiment 1 the participant's current mood state may have affected their response, and the measuring instrument was not sensitive enough to capture moment-by-moment reactions. Instances when participants altered choices did suggest they had followed the instruction to base their response on an overall impression rather than the opening moments of a composition.

Two clinical investigations were carried out with the intellectual disability population. The second (experiment 6) did broaden the sample to include people with both mild and severe disability. However, all the participants with severe intellectual disability refused to use the listening equipment, and this leaves the research question unanswered among those most likely to exhibit the type of disruptive behaviour under investigation. Although using headphones was one of the more innovative aspects of this thesis, experiment 6 did not reflect common practice. In community settings, it would be more usual to play background music 'free field' than to issue everyone with MP3 players.

9.1.9 Directions for future research

Future research might compare different ways of delivering sedative music (headphones, free field) and determine what types of background music are most effective in reducing disruptive mealtime behaviours. Future research might consider long-term effect, and look at the timing of the intervention by introducing it 15 minutes, 30 minutes, or 1 hour before mealtimes. Future research might also look at how sedative music affects caregivers. Two nurses who completed the pilot study questionnaire commented that their behaviour was affected by the intervention.

Finally, the PFSM is more than just a tool for analysing music; it can help music therapists manipulate the dynamics, rhythm, tempo and/or tonality of improvisations, and create music matching client need. Furthermore, the clinical investigations may encourage music therapists working with the intellectual disability

population to be creative and flexible. They should not limit their roles. They should think about addressing the social needs of their clients, and consider how music can enhance their environment and their lives beyond the treatment room.

9.2 Dansk resume

”Musikterapiens primære mission er at hjælpe klienter med at opnå sundhed gennem musik... Vi må være parate til at bruge alle musikkens facetter til klientens fordel” (Frit oversat efter Bruscia, 1995, pp. 72-73).

9.2.1 Introduktion

Undersøgelserne i denne afhandling efterforsker effekten af receptiv musikterapi på forstyrrende spiseadfærd hos voksne med betydelige psykiske funktionsnedsættelser. Ætiologien bag den udfordrende adfærd påpeger, at den er drevet af den mentale tilstand på lige fod med andre årsager. De dårlige håndteringsmekanismer (Wayment & Zetlin, 1989) og irrationaliteten (Lindsay & Olley, 1998) forbundet med psykisk funktionsnedsættelse forværrer stressende faktorer i forbindelse med måltider og i forbindelse med forhøjede arousal-niveauer (stimuleringsniveauer) (O'Brien et al., 1991). Hovedspørgsmålet i dette forskningsstudie har undersøgt, hvorvidt det at bruge ikke-adfærdsbetinget beroligende musik (herefter refereret til som beroligende musik) til at maskere forstyrrende lyde, til at skabe et mindre forstyrrende miljø og til at lindre ophidselse kan påvirke denne form for udfordrende adfærd. Definitionen og anvendelsen af indspillet musik brugt til beroligende formål undersøges ligeledes som en del af hovedspørgsmålet i forskningsstudiet.

9.2.2 Forudsigelige faktorer i beroligende musik (Predictable Factors in Sedative Music (PFSM))

Receptiv musikterapi involverer altid lytning (Wigram et al., 2002), og et af de første krav til enhver undersøgelse, der bruger musikken på denne måde, er at lave en udvælgelse af musikken, der passer til individet, dets situation og til det beskrevne formål.

For at kunne definere musikkens beroligende effekt blev en pålidelig metode (Predictable Factors in Sedative Music (PFSM)) udviklet. PFSM er baseret på tidligere forskning (Erdonmez Grocke, 1999; Shoemark, 2004; Wigram, 2004), der sidestiller beroligende musik med graden af forudsigelighed. PFSM tilføjer en systematisk analyse i udvælgelsesprocessen af beroligende stimuli ved at identificere og definere 6 musikalske forudsigelighedsfaktorer (Tabel 1). Faktoren melodi er inddelt i 5 undersektioner, og således evaluerer lytteren 10 separate elementer, der

giver hvert musikstykke en PFSM score rangerende fra 0 (uforudsigeligt/ikke-beroligende) til 10 (forudsigeligt/beroligende).

Forudsigelige faktorer i beroligende musik (PFSM)

<i>Musikalsk faktor</i>	<i>Beskrivelse af forudsigelighed</i>
Form	Vers & omkvæd eller introduktion, vers & omkvæd struktur.
Tempo	Forbliver stabil med gradvise stigninger (accelerando) eller fald i tempo (ritardando).
Volumen	Forbliver stabil med gradvise stigninger (crescendos) eller fald i volumen (diminuendos).
Tekstur	Forbliver stabil med subtile ændringer i stil eller instrumentering.
Melodi - Linje	Gentagelse af materiale.
- Linje	Få forsiringer, ingen uventede pauser eller breaks.
- Klangfarve	Blid lyd med gradvise forandringer i og imellem instrument familier.
- Tonehøjde	Gradvise ændringer i register.
- Accenter	Få – brugt for at tilføje udtryk mere end for at tilføje energi til en melodilinje.
Harmoni	Modulationer og kadencer, der ikke introducerer uventede harmonier eller dissonanser.

9.2.3 Vurdering af den indre validitet af PFSM

427 mennesker deltog i afhandlingens 6 forsøg. De to første forsøg brugte voksne uden psykiske funktionsnedsættelser til at vælge beroligende musik med henblik på at vurdere den indre validitet af PFSM.

I *forsøg 1* modtog 48 voksne (18-69-årige) et kassette bånd med 15 stykker musik a 2,5 minutters varighed med instrumentale arrangementer af populære sange. Dette forsøg identificerede beroligende stimuli til de efterfølgende kliniske undersøgelser ved at fastslå graden af enighed mellem deltagernes evalueringer og forskerens egne pre-scoringer af musikstykkerne ved brug af PFSM.

Forsøg 1 brugte underkategorierne Energetic Arousal og Tension Arousal fra University of Wales Institute of Technology Mood Adjective Check List (UWIST-MACL), forkortet UMACL (Matthews et al., (1990)). Deltagerne fik en responseddél med 16 af de originale 24 UMACL ord. 8 ord målte stimulerende respons og 8 ord målte ikke-stimulerende respons. Deltagerne blev bedt om at vælge 6 tillægsord, der bedst beskrev, hvordan hvert musikstykke fik dem til at føle sig. Gennemsnittet af valgte stimulerende og ikke-stimulerende tillægsord blev beregnet for hvert musikstykke. Der var en meget tydelig signifikant positiv korrelation mellem

den subjektive PFSM score og det objektive gennemsnit ($\rho=0.870$, $N=15$, $p<0.0005$, to-halet). Forsøg 1 demonstrerede at PFSM-scoringerne var en nøjagtig vurdering af den beroligende kvalitet eller af de forskellige musikstykker, og identificerede de 5 højest scorende som værende passende beroligende stimuli. En tolkning af antallet af valgte stimulerende og ikke-stimulerende tillægsord til hvert musikstykke indikerede en cut-off score for beroligende musik i PFSM på mindst 6.

I *forsøg 2* modtog 25 deltagere (18- 59-årige) to blanke compact discs (CD'er). De optog et enkelt stykke musik på hver CD og identificerede deres valg ved at kode CD'en. (e.g. 24678). Musikstykkerne var klassiske, folk og populær musik samt udført af instrumentalister og vokalister.

Forskeren gav hvert musikstykke en PFSM score og sammenlignede dette resultat med deltagerens information. De blinde evalueringer identificerede alle beroligende musikstykker og 21 af de stimulerende musikstykker (de resterende 4 var ukorrekt placeret i den beroligende kategori). Disse resultater indikerer, at PFSM kan skelne mellem beroligende og stimulerende musik og bekræfter den indre validitet af PFSM-metoden. ($X^2\text{Yates}=32.84$, $df=1$, $p<0.001$).

9.2.4 Identificering af en passende beroligende stimuli

Forsøg 3 blev udført for at undersøge om stimuli konsekvent ville blive opfattet som beroligende. 224 voksne uden psykiske funktionsnedsættelser (18-69-årige) deltog i forsøg 3, og 160 af disse deltagere lyttede til de 5 højest scorende musikstykker, hvilket samlet blev 17 minutter og 39 sekunders (17:39) beroligende musik. De resterende 64 deltagere lyttede til 18 minutter og 25 sekunders (18:25) harmonika musik og fungerede som kontrol for det at sidde og lytte til musik alene kunne ændre arousal-niveauer.

UMACL-redskabet undersøgte 4 dimensioner herunder Energetic Arousal (EA) (energisk stimulerende), Tense Arousal (TA) (anspændthed stimulerende), Hedonic Tone (HT)(hedonisk karakter) og General Arousal (GA) (generelt stimulerende), og deltagerne udførte UMACL før (pre) og efter (post) de lyttede til musikken.

Mixed ANOVAs blev brugt til at analysere EA, TA, HT og GA. Analysen indeholdt både elementer af repeated measures (gentagende målinger) (pre og post samt afhængige variabler) og en between-participant's design (sammenligning af

deltagere) med 4 køn/musikalitets kombinationer: (mand/musiker; mand/ikke-musiker; kvinde/musiker; kvinde/ikke-musiker).

Den beroligende musik mindskede alle afhængige variabler i UMACL signifikant (EA: $F(1,156)=16$, $p<0.05$; TA: $F(1,156)=19.76$, $p<0.05$; HT: $F(1,156)=6.67$, $p <0.05$; GA: $F(1,156)=47.65$, $p=.000$) og kontrolgruppen producerede en anderledes reaktion. (3 afhængige variabler blev forøget). Dette indikerer at de neddæmpende kvaliteter i beroligende musik, og ikke bare deltagelse i en passiv aktivitet, påvirkede deltagerens respons. Deltagerne foretog optegnelserne af deres reaktioner i deres fritid samt i deres eget hjem. Beslutningen omkring at tage afstand fra en laboratorie-opsætning og i stedet foretage eksperimentet under "naturlige" rammer forbedrede forsøgets resultater. Diskussionen formodede, at genkendelighed, præference, kønsforskelle og strukturelle musikalske træk alle kan have bidraget til forskellige undergruppers respons.

9.2.5 Sammenligning af hvordan mennesker med og uden betydelige psykiske funktionsnedsættelser responderer på musik

Præference spiller altid en afgørende rolle i undersøgelsen af, hvordan mennesker påvirkes af musik; yndlings musik har ofte mere indflydelse. På trods af arbejdet udført i forsøg 1, 2 og 3 forestod udfordringen i at balancere dette med faktoren om, at voksne med betydelige psykiske funktionsnedsættelser ofte ikke kan foretage valg. I *forsøg 4* lyttede 48 voksne (25-55-årige) med psykiske funktionsnedsættelser til de samme 15 instrumental arrangementer af populær musik, som deltagerne i forsøg 1. Forsøg 4 (som også målte deltagerens stimulerings respons) havde tillige tilsvarende lyttetid (30 sekunder) og et respons-ark tilpasset deltagerens kognitive evner. De blev bedt om at vælge mellem to tegninger: "Afslappet" (chilled out) mand liggende på ryggen, der ser rolig og afslappet ud (ikke-stimulerende respons), eller "bevæger sig" (move about) mand, der danser energisk med en stok i den ene hånd og en høj hat i den anden (stimulerende respons).

Der var meget signifikante resultater ($\rho=0.831$, $N=15$, $p<0.001$, to halet) når antallet af deltagere med psykiske funktionsnedsættelser, der valgte den "afslappede" mand til hvert arrangement, blev korreleret med deltagere uden psykiske funktionsnedsættelser, der producerede en ikke-stimulerende respons i forsøg 1. De to forskellige grupperes respons lignede hinanden, og dette muliggør at voksne uden

betydelige psykiske funktionsnedsættelser kan vælge beroligende musik til mennesker med betydelige psykiske funktionsnedsættelser.

9.2.6 Overblik over forsøg 1, 2, 3 og 4

En gennemgang af beroligende musikkulteratur udgivet fra 1996 – 2008 undersøgte 44 artikler og opdagede mangler i kriterier der anvendes til at afgøre beroligende stimuli, graden af konsensus opnået til at støtte det endelig valg samt måden hvorpå det endelig valg af musik blev rapporteret. Forsøg 1, 2, 3 og 4 tog sig af de første 2 af disse begrænsninger. Den sidste kan adresseres ved at give detaljerede informationer omkring den beroligende musik. Både navnet på kompositionen samt detaljer omkring CD'en er nødvendige for at kunne genfremstille en lignende receptiv musikerapiundersøgelse. De 5 arrangementer identificeret som værende beroligende i forsøg 1,3 og 4 var: *No matter what* (PHILIPS 468362-2), *The long and winding road* (459692-2), *Blue eyes* (724353543129), *I have a dream* (EMPRCD585) og *Yesterday* (529556-2).

9.2.7 Effekten af beroligende musik på forstyrrende spiseadfærd hos voksne med betydelige psykiske funktionsnedsættelser

9.2.7.1 Baggrund

Forskeren satte sig for etisk at kunne identificere en situation som mennesker med betydelige psykiske funktionsnedsættelser fandt stressende, samt at bruge beroligende musik til at lindre angst og lidelse i en kontrolleret undersøgelse. Måltider blev identificeret som værende en kilde til stress. Forstyrrende spiseadfærd (ikke samarbejdende, kaste med maden, fysisk aggression, verbal aggression og selvskadende adfærd) syntes at være angstdrevet adfærd forværret af sult, det forhøjede aktivitetsniveau og lydniveau i spisestuer samt nærheden af de andre spisende (Denney, 1997).

9.2.7.2 Forsøg 5 og forsøg 6

Forsøg 5 (pilot-undersøgelse) og *forsøg 6* (hovedundersøgelse) blev udført for at kunne afgøre effekten af den beroligende musik identificeret via PFSM samt forsøg 3 og 4 på forstyrrende spiseadfærd hos voksne med betydelige psykiske funktionsnedsættelser.

Forsøg 6 adresserede forskellige metodologiske emner, som blev identificeret i konklusionen af forsøg 5. Høretelefoner blev anvendt for samtidigt at kunne monitorere deltagere med og uden beroligende musik og for at kontrollere og undgå, at deltagernes adfærd forandredes i kraft af forskellige omgivelser i to separate eksperimenter snarere end i kraft introduktionen til den beroligende musik. Kvaliteten af dataindsamlingen blev forbedret ved at skelne mellem angstprovokeret forstyrrende adfærd og mere vane-, udholdenheds og velopdragenhedsafhængige typer af adfærd. Endelig blev 4 afhængige målinger reduceret til 1. En del af den originale hypotese (ville beroligende musik forøge mængden af konsumeret mad) meritede sig ikke til videre undersøgelse. Forsøg 6 fokuserede på at teste hvorvidt den beroligende musik ville bidrage til at mildne stress omkring måltider og påvirke den forstyrrende adfærd hos voksne med betydelige psykiske funktionsnedsættelser i løbet af denne daglige aktivitet.

9.2.7.3 Resultat og diskussion

I begge forsøg var den forstyrrende spiseadfærd ikke så fremherskende som forventet. F.eks. udviste kun 12,5% (n=3) af de 24 deltagere i forsøg 6 forstyrrende adfærd til sammenligning med andre rapporterede procenter, der ligger mellem 18% (Reid et al., 1978) og 45% (Dudley et al., 1999). Ikke desto mindre mindskede interventionen enhver form for udvist forstyrrende spiseadfærd. I forsøg 5 reducerede interventionen rastløshed signifikant ($X^2=6.911$, $df=2$, $p<0.05$) og reducerede uhensigtsmæssig brug af genstande herunder mad, bestik, service og møbler ($T= -2.297$, $N=14$, $p<0.05$). I forsøg 6 blev 1 af de 3 former for forstyrrende spiseadfærd formindsket med over 50% mens de andre to blev reduceret med over 75%.

Der var også en meget interessant individuel reaktion i forsøg 5, hvor mønsteret i responsen fra en 53-årig kvinde demonstrerede virkningen af den beroligende musik. Et dagligt gennemsnit på 11,8 i forstyrrende spiseadfærd i løbet af uge 1 (ikke-musik) faldt til 4,6 i uge 2, da musikken blev introduceret, for så igen at stige til 8,4 i uge 3, da baggrundsmusikken blev taget fra hende, og tilstanden uden musik blev genopsat. Case studie forskning kan mere effektivt undersøge disse fænomener.

I forsøg 5 havde interventionen ikke nogen statistisk signifikant effekt på 12 af de 13 analyserede former for adfærd, og i forsøg 6 svarede responsen fra 1 af de tre 3 deltagere, som udviste forstyrrende spiseadfærd, ikke til det generelle

resultatmønstre. Selvom interventionen blev foreslået ud fra det grundlag, at den ville kunne reducere forstyrrende spiseadfærd, var beroligende musik kun stærk nok til at modificere udfordrende adfærd, som havde en fysiologisk komponent, og som var motiveret af indre processer (F.eks. kan rastløshed modulere hypo- og hyper-reaktive sansesystemer). Interventionen påvirkede ikke fysiske og sociale dimensioner, der medførte en del udfordrende adfærd.

To meget praktiske overvejelser fremsprang fra forsøg 6. Mønstret i forstyrrende spiseadfærd burde opmuntre plejere til omhyggeligt at planlægge måltider uden ventetid, og deltageres reaktioner på introduktionen til høretelefoner påpeger et behov for omhyggeligt at overveje, hvordan den enkelte person foretrækker at få leveret receptiv musik.

9.2.8 Begrænsninger

De sidste to afsnit i dette resume (begrænsninger, forslag til fremtidig forskning) vil anskue de 6 forsøg som en helhed.

PFSM blev udformet med stor omhu. Unøjagtige konklusioner blev dog foretaget i forsøg 2, da nogle af deltagerens stimulerende musikstykker blev identificeret som værende beroligende. Et vægtet evalueringssystem ville være mere behjælpeligt end det ikke-vægtede evalueringssystem anvendt i denne afhandling. I forsøg 1 kan deltagerens daværende stemningstilstand have påvirket deres respons, og målingsredskabet var ikke sensitivt nok til at fange hvert øjeblikke reaktioner. Forekomster af deltagere, der ændrede deres valg påpeger dog at de fulgte instruktionen om at basere deres respons på et helhedsindtryk snarere end på åbningsøjeblikket i en komposition

To kliniske undersøgelser blev udført med voksne med betydelige psykiske funktionsnedsættelser. Det andet (forsøg 6) udvidede udsnittet af populationen til også at inkludere mennesker med både milde og svære handicaps. Alle deltagere med svære handicap nægtede dog at bruge lytteudstyret, og dette efterlader forskningsspørgsmålene ubesvarede for de mennesker, der havde størst sandsynlighed for at udvise den form for forstyrrende adfærd, som undersøgelsen var rettet mod. Selvom det at bruge høretelefoner var et af de mere innovative aspekter i denne afhandling, reflekterer forsøg 6 dog ikke almindelig praksis. I samfundet ville det være mere brugt at spille baggrundsmusik "free field" (musik afspillet frit i rummet) end at udstyre alle med MP3-afspillere.

9.2.9 Forslag til fremtidig forskning

Fremtidig forskning kunne sammenligne forskellige måder at levere beroligende musik på (høretelefoner, free field) og afgøre hvilken form for baggrundsmusik der ville være mest effektiv til at reducere forstyrrende spiseadfærd. Fremtidig forskning kunne også overveje langtidseffekten og undersøge timingen af interventionen ved at introducere den 15 minutter, 30 minutter eller 1 time før måltider. Fremtidig forskning kunne også undersøge, hvordan beroligende musik påvirker plejere. To sygeplejersker som gennemgik pilotstudiets spørgeskema kommenterede, at deres adfærd blev påvirket af interventionen.

Endelig, er PFSM mere end bare et redskab til at analysere musik; det kan hjælpe musikterapeuter med at manipulere dynamik, rytme, tempo og/eller tonaliteten af improvisationer og skabe musik, der matcher klienters behov. Ydermere kan den kliniske undersøgelse opmuntre musikterapeuter, der arbejder med mennesker med betydelige psykiske funktionsnedsættelser, til at være kreative og fleksible. De burde ikke begrænse deres rolle. De burde tænke på at adressere deres klienters sociale behov og overveje, hvordan musik kan forbedre deres miljø og deres liv udenfor terapilokalet.

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APPENDIX 1:

Hooper, J., Wigram, T., Carson, D., Lindsay, B. (2008a)
A review of the music and intellectual disability literature (1943-2006)
Part One – Descriptive and Philosophical writing
Music Therapy Perspectives 26(2), 65-79

Abstract

There is a long tradition of writing that considers how individuals with an intellectual disability respond to, and are affected by music. This paper, which examines descriptive and philosophical literature, discusses surveys that consider client responses, methodological issues, and music therapy provision; reports that provide general accounts of work settings and music therapy programmes; and case studies that illustrate the potential benefits of improvisation, Music Activity Therapy, and receptive music interventions. Finally, this paper identifies philosophical writing that is underpinned by the desire to promote music as a viable and credible treatment option for individuals with an intellectual disability.

This paper not only considers clinical practice by directing readers towards examples from the extant literature that identify outcomes, but it also reflects on the relative strengths, and weaknesses, of the different methods of enquiry.

Introduction

In 1959, Juliette Alvin, widely considered the mother of music therapy in Great Britain, outlined how 24 children (6 to 16 years) with mild to severe intellectual disability responded to six short concerts that also included contact with the performer (the author), and her instrument (a cello). She described their vocal and physical reactions (“some made noises as if trying to sing or whistled softly; others moved their hands or feet, beat time with their fingers” (Alvin, 1959, page 991)); identified changes in their level of engagement (“immediate curiosity became interest, and their desire to participate was more than mere imitation” (page 991)); and noted how the children’s “self control and confidence developed” as they “came forward to play a note on the cello” (page 992). Juliette Alvin was not the first music therapist to indicate how music therapy met the needs, and developed the potential, of individuals with an intellectual disability, and she was not to be the last. This paper, and a subsequent one, will provide a detailed appraisal of that writing: something hitherto absent from the music therapy literature. Intellectual disability is the term used by the World Health Organisation (WHO), and adopted in Australasia, that equates with developmental disability and mental retardation in North America, and learning disability in the UK (McConkey, 2003). The person with an intellectual disability is limited intellectually. The difficulty they experience understanding, learning, and remembering new things, and generalising any learning to new situations, affects their communication, self-care, home living, self-direction, functional academic, and social/interpersonal skills. Furthermore, it may limit access to community services, and have an impact on work, leisure, health, and safety (American Psychiatric Association, 2000).

This review is organised according to the method of enquiry. The literature is arranged into three of the four broad categories put forward by Jellison (1973), and subsequently employed by Bunt (1984), and Hooper, Lindsay, and Richardson (1991)

when they discussed music therapy research in Great Britain. The three categories are:

- (1) descriptive (surveys, reports, case studies, literature reviews/meta-analyses).
- (2) philosophical (speculation, criticism, indicators for research).
- (3) experimental (i.e. either controlled research carried out within or between subjects, comparing interventions, or recording pre- and post- intervention responses).

(Jellison's fourth method of enquiry is historical writing. It is not included as a separate category in this review, although reference is made to an historical account when the reports are discussed).

This paper deals with the descriptive and philosophical writing. A second paper focuses on the experimental category. In each case, the aim is not only to highlight examples from clinical practice that identify outcomes, but also, by organising the review by method of enquiry, to allow some reflection on the strengths, and weaknesses, of the music therapy research in this area of clinical practice.

Meadows (1997), who identified six general music therapy goals for individuals who have an intellectual disability, included *developing specific skills* as the fourth goal alongside fulfilling basic needs (first goal), developing a sense of self (second), establishing or re-establishing interpersonal relationships (third), dispelling pathological behaviour (fifth), and developing an awareness and sensitivity to the beauty of music (sixth). Meadows suggested that developing specific skills involved "focusing on the acquisition or development of competencies which enable the (individual) to function with greater independence", and that these skills "included physical, emotional, cognitive, social or communicative development" (page 5). This list demonstrates how the different goals are interrelated. For example, dispelling pathological behaviour (fifth goal) is dependent on emotional development. Likewise, developing a sense of self (second goal), and establishing or re-establishing interpersonal relationships (third goal) both rely on an individual's social or communicative development. It is because they overlap in this way, and there is the sense *developing specific skills* underpins the general music therapy goals for this client group, that the discussion of the case study literature in this paper considers social and cognitive, physical, and emotional and psychological outcomes. This paper and part two are entitled a review of the music and intellectual disability literature, as although they predominately present an overview of material written by music therapists, they also include aptitude research that falls outside of music therapy practice, as well as reports and investigations by researchers who are not music therapists.

Literature search

A systematic computerised and manual literature search was undertaken. Databases were searched for the terms 'music' and 'music therap\$', crossed with 'retard\$', 'mental retard\$', 'mental defectiv\$', 'disabilit\$', 'learning disability\$', 'development\$ delay\$', 'special needs', 'special education', 'EMR', 'Down's syndrome', 'autism', 'Rett syndrome', 'cerebral pals\$', and other synonyms of these. The databases searched were AMED (1985-), BNI (1985-), CINAHL (1982-), EMBASE (1980-), ERIC (1966-), Medline (1966-), PsycINFO (1806-), Social Work Abstracts (1977-), SPORTDiscus (1830-). The hand-searched journals, accessed physically, via the internet (www.musictherapyworld.de), or on CD-ROM (Music Therapy Research: Quantitative and Qualitative Foundations CD-ROM 1 1964-1998) were Journal of Music Therapy (1964-), Music Therapy Perspectives (1982-), Music

Therapy (1981-1996), Journal of British Music Therapy (1987-1996), British Journal of Music Therapy (1997-), Nordic Journal of Music Therapy (1992-), Canadian Journal of Music Therapy (1973-1979 & 1993-), New Zealand Society for Music Therapy Annual Journal (1987-), The Australian Journal of Music Therapy (1990-), Music Therapy Today (online www.musictherapytoday.com 2001-) and Voices: A World Forum for Music Therapy (online www.voices.no 2001-). Reference lists of the studies identified in this way were also checked to find additional material. Finally two published registers of music therapy studies, with 170 and 148 citations respectively, helped pinpoint relevant literature from 1921-1959 (Sears & Sears, 1964), and references of research with disabled children and youth from 1975-1999 (Jellison, 2000).

In total, 606 documents, written between 1943 and 2006, were identified in this way. They included published review articles, chapters, or theses, and some of the unpublished “grey literature”. The research reports and conference papers cited in ERIC were considered, but the dissertation abstracts cited in PsycINFO were not. They were authored predominately by writers from North America (n=374), and the UK and Ireland (n=167). The remaining 11% originated from Europe (n=29), the Middle East (n=8), Africa (n=2), South America (n=3), Australasia (n=19), and the Far East (n=4). The intellectually disabled individuals who were the subjects of many of these documents ranged in age from 14 months (Witt & Steele, 1984) to 77 years (Wigram, 1992a), in cognitive ability from mild (Byrnes, 1997) to severe intellectual ability (Darnley-Smith & Patey, 2003a), and presented with related conditions including Rett syndrome (Hadsell & Coleman, 1988), autism (Graham, 2006; Heal & O'Hara, 1993) Down syndrome (Rapp, 2004), and Williams syndrome (Udwin & Yule, 1991).

Descriptive

The descriptive literature (n=292) discusses active and, to a lesser extent, receptive music therapy techniques. In active techniques the client is involved in producing the musical content, and shares instrumental and/or vocal ideas with the therapist; in receptive techniques s/he listens to music and then responds silently, verbally, or in another modality (Grocke & Wigram, 2007). These citations include one historical paper, eleven literature reviews, and three meta-analyses; some of them will be referred to in the second part of this review.

(1) Surveys

There were fifteen surveys, and they looked at (1) provision (n=5), (2) methodology (n=3), and (3) client responses (n=7).

Wendelin and Engle (1954) carried out an early investigation of music therapy provision for people with an intellectual disability. They surveyed 59 institutions and documented the qualifications of “their teachers of music”, the instrumental and vocal music groups they organised, and the methods they used to select patients and report on their progress. Evers (1992) distributed a postal survey to 330 paediatricians, 40 established child and youth psychiatrists, and 186 paediatric institutions in the Federal Republic of Germany. Bracefield, Kirk-Smith et al. (2000) surveyed 69 professionals attending courses in music therapy. Bracefield, Kirk-Smith et al. found a shortfall in music therapy available for people with an intellectual disability living in Northern Ireland. Evers concluded there was “sufficient medical acceptance of music therapy” and “widespread readiness to employ music therapy as a treatment for autism” (page 158).

The remaining provision surveys looked at music education. In the USA, Jellison and Duke (1994) examined mainstreaming; they reported that although 336 qualified and prospective teachers had lower expectations of students with an intellectual disability they accepted them in regular music lessons. Ockelford, Welch, and Zimmermann (2002) established that music education was extensively used in England, but concluded that new curriculum and staff development resources were required if it was to have any effect on the lives of pupils with severe and profound intellectual disability.

Surveys examined, and informed, music therapy methodology. Chase (2004), who carried out a survey that *examined* methodology, gathered responses from 95 music therapists working with children with an intellectual disability, and identified that motor, communication, social, cognitive, and music were the five most frequently assessed major skills areas. On the other hand, Wasserman, Plutchik et al. (1973) and DiGiammarino (1994) completed surveys that *informed* methodology. Wasserman, Plutchik et al. assisted the planning of music therapy. They invited families to complete a questionnaire, and gathered information about the musical preferences, and aptitudes, of 16 adults with an intellectual disability. DiGiammarino helped leisure programming by asking 222 music therapists to categorise 45 functional music listening skills and 19 functional performance skills into two levels of difficulty.

The third group of surveys looked at client responses: in one case (DiGiammarino, 1990) with surprising results. DiGiammarino (1990) asked carers to identify the musical skills of 120 people with mild to severe intellectual disability. Although those with severe intellectual disability were rated least able (as expected), the moderate group confounded expectations and outperformed those with mild intellectual disability. Other pieces of work identified music as a favourite recreational and leisure activity (S. Hughes & Fullwood, 1985), and provided evidence that people with Rett syndrome consistently responded to music (Merker, Bergström-Isacsson, & Engerström, 2001). Bunt and Alberman (1981) highlighted positive changes in children's behaviour, and in staff attitudes. They used three separate questionnaires to evaluate the role of music therapy in a London district. Kaplan & Steele (2005) analysed the goals and outcomes of a music therapy programme for individuals (2-49 years) with diagnoses on the autism spectrum. The respondents (30 out of 42 parents/carers invited to participate) used a four point Likert scale, and "indicated that 100 percent of the subjects generalised the responses acquired or practised in music therapy to non-music therapy environments either "occasionally" or "frequently"" (page 14). Finally, 45 consumers, 30 carers, and 60 audience members reported that a community-based music therapy programme was a valuable intervention (Curtis & Mercado, 2004).

The survey is a method of collecting information, and overall material gathered on the provision of music therapy for people with an intellectual disability, on methodology, and on client responses, not only informs practitioners by identifying development areas and offering practical details on undertaking music therapy with the client group, it also provides evidence supporting the efficacy of the intervention. These endorsements, especially those from outside the profession, provide music therapists with useful evidence when advocating increases in music therapy provision either in their geographical area, or to education and health service administrators.

As well as the surveys, identified above, the descriptive accounts were either an overview of a particular aspect of work (report), or they looked at how one client, or a group, responded to improvisation or Music Activity Therapy (case study).

Improvisation and Music Activity Therapy are both active music therapy techniques. Improvisation is generally an insight-orientated approach intended, or used, to resolve psychological conflicts. The musical content of improvisation-based active music therapy *evolves* through the instrumental and vocal exchanges that take place between therapist and client (Bunt, 2001). On the other hand, the musical content of a Music Activity Therapy session is *predetermined*. In this case, the music therapist engages his/her client in musical activities “designed or selected so that participation in them requires the client to learn or practice a targeted competence” (Bruscia, 1998, page 185). Although it may appear prescriptive, music therapists who employ Music Activity Therapy remain open and sensitive to nuances in the client’s responses, and they adapt their own responses and develop the activities accordingly (Hooper, 2001). The primary focus of Music Activity Therapy is to improve adaptive behaviour. It accommodates and augments the goals and treatment plans of other disciplines, such as physical, occupational, and speech therapies, and focuses on the acquisition of sensorimotor, perceptual, cognitive, emotional, or social skills (Bruscia, 1998).

(2) Reports

There were 100 reports. Although mostly written by music therapists, the authors also included an artist in residence (Langford, 1985), and individuals from the nursing (Hodges, 1981; Parriott, 1969), teaching (Dunn, 1992; Groves & Groves, 1980), and occupational therapy professions (Zielinski, 2001).

Several authors provided general accounts of work settings and music therapy programmes. Wigram (1988) described “a broad-based, but specialised service” offered to people with an intellectual disability who were behaviourally disturbed, and Farnan (2003) wrote about music therapy in Central Wisconsin. Wigram focused on the processes involved (e.g. each session began with a musical greeting activity, and group members greeted the therapists and each other), and identified a “considerable reduction in aggression and a notable increase in their tolerance of each other” (page 45). This example demonstrates how the development of specific skills (in this instance social skills) depends on positive changes in behaviour (i.e. a reduction in aggression). Farnan summarised the goals of different groups in a series of single paragraphs. Farnan described early intervention groups for young children; groups held in the classroom that reinforced both the Individual Education Program objectives and the Individual Program Plan for each student; and adult groups that worked on functional life skills through the handling and playing of hand-held instruments and objects. Wolfgram (1978), Ely and Scott (1994), and Sutton (2002) described how being welcomed and valued in a music therapy session, rather than segregated or avoided, accelerated social skills, turn taking, concentration, and interaction. Wolfgram, and Ely and Scott, ran a music therapy session for institutionalised inpatients. Sutton integrated difficult children, who tended to be grouped in one classroom, into the wider school community.

Some reports described how the music therapy programme was set up (Chance, 1987; Farnan, 2003; Tuduri, 2006). Other reports identified the specific music therapy techniques employed. The techniques included: (a) non-traditional guitar (Cassity, 1977), (b) Soundbeam, (that allowed sound to be created without the need for physical contact with any equipment) (Swingler, 1998), (c) music software (Anonymous, 2006; Freundlich, Pike, & Schwartz, 1989; Ingber, 2003; Krout, 1988; McCord, 2001; Upitis, 1988), (d) the Orff-Schulwerk method (that used task analysis to determine, and then develop, the component skills necessary to perform an exercise) (Dervan, 1982), (e) learning an instrument (Knolle, 1973; Rosene, 1982; Zielinski, 2001), (f) taking part in public performance (Beall, 1985; Chance, 1987;

Hodges, 1981; McBain, 1982; Monagan, 1989; Pershing, 1973; Williams, 1985) (g) listening to short concert performances (Alvin, 1959; Murphy, 1958), and (h) a multidisciplinary approach combining music therapy with other arts therapies (Watson & Vickers, 2002), speech therapy (Oldfield & Parry, 1985), physiotherapy (Dunachie & Budd, 1985; Oldfield & Peirson 1985), and occupational therapy (Oldfield & Feuerhahn, 1986).

In the USA, and UK, music has always been considered part of the education offered to children with an intellectual disability. Solomon (1980) demonstrated that, even before 1930, the music curriculum played an important role in diagnosis and treatment. (Solomon presented an historical account that described nineteenth and early twentieth century classroom practices). Beal and Gilbert (1982), Groves and Groves (1980), and Scheerenberger (1953) outlined sample music curriculum guidelines. Scheerenberger, for example, described a school music programme developed for children with mild intellectual disability. It combined vocal music, rhythmic experiences, and music appreciation, and contributed to various social, academic, and non-academic objectives. Gfeller and Rath, (1990) evaluated a music education curriculum, and suggested that it was effectively designed and implemented. They recorded responses before, and five months into, the implementation of a music education curriculum, and identified increases in the music skills and participation of 14 children (5 years to 13 years) with moderate intellectual disability. (Experimental studies will be considered in more detail in part two of the review). More recently, Coleman & Brunk (1999) developed the Special Education Music Therapy Assessment Process (SEMTAP). SEMTAP uses records review, interview, observation, and direct assessment to compare an individual's response to Individualised Education Plan (IEP) goals with, and without, music presentation. It determines whether music is required for an individual to benefit from an educational programme, and whether music therapy ought to be added to their IEP.

The reports often detailed the benefits of introducing music to people with an intellectual disability. The emphasis was clearly on non-musical gains, as only Alvin (1971) described the musical development that occurred. Table 1 organises these benefits according to the specific skills identified by Meadows (1997) in the fourth of six general music therapy goals for individuals who have an intellectual disability.

Table 1: Reported benefits of introducing music to those with an intellectual disability

Social	<i>Communication</i>	Barber (1973), Davis (1990), Grant (1989), Ma, Nagler, Lee, and Cabrera (2001), Oldfield and Parry (1985), Rowe (1995), Sternlicht (1965)
	<i>Relating to others</i>	Grant (1989), Knill (1983), Parriott (1969), Smith (1987), Sutton (2002), Thomas (1978), Wright (1976)
	<i>Cooperation</i>	Parriott (1969)
	<i>Peer acceptance</i>	Ely and Scott (1994), Hughes, Robbins, McKenzie and Robb (1990)
Cognitive	<i>Motivation</i>	McMahon (1978)
	<i>Concentration</i>	Barber (1973), Smith (1987)
	<i>Perceptual ability</i>	Grant (1989)
	<i>Learning</i>	Thomas (1978)
	<i>Music development</i>	Alvin (1971)
Physical	<i>Movement</i>	McMahon (1978), Oldfield and Peirson (1985)
	<i>Body awareness</i>	Bean (1986), Knill (1983)
	<i>Spatial awareness</i>	Thomas (1978)
	<i>Limb extension</i>	Bean (1986)
Emotional and Psychological	<i>Expressing emotion</i>	Parriott (1969)
	<i>Alleviating agitation</i>	Hooper (1991)
	<i>Pleasure</i>	Clark (1968)
	<i>Accomplishment</i>	Monagan (1989)
	<i>Self esteem</i>	Monagan (1989), Spero and Weiner (1973), Zielinski (2001)

(3) Narrative case studies

(a) Introduction:

The single, multiple, or group narrative case study (hitherto simply referred to as the case study) is the favoured method of descriptive writing. It accounts for over half (162 out of 292) of the descriptive articles identified by the literature search. 95% (154 out of 162) were accounts of active music therapy. The remaining eight described receptive techniques, and discussed the use of Vibroacoustic therapy (VAT) (Ellis, 2004; Persoons & De Backer, 1997; Wigram, 1997), and recorded music (A. L. Steele, 1967; Sullivan, Laverick, & Lewis, 1994). Whereas a single and a group case study refers to a single unit (i.e. one individual or one group), multiple case studies present material about two or more people who are not reported as a group but continue to be identified as individuals.

Typically the case study allows the writer to illustrate a client's progress either over a lengthy period (Atkinson (2003) and Tyler (1998) describe 4 years improvisation), or by focusing on significant moments (Ansdell, 1995b; Atkinson, 2006; Cole, 2003), specific sessions (Levinge, 1993; P. Steele & Leese, 1987), or certain periods of therapy (Agrotou, 1988; Levinge, 1990). The writer describes each client before s/he commences active or receptive music therapy, and then reports his/her progress.

A case study written in this way often provides an opportunity to illustrate and comment on the intervention offered, or to identify ways in which music therapy can address a specific condition. For example, Aigen (1995), Ansdell (1995a), and

Ritholz and Turry (1994) discussed Creative Music Therapy. Purdon (2002), and Kowski (2002) illustrated Analytical Music Therapy (AMT). Creative Music Therapy and AMT are both active music therapy techniques that employ improvised music. Paul Nordoff and Clive Robbins developed Creative Music Therapy. Music therapists work in pairs. One person establishes a musical relationship, while the other engages the client and facilitates their responses. Nordoff and Robbins intended the therapy to be a musical experience that absorbed the client from the moment s/he entered to the moment s/he left the room (Wigram, Pedersen, & Bonde, 2002). Mary Priestley devised AMT to encourage personal growth, and greater self-knowledge, by combining improvisation with verbal exploration and reflection (Wigram et al., 2002).

Hadsell and Coleman (1988) presented the "basic" music therapy goals for clients with Rett syndrome. Starr and Zenker (1998) used three case studies to demonstrate how they employed music therapy to achieve specific goals for each autistic child (increase language skills, interaction, ability to wait) based on their understanding of the nature of autism. Indeed, writers often focused on characteristics of Rett syndrome, autism, and cerebral palsy. Krout, Burnham, and Moorman (1993) addressed the lack of independence, and Herron (1970) the muscular coordination problems, associated with cerebral palsy. Di Franco (1999) tackled the compulsive behaviour, Wimpory and Nash (1999) the social isolation, and Wolf, Rutenberg, Levin, and Levin (1969) and Nye (2003) the emotional detachment characteristic of autism. Finally, Wigram (1991a; 1997) attended to the purposeless mannerisms and high activity levels displayed by girls with Rett syndrome.

The case study literature did not adhere rigidly to the format outlined above. In some instances quantitative data, or written musical examples, were also presented. Herron (1970), Winnega and Berkson (1986), Wager (2000), Rickson (2002), and Hooper, McManus et al. (2004) all added quantitative data to accounts of Music Activity Therapy. Wager described four years music therapy with a man (36 years) who had mild intellectual disability and autism, and provided a numerical summary of the behavioural objectives achieved. Hooper, McManus et al. added quantitative evaluations of a client's eye-contact, interaction, and participation to their description of an intervention that stimulated the client's proprioceptive and vestibular senses, and complimented physiotherapy goals by encouraging sensory integration. de Aisenwaser (1975) placed the observations of a music therapist and psychologist side-by-side to illustrate that the deficiencies of a fifteen-year-old girl with mild intellectual disability were not so evident when she was engaged in music therapy. Agrotou (1988) and Steele and Lesse (1987) provided musical scores, and Rainey Perry (2003) and Walsh-Stewart (2002) video analysis, to supplement their descriptions of improvisation. Walsh-Stewart recorded the attention, communication, participation, interaction, and emotionality of five boys with autism (4 years, 5 months to 9 years, 11 months) who attended ten sessions of group music therapy. The sessions combined a psychodynamic approach and Division TEACCH. (Division TEACCH is a communication programme, devised for children with autism, which visually sets out the sequence of activities that lies ahead of them).

It was not uncommon to find music therapy combined with another treatment. Goldstein (1964), Herman (1991), Zigelbaum (1991) and Alvares (1998) linked music with other creative arts experiences. Fearn and O'Connor (2004) combined improvised music and movement. Lathom (1964), and later Bruscia (1982), described programmes carried out by music therapists and speech therapists, and Elefant and Lotan (2004) described a dual music therapy and physiotherapy intervention. Finally, Knight (1974) combined music therapy and braille instruction, and Clarkson

(1994) employed Creative Music Therapy and Facilitated Communication (a method enabling written expression) in the treatment of an autistic adult. In each case the writers acknowledged that, in much the same way as two heads are better than one, each discipline reinforced and enhanced the value of the other.

(b) Group case studies:

Social outcomes

Although they lack the empirical foundation of controlled or comparative experimental research, and do not present results derived from observation or experiment that test a particular hypothesis, the case studies do give a good account of the potential benefits of improvisation, and Music Activity Therapy.

Group case studies (n=12) either illustrate social benefits of the intervention, or consider issues that arise during sessions. Tyler (2002), for example, describes a session with four boys (14 years to 17 years) who had moderate intellectual disability, and identifies difficulties encouraging participants to relate to each other, and problems setting group boundaries about choosing and playing instruments. In the remaining group case studies, improvisation and Music Activity Therapy offer a transitional space for developing social skills (Nicholls, 2002), and for trying out new ways of relating (Hibben, 1991). Nicholls describes how four 16-17 year old adolescents with severe intellectual disability "explored their roles", "worked on emotional issues", and "developed some important social skills" (page 244) during a closed improvisation group. Hibben (1991) recounts that music helped eight hyperactive children toward greater cohesion "by holding (them) together in its sound" (page 187).

(c) Single or multiple case studies:

Single or multiple case studies, that describe individual improvisation or Music Activity Therapy sessions, account for 142 of the remaining 150 case studies, and make up the majority (142 out of 162 or 88%) of the total case study literature. While they demonstrated progress in a variety of areas, any improvement often depended on redirecting, or reducing, challenging behaviour(s). Challenging behaviours are additional unusual behaviours that are associated with intellectual disability. They fall into the broad categories of aggression, destructiveness, self-injury, and stereotyped mannerisms (Emerson, 2001). Wigram (1991b), for example, described 22 months of music therapy re-channelling the manneristic activity of an 11-year-old girl with Rett's Syndrome. Steele (1967) described how recorded music controlled a child's aggressive, self-directed behaviour, and increased cooperative interactions.

Social and cognitive outcomes

Several authors reported gains either in social functioning (Skewes & Thompson, 1998), in cognitive (Goldstein, 1964) or musical ability (Barclay, 1978; Shoemark, 1991; Spitzer, 1989), or in a combination of these areas (Krout et al., 1993). Skewes and Thompson developed the social competency of five children (3-4 years) with moderate to profound intellectual disability by using improvisation techniques and songs to encourage them to interact musically with their peers and carers. Goldstein described how a music and creative arts therapy programme increased an autistic girl's ability to concentrate, and Spitzer related how using a computer aided ear training exercise helped a youth with Down syndrome widen his singing range, and improve the accuracy of his singing. Finally, Krout et al. combined each of these areas in a study that described how the use of technology (electronic music) increased the independence of a 17-year-old girl with an

intellectual disability and cerebral palsy, as well as her attention-to task, and colour and instrument identification skills.

Individual case studies also illustrate how active music therapy can encourage communication. Improvisation facilitated improvements that ranged from enabling a woman (35 years) with profound intellectual disability to communicate at a deep preverbal level (Kowski, 2002), to developing turn taking and interaction (Rainey Perry, 2003) and promoting speech and language development (Sutton, 1993). A coordinated music therapy and speech therapy intervention prompted a similar array of outcomes: non-verbal communication (Mahlberg, 1973; Stevenson, 2003); the speech articulation of a ten-year-old autistic boy (Farmer, 1985); and the elementary reading skills of a child with mild intellectual disability (Lathom, Edson, & Toombs, 1965).

Emotional and psychological outcomes

Improvised music allows people with an intellectual disability to represent and externalise emotions such as anger, sadness, and melancholy (Wigram et al., 2002). Atkinson (2006) used five improvisation extracts to demonstrate how much could be learnt about a young man with an intellectual disability, and his clinical issues, by listening to his music, and there are other case studies that describe individuals given the opportunity to express their emotions. Agrotou (1988), Etkin (1999), and Keats (1995) wrote about the musical relationships that enabled a girl (10 years) with severe intellectual disability and autistic tendencies, a nine-year-old abused child with severe intellectual disability, and a male (40 years) who had autism and severe hearing impairment, to express painful feelings and affective experiences. Strange (1999) developed a therapeutic relationship that meet the needs of three emotionally disturbed teenagers (15 years, 16 years, 13 ½ years) with a moderate intellectual disability, and Flower (1999) opened up the internal world of two children (9 years, 7 years) with communication disorder. Strange and Flower wrote about clients who grew emotionally, and some music therapists have described this process in considerable detail. Warwick (1984), for example, related how a child's (8 years) "inner world (was brought) into balance with the actual world that surround(ed) him" (page 7) as he developed some self-awareness through music, and became happier and more responsive.

The writers often identified the type of relationship that developed. They described how improvisation offered either an experience of 'trust' (Agrotou, 1993), 'relating' (Gale, 1989), 'sharing' (Darnley-Smith & Patey, 2003b), or 'togetherness' (Sobey, 1993). They identified the relationship building qualities of singing (Neugebauer, 2005; Shin, 2006) and pre-verbal vocalisations (Graham, 2004; Ritchie, 1993); examined how the relationship may have developed (Boxhill (1981) used a case study to illustrate three possible stages (reflection, identification, and a contact song) in the process); and explained the relationship in terms of a mother-child interaction (Holck, 2004; M. H. Hughes, 1995). In some instances the client's mother actually participated in the improvisation. Alvin (1981), Warwick (1995), and Woodward (2003; 2004) all described how playful musical interactions, engendered the mother's positive attitude towards her off-spring. Oldfield (2001) illustrated how music therapy facilitated this process. It incorporated playful dialogue and movement patterns, specific to four autistic children under the age of five, in a clear and reassuring structure.

Finally, authors of case studies indicated psychological changes (Ansdell, 1995c; Atkinson, 2003; Bennis, 1969; Brown, 2002; Goldstein, 1964) or benefits for the client (Heal and O'Hara 1993 ,Etkin, 1999). Ansdell described how in Creative

Music Therapy he and the client reached a new level of playing ("with mutual give and take") that gave the client "a real sense of being" and resolved angry outbursts at home. Brown also discussed how music therapy helped an individual manage anger; Goldstein, and Bennis, helped their clients accept failure; and Atkinson, in a description of four years music therapy with a man (24 years) who had moderate intellectual disability and autism, illustrated how his bad feelings had been made more bearable.

On the other hand, Heal and O'Hara and Etkin outlined the psychological benefits of improvisation. Heal and O'Hara described the progress made by an anorexic Down syndrome woman (28 years) who had mild intellectual disability. Nine months into therapy, significant changes were apparent in the young woman's mental state, and, although admitting to episodes of anorectic behaviour when under stress, her weight remained fairly stable. Etkin described how three years work helped an abused child (9 years) with severe intellectual disability by holding, containing, and supporting the experience and expression of painful feelings. Etkin's interpretation reflects the influence of psychoanalysis. Other authors have explained psychological developments during improvisation in similar terms (De Backer, 1993; Heal, 1989; Lecourt, 1991), or, alternatively, they have referred to psychodynamic principles (Clough, 1992; Davies & Mitchell, 1990; Ritchie, 1991), or acknowledged the psychoanalytical theories of Laing and Winnicott (Levinge, 1993; Monti, 1985; H. M. Tyler, 1998), Klein (Walsh, 1997), and Alvarez (H. P. Tyler, 2003).

Physical outcomes

Herron (1970) described how the continual use of hands and fingers, and the continuous air stream that were needed to play a melodica, improved the muscular co-ordination, and breath support of cerebral palsied children with mild intellectual disability. Wigram (1997), and Yasuhara and Sugiyama (2001), addressed the physical symptoms of Rett syndrome. Wigram (1997) explained that VAT reduced general activity level, and relaxed muscle tone. (During VAT a client reclines on a chair, mattress, or bed, and, as s/he listens, directly experiences the audio generated vibrations created by music that is being played through speakers built into these units (Wigram et al., 2002)). Yasuhara and Sugiyama (2001) improved purposive hand use. They captured three children's interest by giving them the chance to play instruments by themselves, and this increased the longest duration of hand grasping "from 2 to 12 s(econds) in case 2 and from 7 to 80 s(econds) in case 3" (page 82).

Examining process

Some of the literature did not describe client response or therapeutic outcome. It used the case study either to examine an element of the music therapy process, or to focus on a particular music therapy technique.

Cowan (1989), for example, used the description of music therapy with an adult (37 years) who had severe intellectual disability to examine the music therapist's role in general, and in relation to that case. In particular, Cowan wondered what part the verbal material exchanged between herself (the therapist) and Lorna (the client) had played in the growing therapeutic relationship, and questioned whether she was fully equipped to deal with this non-musical element. Oldfield (1995) described individual music therapy with a seven-year-old autistic child, and illustrated directive (when the therapist lead the child) and non-directive (when the therapist allowed herself to be led by the child) approaches. Turry and Marcus (2005) attempted to give a sense of the teamwork central to Nordoff-Robbins music therapy (an approach in which music therapists often work in pairs) by providing a moment-by-moment description of each music therapist's role.

(d) Discussion:

Overall, the report and case study literature is a comprehensive and compelling account of music therapy and intellectual disability. Both the table summarising the reported benefits, and the case studies subsections, illustrate the range of outcomes met by music therapists working with this client group. In addition, there is no questioning the quantity of material. Reports and case studies account for 77% of the articles (262 out of 342) identified in this paper, and 90% of all the descriptive writing that has been undertaken (262 out of 292). Nevertheless more attention could be paid to the assessment phase of the treatment process, and the role it might play understanding behaviour. Raglio, Traficante, and Oasi (2006), and Wigram (1992b; 1995; 1999; 2000; 2002) provide useful starting points. Raglio et al. monitored the first improvisations of seven children (3 to 10 years) with intellectual disability, and devised a system for coding changes in patient/therapist interactive behaviour. Wigram illustrated how the interpretation of abilities and skills that emerged during assessment facilitated more accurate diagnosis of autistic behaviour.

In a similar manner, papers that describe the practical benefits of music therapy outside the treatment room (Boisvert, 2002; Bunt, 2002), and that evaluate the musical content of music therapy sessions (Luck et al., 2006), should encourage music therapists to broaden the scope of descriptive writing. Luck et al. (2006) analysed improvisations, and suggested that an individual's musical expression might indicate their level of intellectual disability. Music therapists might either consider documenting the long-term effect of music therapy, or they could examine the relationship between the different degrees of each client's intellectual disability and the various levels of their musical response.

Philosophical

There were fifty philosophical articles, and the earliest examples, written at a time when music therapy was developing as a profession, either considered how it might benefit diagnostic sub-groups within intellectual disability (Alvin, 1961; Lathom, 1964), or focused on the part it could play in conjunction with other interventions (Buchan, 1943), or in the promotion of particular skills (Cleland & Swartz, 1970; Gilliland, 1951). Alvin and Lathom discussed the role music therapy played treating cerebral palsy and emotional disturbance. Gilliland focused on the development of physical skills, and Cleland & Swartz on facilitating socialisation. The first published paper (Buchan) discussed the contribution music made to an education programme, and stressed that it not only provided entertainment but also "furnish(ed) emotional outlets", and developed self-confidence (page 94). Even at this stage in its development, writers had identified the value of using music therapy with the intellectual disability population.

Subsequent philosophical articles that continued in this vein were also underpinned by the desire to promote music therapy as a viable and credible intervention for people with an intellectual disability. Authors, who focused on the promotion of particular skills, continued to discuss how music therapy facilitated socialisation (Gunsberg, 1991; Segal, 1990), and encouraged language development (Leung, 1985; Morgenstern, 1974). Morgenstern, for example, identified the elements within music itself (structure, repetition, and contrasts) that turned it into a useful, adaptive tool for preparing and developing language. Articles appeared that endorsed music therapy as a treatment for withdrawn children (Crockford, 1977), and for children with autism (Thaut, 1984; Trevarthen, 2002), or Rett syndrome (Hanks, 1986). Trevarthen, who discussed improvised musical engagement and autism,

suggested that music therapy helped autistic children, not by giving cognitive stimulation, but by activating receptive resources that remained in spite of the condition. Boswell and Vidret, (1993) put forward a case for combining music and movement activities. They argued that “weaving together” rhythmic movement and music provided a “stronger fabric” for developing people with an intellectual disability than using each component independently (p.37). Writers also considered how music therapy could back-up the nursing profession (Collingwood, 1982), and contribute to family therapy (Decuir, 1991), and group psychotherapy techniques (Chorost & Luchow, 1991). Alley (1977), and Daveson and Edwards (1998), wrote respectively about changes impacting on the education system in the USA and Australia. They each asserted that music therapy could contribute to new curricula that were being implemented because it complimented music education by assisting cognitive, psychological, physical, and socio-economic development.

The philosophical writing, discussed above, was supplemented by articles that debated practical and professional issues, and encouraged the reader to think about his/her opinion. For example, when music therapists were asked to consider their theoretical orientation when working with people with an intellectual disability, the views put to them reflected the dichotomy of opinion within the profession. Whereas, La Fon (1989, page 25) criticised “the behavioural tunnel vision” of some music therapists, Dunachie (1995) and Steele (1977) favoured a more objective approach associated with behaviourism. Steele discussed the need to determine cause and effect relationships. Dunachie argued that musical material should be understood within the normal musical development framework rather than as an abstract representation of inner state.

Writers also discussed particular stages of the treatment process, and either examined the music therapist’s role in assessing client need (James, 1986), in determining treatment goals (Lathom & Eagle, 1982), or in evaluating progress (Ellis, 1996; Ockelford, Welch, Zimmermann, & Himonides, 2005; Wigram, 1993). James argued that quality music therapy services depended on careful assessment, and asked the reader to consider brief rationales written in support of twelve different standardised instruments that would help them document progress. Lathom and Eagle suggested that the four non-musical aims (encouraging participation, encouraging cooperation, improving motor skills, improving cognitive skills) most frequently identified by music therapists providing music for children with severe intellectual disability were “the key to the child’s success in school” (page 31). Wigram outlined the positive effect of VAT and improvisation on self-injurious behaviour, and considered the different techniques that may be required to evaluate contrasting music therapy interventions. Wigram suggested that whereas the passive nature of VAT made it possible to record information while the session was going on, a music therapist could not be distracted during an improvisation session, and subsequently video analysis was the best way to evaluate that particular intervention. Ockelford, et al. put forward a framework that would facilitate assessing, and then recording, the musical development of an individual with an intellectual disability. The model used concentric circles to chart a five-stage path through three distinct responses. “The three responses: ‘reactive’, ‘proactive’, and ‘interactive’... correspond(ed) (respectively) to ‘listening and responding to sound and music’, ‘causing, creating and controlling sound, and ‘participating in sound and music-making with others’” (page 900). Adutt (2006) adopted this model when he described how the sounds made by children with severe intellectual disability changed in the course of music therapy.

Finally, philosophical papers discussed how to manage and administer a music therapy programme in the light of changing government legislation (Alley, 1979; Watson, 2003), and as adults with an intellectual disability moved away from institutions and began living in the community (Coates, 1987). In the UK, Watson illustrated how music therapy met two of the objectives of a government white paper *Valuing People* (Department of Health, 2001), and facilitated transition into adult life (objective 2) and fulfilling lives (objective 7). Coates, writing in the USA, argued that music therapy should develop music skills that were suitable as leisure time, community-based activities (e.g. a client could be encouraged to select and play a record). It was a controversial piece of writing that asked music therapists to consider whether the development of the discipline needed to focus more on meeting healthcare and other specific needs, rather than on delivering “something that (clients) would enjoy” (page 172).

Overall, although they have helped establish music therapy as a viable treatment option for people with an intellectual disability, the philosophical papers are perhaps of greatest value as they have challenged music therapists to think about, and refine, the intervention they are providing for this particular client group.

Conclusion

Over the past decade the Evidence Based Medicine (EBM) framework has been incorporated into healthcare practice to judge the effectiveness of medical interventions, and determine service provision (Edwards, 2002). The EBM framework is levels of evidence variously defined in Australia by the National and Medical Research Council, by the US Preventive Services Task Force (Edwards, 2002), and in the UK by the King’s Fund Centre for Evidence Based Practice, and the Clinical Effectiveness Support Unit, Wales (Wigram, 2002). The UK EBM framework has eight levels. It begins with two types of literature review (systematic, summary), and then, starting with Randomised Controlled Trials (RCTs) (level 3), moves down through case control studies (level 4), case series (level 5), case reports (level 6), and qualitative studies (level 7) to recognition or validation from experts within the medical profession (level 8). (This is not the occasion to debate the structure of this framework. It has been included to place the descriptive writing discussed in this paper within the context of the different levels of evidence).

In the UK, RCTs are often referred to as the ‘Gold Standard’. However, it would be dangerous to apply an analogy with the reward for Olympic success to the other levels of the EBM framework. If such an analogy was used it would undermine the significance of the reports and case studies that dominated this literature review: they would be fourth (and out of the medals) in relation to RCTs. Grocke and Wigram (2007), for instance, agree that case study writing should not be devalued in any way. They made the following comment about evidence-based practice in receptive music therapy...

“Music therapy methods may sometimes be supported by controlled studies, but as in psychotherapy, physiotherapy, occupational therapy and speech and language therapy, the evidence of effect relies primarily on anecdotal accounts written by case studies, clinical reports and other publications” (page 15).

This review has demonstrated the value of the descriptive and philosophical writing not just as a medium for identifying clinical outcome, but also for informing and advancing clinical practice, and for demonstrating the efficacy of music therapy as an intervention for individuals with an intellectual disability. Writers will continue

to publish descriptive and philosophical papers documenting their work with this client group, and they should continue to do so. Descriptive and philosophical writing has an important part to play understanding, and developing, the role of music in the treatment of intellectual disability.

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APPENDIX 2:

Hooper, J., Wigram, T., Carson, D., Lindsay, B. (2008b)
A review of the music and intellectual disability literature (1943-2006)
Part Two – Experimental writing
Music Therapy Perspectives 26(2), 80-96

Abstract

After part one of the literature review focused on descriptive and philosophical literature, attention is turned to experimental writing. This paper begins by looking at musical aptitude. It identifies research that compared the musical aptitude of people with, and without, an intellectual disability, and investigations that assessed the musical aptitude of diagnostic subgroups from within the intellectual disability population (Down syndrome, musical savants, autistic spectrum disorder, Williams syndrome).

This paper then goes on to consider research that examined how individuals with an intellectual disability responded to active (improvisation, and Music Activity Therapy) and receptive (contingent, contingent-interrupted, and non-contingent music) interventions. The studies are ordered according to therapeutic outcome, and it describes their method, and considers various issues that arose.

The conclusion summarises the strengths and weaknesses of the experimental writing, and identifies agendas for music therapy research with this population. It argues that the experimental research should not be considered in isolation. Instead, it suggests, that along with the descriptive writing (discussed in part one of the review), the experimental writing is part of a body of work that captures both the richness of clinical experiences, and the cause-effect relationships underlying those experiences.

Introduction

Music therapists have always been convinced that the interventions they offered were of great value to individuals with an intellectual disability (Watson, 2002). Early pioneers of the music therapy profession, described their clinical work in journals and newsletters, and documented the social and cognitive, physical, and emotional and psychological outcomes. For example, Juliette Alvin, who is widely considered the mother of music therapy in Great Britain, summed up her own experiences working with people with an intellectual disability by asserting “we know that music is an essentially flexible means of communication which can work at every mental, emotional, and social level” (J. Alvin, 1975, page 2). A strong tradition of descriptive and philosophical writing developed; it not only demonstrated the efficacy of music therapy as an intervention for individuals with an intellectual disability, but also identified clinical outcomes, and informed and advanced clinical practice. (This writing was discussed in detail in part one of this review of music and intellectual disability literature (1943-2006)). However, while acknowledging the important role descriptive and philosophical writing has played, and will continue to play, in understanding and developing the role of music in the treatment of intellectual disability, the Evidence Based Medicine (EBM) framework incorporated into healthcare practice in Australasia, the UK, and the United States, is challenging practitioners to provide experimental evidence demonstrating the merits of the interventions they are offering. This part of the review documents how they have

risen to that challenge, and how they have evaluated their work with people who have an intellectual disability.

This paper is divided into three sections. It begins by reviewing investigations that considered musical aptitude (n=81). It then goes on to discuss literature that examines how people with an intellectual disability respond to active music therapy techniques (n=71), and concludes by examining material that evaluates their response to receptive music therapy techniques (n=112). (In receptive music therapy the client is a recipient of the music experience, as distinct from active music therapy when s/he is involved in music making (Grocke & Wigram, 2007)).

Musical aptitude

(1) Background

Musical aptitude is innate sensitivity to the elements of music, and, alongside learning, it plays a part in musical ability: the general term used to describe the level of musical skill and understanding. The relationship between musical ability, aptitude, and learning has been argued within the nature-nurture debate (Sadie, 2001). (The nature-nurture debate considers the relative importance of an individual's innate qualities ("nature") versus their personal experiences ("nurture") in determining, or causing, individual differences in physical and behavioral traits (Ridley, 2003)). In Western cultures, those who emphasise the importance of innate qualities (nature) assert that special gifts and talents explain musical ability. Musical ability is often viewed in all-or-none terms: some individuals are blessed with "talent", whereas others must do without (Dalby, n.d.). On the other hand, those who place the emphasis on nurture suggest that early musical opportunities and experience, coupled with cumulative practice completed over many hours and years, are the predictors of eventual expertise. Ericsson, Krampe, and Tesch-Romer (1993), for example, compared expert and amateur musicians, and found that higher levels of regular practice (more than twice the amount) separated the best violinists in their sample from a group at the same institution training to be music teachers.

It is harder to find evidence that genetic factors contribute to musicality. First, musical ability appears to be less heritable than characteristics such as intelligence. Coon and Carey (1989) presented analyses of musical ability data, and demonstrated that musical ability was influenced more by shared family environment than by shared genes. Second, recent research, far from confirming the all-or-none explanation, revealed that musical aptitude was normally distributed in the population. There were relatively few people with high aptitude, a similar number with low aptitude, and the majority fell somewhere in the middle with average aptitude (Dalby, n.d.). However, even though early musical opportunities and experiences appear to offer better predictors of eventual ability, there is a general consensus that the development of musical abilities depends on a complex mix of "cognitive, motivational, social and cultural factors, and an individual's experience, education, aspirations and attitudes towards music and musical training" (Sadie, 2001, page 557).

Musical aptitude is generally measured using a standardised psychometric test. The tests include those devised by Seashore (1919), Gordon (1965) (1978), and Bentley (1966). They do not need specific performance skills acquired through formal musical training. They assess aptitude by concentrating on relatively simple and short-term perceptual sub-components of musical skill, such as the ability to tell whether two short musical sequences are the same, or different, in pitch and/or rhythm (Sadie, 2001). Although these tests are used to decide whether children should be offered specialist music programmes, their value has otherwise been

undermined because they are unreliable predictors of long-term future achievement in music (Sadie, 2001). Huftstader (1974) and Mota (1997), for example, both identified that measures of aptitude did not predict subsequent musical success. Mota found no meaningful relationships between the singing achievement, and developmental tonal aptitude scores, of 162 students randomly selected from kindergarten, first, second, and third grade classes.

(2) Assessing musical aptitude compared to samples without intellectual disability

Musical aptitude is linked with intellectual disability, although, historically, opinion generally restricted it to certain diagnostic classifications, or to particular components of music. Tredgold (1952), for example attributed “a marked sense of rhythm and a remarkable fondness for music” to persons with Down syndrome. Older statements also claimed that musical sensitivity was constrained by an individual’s general level of intelligence. Blacketer-Simmonds (1953), for example, while accepting that all were “supersensitive to musical sounds” only attributed musical aptitude to “sufficiently intelligent” individuals. Research teams have investigated these opinions, and looked at the relationship between musical aptitude, intelligence, and cognitive processes.

The studies that assessed musical aptitude by using subtests from the Seashore (1919), Gordon (1965) (1978), and Bentley (1966) batteries typically detected a lower level of performance among those with intellectual disability compared to samples without intellectual disability, or to published norms. Braswell, Decuir, Hoskins, Kvet, and Oubre (1988) administered Gordon Primary Measures of Music Audiation (1978) to 59 children with intellectual disability, and 263 normal students, and the intellectually disabled participants scored significantly lower on both the tonal and rhythm subtests. When Larson (1977) invited seven and eight-year-old children, with and without intellectual disability, to match pitches played on the piano by vocalising with the syllable “ah”, children with an intellectual disability possessed a lower mean singing range, and midpoint, than normal children of the same chronological age. McLeish and Higgs (1982) tested 121 children with intellectual disability (8 to 16 years) and found that their total scores on both the Seashore elemental measures, and Bentley Measures of Musical Abilities, did not match the published norms. However, this may not be an accurate reflection of the situation. The mental age (MA) of those with an intellectual disability is below the level required for musical aptitude tests, and there is evidence that their vocal range is less than half that of individuals who do not have an intellectual disability (Larson, 1977). Consequently, the difficulty they may have experienced understanding and following instructions, the possibility that vocal tests lay outside of their restricted vocal range, and the unfamiliarity of the musical stimuli often presented in the course of these tests (pure tones rather than notes generated by a conventional musical instrument), may all have adversely affected their performance.

The research comparing the musical aptitude of individuals with and without an intellectual disability did not determine, with any degree of certainty, whether these observed deficiencies were linked to maturation, or to intelligence. It is not surprising that there is little information about this, as investigators rarely measured individuals with an intellectual disability against MA or chronological age (CA) matched samples. Braswell et al. (1988), for example, compared intellectually disabled participants with advantaged and disadvantaged children. Bixler (1968), who employed Gordon (1965) to assess the musical aptitude of 39 individuals with intellectual disability, did not enrol any other participants. However, Braswell et al. did identify the sample by degree of intellectual disability, and Bixler correlated

aperture scores with assessments of reading and arithmetic ability. Consequently, when Braswell et al. identified a non-linear variation in discrimination associated with severity of intellectual disability (i.e. those with moderate intellectual disability scored lower than the severely intellectually disabled), and Bixler discovered only a modest correlation when the participant's aptitude scores were matched with the other variables, it appeared that musical aptitude was relatively independent of intelligence.

While this is an intriguing outcome, it perhaps needs to be treated with caution, especially as results of the single investigation (Zenatti, 1975) that did employ the traditional design for examining any link between aptitude, maturation, and intelligence were somewhat at variance. Zenatti sampled 396 children with intellectual disability, and comparison groups of normal intelligence (n=480) matched by CA and MA. The participants compared three or four note melodies; the second was either the same or different by one note. The discrimination of those with intellectual disability, which was "clearly inferior to that of normal children of the same age and approximated ... children of the same mental age" (page 43), suggested that the rate of acquiring melodic memory skills was related to intelligence rather than maturation. This outcome was reiterated by McLeish and Higgs (1982), and Moog (1979), who linked low intelligence with under achievement in overall musical ability, and rhythmic perception, respectively.

(3) Assessing the musical aptitude of diagnostic subgroups

Moog asked participants to judge if aural exercise pairs were the "same" or "different", and compared children who had an intellectual disability with a non-handicapped sample matched on CA, and individuals with "serious physical handicaps in movement dating from birth" (page 74). Moog's investigation, which concluded that motor restriction reduced rhythmic sensitivity almost as much as intellectual disability, introduced a comparison group distinguished by diagnosis, and other investigators have followed suit by either including diagnostic sub-groups in their experiments, or by focusing on specific conditions: in particular, Down syndrome, musical savants, autistic spectrum disorders (ASD), and Williams syndrome. (There is debate about whether autism and Asperger's syndrome lie on a continuum or form two distinct disorders, and consequently the literature often fails to distinguish between the two conditions. In this paper, ASD is used as an all-inclusive term rather than explicitly differentiating between autism and Asperger's syndrome).

(a) Down syndrome:

The first reference to specific musical ability in Down syndrome appears to have been made by Fraser and Mitchell (1896) some ten years after the condition was described by Langdon Down. Since then, writers, in both the popular and professional literature, have continued to associate a fondness for music, and a sense of time and rhythm, with Down syndrome (Engler, 1949; Hallas, 1976; Lapage, 1911; Smith & Berg, 1976). However, as none of these authors offered any experimental evidence to back their assertions, Cantor and Girardeau (1959), and later Stratford and Ching (1983), carried out trials to scrutinise the claims made about musical ability in individuals with Down syndrome. Their investigations neither confirmed, nor denied, this notion.

Cantor and Girardeau (1959), and Stratford and Ching (1983), examined how individuals with Down syndrome performed during rhythmic discrimination and reproduction tasks respectively. Stratford and Ching compared ten intellectually disabled participants, ten intellectually disabled children with Down syndrome, and ten normal children who shadowed three different rhythms of increasing complexity; they used a metal rod, and tapped along with the stimuli on a metal plate. Although

the response of the Down syndrome and normal groups were remarkably similar (their ability to maintain a rhythmic pattern congruent with the stimulus decreased as the rhythm became more complicated), Stratford and Ching were “reluctant to make fundamental claims, based on the evidence..., as to whether or not Down syndrome children had a marked sense of rhythm” (page 36). Cantor and Girardeau asked a non-handicapped sample (n=24), and 44 individuals with Down syndrome, to identify fast (120 beats per minute) and slow (88 beats per minute) metronome rates. Even though the performance of the normal sample significantly exceeded that of the Down syndrome group, Cantor and Girardeau acknowledged that the significantly higher MA level of the non-handicapped sample was a confounding variable. (This confound acts as a timely reminder of the methodological weakness characterising most of the studies that assess musical aptitude by exposing individuals to standardised psychometric tests: investigators rarely employed comparison groups without an intellectual disability that were matched according to MA and CA).

(b) Musical savant:

There is some question whether the investigations that employed standardised psychometric tests reflected the musical sophistication of individuals with an intellectual disability. They used passive tasks and impoverished stimuli, and either asked listeners to make discrimination judgements in response to briefly presented pairs of stimuli, or restricted performance to simple reproduction or matching. Furthermore, scant attention was paid to the participant’s musical training and performance history. One possible solution is to examine performance in a freely structured test. FitzPatrick (1959), and Stratford and Ching (1989), who questioned the rhythmic superiority of individuals with Down syndrome following their response to a rhythmic folding task, and while moving to music respectively, provide early examples of this approach. In recent times, freely structured tests have been used, as well as reproduction aptitude tasks, to investigate the responses of musical savants.

Langdon Down (1887) was the first to identify the *idiot savant*. These are people with an intellectual disability who excel in one field of endeavour. There are around six separate kinds of savant ability. As well as musicians, people can have outstanding spatial ability, or they can be mnemonists (an individual with the ability to remember and recall unusually long lists of data), calendrical calculators, hyperlexics (someone with word recognition ability far above expected levels), or artists.

Musical savants have been the subjects of several discursive case reports. Anastasia and Levee (1960), Minogue (1923), Owens and Grimm (1941), Scheerer, Rothman, and Goldstein (1945), and Viscott (1970) all provided illuminating descriptions. Owens and Grimm, for example, described a twenty-three year old girl, who despite no formal musical training, played piano by repeating tunes heard over the radio, and created new songs by rearranging songs she had heard before. Viscott’s participant (Harriet G.), although never taught any music, possessed an encyclopaedic knowledge of symphonic and operatic works, a phenomenal sense of pitch, and the ability to transcribe music from memory. However, none of these writers offered precise observation or measurement; it was not until recently that their music ability was analysed. Some of the experiments restricted performance to reproducing four to sixteen bars (L. K. Miller, 1987), and four-chord and eight-chord sequences (L. K. Miller, 1995). On the other hand, Hermelin, O’Connor, and Lee (1987), and Hermelin, O’Connor, Lee, and Treffert (1989) looked for evidence of generative music capacity by inviting the participants to improvise, and Sloboda, Hermelin, and O’Connor (1985) scrutinised the errors made by a musical savant and a professional

pianist who heard complete recorded performances, and shorter subsections, and were then asked to play as much as they could of Opus 47 no 3 (Melodie) from Grieg's Lyric Pieces, and "Wholetone scale" from Book 5 of Bartók's Mikrokosmos.

In each case, a clear picture emerged. Musical savant skill was not a form of mimicry dependent on prodigious feats of memory. It was based on the ability to analyse and understand the rules governing composition, and to create music from knowledge of those rules and structures. Hermelin, O'Connor, Lee, and Treffert, for example, transcribed and evaluated the improvisations of a professional musician (26 years), and an intellectually disabled and blind man (34 years), given Opus 47 no 3 (Melodie) from Grieg's Lyric Pieces, and "Wholetone scale" from Book 5 of Bartók's Mikrokosmos as the basis for their performance. The similarity of the Bartók improvisations indicated that the individual with intellectual disability, like the professional musician, ruled out the use of related or remote keys, or transitions between keys, and generated music that took into account the constraints imposed by the structural properties of Bartók's whole-tone scale. Along with the other experiments assessing the musical ability of musical savants, this investigation concluded that, because the cognitive architecture of the musical savant resembled a normal control musician and represented a high degree of cognitive sophistication, musical talent was "independent of general intellectual status" (page 447).

(c) Autistic spectrum disorders (ASD):

The cognitive skill profiles of people with ASD are quite unusual. Although ASD are characterised by impaired interaction, communication, and imagination skills, the various savant skills, described above, occur ten times more often in autistic individuals than among intellectually disabled individuals without autism (Happé, 1999), and absolute pitch (AP), which occurs extremely rarely among typically developing people (only 1 in every 10,000 individuals (Takeuchi & Hulse, 1993)), has been reported in all the musical savants in the extant literature (Mottron, Peretz, Belleville, & Rouleau, 1999). (AP is the ability to name, or to produce, pitches without referring to an external standard (Takeuchi & Hulse, 1993)).

Investigations have been carried out to determine whether Weak Central Conference (WCC) explains the outstanding musical ability demonstrated by individuals with ASD. Firth (1989) put forward the Weak Central Conference (WCC) model after individuals with ASD repeatedly outperformed MA matched typically developing controls, and MA and CA matched intellectual disability controls, on a visuospatial task. The task had asked participants to segment a holistic gestalt into its constituent elements. Firth proposed that Central Coherence, the drive to process information globally and integrate that material in context, was weak in people with ASD. According to the WCC model, autism was characterised by a cognitive system that processed local features at the expense of global, context-dependent meaning, or gestalt (Happé, 1999). Heaton, Pring, and Hermelin (1999), for example, asked children to associate four tones with an animal picture. Afterwards, they presented four versions of a chord that contained only three of the previously encoded tones, and invited the participants to identify the missing animal tone. The task required the children to segment the chord played into its single components, and when the participants with ASD outperformed a sample of typically developing controls they displayed superior ability processing local elements typical of WCC. The WCC model may not be the only explanation. Mottron et al. (1999), who used extensive tests to investigate cognitive systems, concluded that practicing the domain of interest more repetitively and with less variability than typically developing individuals

(cognitive inflexibility), may have facilitated the absolute pitch (AP) displayed by an autistic musical savant.

(d) Williams syndrome:

Williams syndrome (WS) was first identified in 1961 by Dr J.C.P. Williams (Dobbs, 2007). It is rarer than either autism or Down syndrome (1 in 7,500 people have WS, compared with figures of 1 in 150 for autism, and 1 in 800 for Down syndrome (Dobbs, 2007)). WS is a neurodevelopmental genetic disorder that has peaks and valleys in mental function (Levitin et al., 2004). Children with WS, besides elfin facial features and a friendly and talkative disposition (Don, Schellenberg, & Rourke, 1999), have substantial impairments in cognitive domains (such as reasoning, arithmetic ability, and spatial cognition), alongside relatively preserved skills in social domains, face processing language, and also in music (Levitin et al., 2004). The following description illustrates the unusual cognitive profile associated with WS.

“Gloria Lenhoff is a 46-year-old lyric soprano singer...She can sing nearly 2,500 songs in more than 25 languages, reportedly in a perfect accent...But the rest of her world is not perfect...With an IQ of about 55, Gloria literally cannot subtract three from five” (Maher, 2001, page 20).

Musical aptitude has been anecdotally associated with WS from the time the syndrome was first described. In an early report, delineating the psychological characteristics of the syndrome, Von Arnim and Engel (1964) supplied clinical observations of six children, and reported that each child was a good singer. A later case study, investigated the characteristics of 44 children (6-16 years), and identified an ability to learn songs easily (Udwin, Yule, & Martin, 1987).

WS interested researchers, and formal and informal musical aptitude studies were carried out at summer music camps. Lenhoff (1996), a scientist and parent of a child with WS, reported that the WS campers exhibited facility with complex rhythms, strong lyric memory, ease with composing, and a higher incidence of absolute pitch (AP) than seen in the normal population. Lenhoff, Perales, and Hickok (2001) demonstrated the extent of their exceptional AP ability. Five individuals with WS scored 97.5% on 1,084 AP trials compared to cognitively intact musicians with AP who scored 84.3% on similar tests. Levitin and Bellugi (1998) tested the rhythm production skills of 8 music camp attendees with WS (mean age 13.4 years). They found that, as well as giving the same number of correct responses as typically developing 5 to 7 year olds, the WS sample were more musical when they responded in error.

Research has linked the musical aptitude of the WS population to their affinity for music. An early case study reported that music was an infant's "truest love" (Anonymous, 1985, page 968). Hopyan, Dennis, Weksberg, and Cytrynbaum (2001), Lenhoff (1998), and Levitin et al (2004) have established that, compared with typically developing peers, children with WS displayed a greater love of music, and a wider range of emotional responses to music. Levitin (2005) identified a possible neuroanatomical correlate of this engagement: increased activation to music and sound in the right amygdale (the grey matter in the front part of the temporal lobe of the cerebrum).

Several music aptitude studies explored possible explanations for the cognitive profile of WS. Don et al. (1999), for example, used standardized tests of melodic and rhythmic discrimination, as well as structured interviews, to assess the music skills of 19 children with WS (8 to 13 years) and an MA equivalent comparison group (n=19). In contrast to earlier studies, these children were not a select cohort (music camp

attendees) picked because of their musical skills or interests. The results showed that music skills were an area of relative strength for WS children, and identified a correlation between musical and verbal abilities. This correlation demonstrated that intact abilities in the auditory domain underlay both music and language skills, and pointed to Nonverbal Learning Difficulties (NLD) as a possible framework for understanding the cognitive profile of WS. (A child with NLD, rather than exploring the world through touching, feeling, seeing, and hearing, relies predominantly on an auditory and verbally based approach. Assimilation through non-verbal processes is precluded by weak tactile and visual perception, and by difficulty with complex psychomotor skills (Rourke, 1995)).

Another explanation of the WS cognitive profile focused on the relative role of global and local aspects. Deruelle, Schön, Rondan, and Mancini (2005) presented a target melody followed by a comparison that was either “contour violated” or “interval violated”. When they looked at the performance of 16 children with WS, and 16 control children, asked to determine if the melodies were the same or different, WS was associated with an atypical musical processing strategy. There was “global integration deficiency in the Williams syndrome pathology, without better performance in local processing” (page 633). As this was reminiscent of the pattern of results obtained with the visuospatial domain, they suggested that it “argues for a multimodal dysfunction of global integration in the Williams syndrome population” (page 633).

Finally, Dykens, Rosner, Ly, and Sagun (2005) examined how intense involvement in music effected the anxiety levels of individuals with WS. Behaviour checklists were completed to rate problem behaviours, musical measures determined the participant’s emotional responses to music, and information was collected about their previous, and on going, involvement in musical activities. Dykens, et al. identified, that compared to individuals with Prader-Willi syndrome (PWS), and Down syndrome, “increased frequency, skill, and duration in producing music were associated with lower levels of anxiety or fears in the Williams syndrome group” (page 354), and “increased frequency of listening to music was associated with fewer externalising difficulties, especially aggression” (page 354). (PWS is a genetic disorder characterised by excessive hunger, and abnormally large intake of solids by mouth. It carries a high risk of intellectual disability (Curfs & Fryns, 1992))

(4) Discussion

The musical aptitude of individuals with an intellectual disability has, it seems, been the focus of attention from the earliest references to diagnostic subgroups, and continues to be so with the current interest in WS. Overall, this research has negative and positive aspects. On the negative side, methodological limitations appear to be commonplace. The investigations that used standardised music aptitude tests rarely compared individuals with an intellectual disability to MA and/or CA matched groups without an intellectual disability. The examinations of WS (the most recently identified diagnostic subgroup) either relied too heavily on parental perception that was prone to over or underestimation (Dykens et al. (2005) asked parents about the participant’s previous and on going music activities), or employed a flawed sampling method. Although, Don et al. (1999) ensured that children were not a select cohort picked because of their musical skills or interests, they did not rule out the possibility that the participants were an especially musical subgroup of the WS population. Furthermore, the genesis and generation of that skill remains obscure: neuroimaging investigations are needed to determine how individuals with intellectual disability process music.

On the positive side, if the early investigations disappoint because of the absence of CA and MA matched comparison groups, and methodological issues persist in some of the most recent experiments, research that used reproduction and freely structured tasks has advanced understanding of musical savants, and individuals with autism, Down syndrome, or WS. Although researchers are a long way from reaching agreement, the debate that surrounds the importance of the WCC hypothesis, and the NLD framework, has informed deliberations about the cognitive profile of these diagnostic subgroups.

Active music therapy

(1) Background

In active music therapy the client produces the musical content, and shares instrumental and/or vocal ideas with the therapist (Grocke & Wigram, 2007). Part one of the review demonstrated the quantity and diversity of material that *described* active music therapy. In comparison, there were fewer instances when active music therapy was the subject of experimental research, and that research either evaluated improvisation (n=8), or Music Activity Therapy (n=63).

(2) Improvisation

Improvisation is generally an insight-orientated approach intended, or used, to resolve psychological conflicts. The musical content of improvisation-based active music therapy *evolves* through instrumental and vocal exchanges (Bunt, 2001). Although these exchanges usually take place between therapist and client, part one of the review identified occasions when the client's mother also participated in the improvisation (Alvin (1981), Warwick (1995), and Woodward (2003; 2004) described playful mother-child interactions).

Although music therapists continued to deliver an intervention with a psychodynamic orientation, their experimental investigations of improvisation did not focus on psychological outcomes, but instead evaluated its effect on the behaviour, and/or the skills of individuals with an intellectual disability. Lawes and Woodcock (1995), who measured generalisation of gains, observed four females (41 to 52 years) with severe intellectual disability in their everyday environment, as well as during music therapy and therapist interaction conditions. They recorded the incidence of challenging behaviour (self-injurious behaviour), and reported "no observable gains in positive engagement, vocalisation, or self-injurious behaviour...as a result of the music therapy" (page 270). Muller and Warwick (1993) failed to provide convincing evidence that maternal involvement positively affected the behaviour of individuals with an intellectual disability. Muller and Warwick (1993) recruited nine autistic children (3 years to 17 years) who received music therapy with and without their mother. Stereotyped behaviour decreased during both treatment conditions, and they concluded that a "mothers' participation did not have a particular influence on their children's behaviour" (page 227).

In contrast, Oldfield and Adams (1990), and Hooper (1993), compared the effect of improvisation and play therapy, and suggested that the improvisation process had been the key to achieving individual objectives to a greater extent in music therapy than in play sessions. Oldfield and Adams (1990) randomly recruited four participants, identified therapeutic goals, and created a behavioural index for each goal. Random, time-sampled video analysis provided frequency and duration measures that determined each individual's progress. Hooper (1993) introduced a 27-year-old-woman with severe intellectual disability, to five music therapy and five play therapy sessions. Independent observers used Likert scales to evaluate random

sections of video footage chosen from each session. The Likert scores suggested that music therapy was twice as effective as play therapy developing participation, interaction, eye contact, cooperation, and motivation.

Part one of the review identified case studies that commented on Creative Music Therapy. Aldridge, Gustroff, and Neugebauer (1995a; 1995b) and Edgerton (1994) went a step further and evaluated the intervention with waiting-list controls (Aldridge et al., 1995a, 1995b), and an ABA reversal design (A=intervention; B=withdrawal of intervention) (Edgerton, 1994). (Creative Music Therapy (Nordoff & Robbins, 1977) was developed between 1959 and 1976 by Paul Nordoff and Clive Robbins, and furthered after Paul Nordoff's death in 1976 by Clive Robbins and Carol Robbins. In Creative Music Therapy music therapists work in pairs. One person establishes a musical relationship, while the other engages the client and facilitates their responses. Nordoff and Robbins intended the therapy to be a musical experience that absorbed the client from the moment s/he entered to the moment s/he left the room (Wigram, Pedersen, & Bonde, 2002)).

Edgerton (1994) compared Creative Music Therapy with structured musical tasks that did not use improvisation. He found that Creative Music Therapy increased the communicative behaviours of 11 autistic children (6 to 9 years). Aldridge et al. (1995a) uncovered clinically significant developmental changes. There was continuing improvement in hearing and speech, hand-eye co-ordination, and personal-social interaction. Aldridge et al. (1995b) suggested that these changes occurred after just one session. They demonstrated that, after the first session, five children who received individual Creative Music Therapy displayed greater developmental changes than three control participants. Aldridge et al. (1995b) also confirmed the clinical relevance of the developmental changes. Two case vignettes, that combined quantitative data, descriptions of music therapy, and observations obtained from personal interviews with parents, identified how progress in music therapy had positively influenced each child's behaviour while s/he was at home.

These studies are the first tentative steps to evaluate improvisation. There is the sense that researchers, determined to build on the case study literature (discussed in part one of the review) develop a methodology that takes their set of circumstances into account. Inevitably, each is forced to make compromises. Lawes and Woodcock (1995), for example, expressed concern that the experimental design had interfered with the therapeutic process; the music therapist deviated from normal working practices by interacting without conducting music therapy. Oldfield and Adams (1990) acknowledged that practical constraints had restricted the number of treatment sessions videotaped, limited the number of participants observed, and precluded an assessment of long-term effect. Indeed, all the researchers were quick to recognise that results needed to be validated by a much larger participant group, and that until this was the case each outcome was "best considered a pointer in a general direction rather than a conclusive statement" (Aldridge et al., 1995a, page 204).

(3) Music Activity Therapy

The musical content of a Music Activity Therapy session is *predetermined*. The music therapist engages his/her client in musical activities "designed or selected so that participation in them requires the client to learn or practice a targeted competence" (Bruscia, 1998, page 185). Researchers have evaluated how people with an intellectual disability responded to a programme of different music activities (Braithwaite & Sigafoos, 1998; Humpal, 1991; Stevens & Clark, 1969), and, in particular how they have reacted to (1) music and movement (M. R. James, Weaver, Clemens, & Plaster, 1985; Wigram & Weekes, 1985) (2) melody and rhythm (Staples,

1968), (3) the Gamelan (a set of percussion instruments consisting of tuned gongs, metallophones, cymbals and drums) (MacDonald, O'Donnell, & Davies, 1999) (4) songs (Wylie, 1996) and singing (Detzner, 1997; Hoskins, 1988; Pasiali, 2004), and (5) rhythm instruments (Hariston, 1990).

Music Activity Therapy aims to improve adaptive behaviour. It accommodates and augments the goals and treatment plans of other disciplines, such as physical, occupational, and speech therapies, and focuses on the acquisition of sensorimotor, perceptual, cognitive, emotional, or social skills (Bruscia, 1998). This section of the review looks at the treatment goals (sensorimotor, cognitive, and social development), and the particular music activities (songs and singing) evaluated by the experimental research. In each case, attention will be given to the method, and outcome, of the investigations.

(a) Sensorimotor development:

Part one of the review, that examined descriptive and philosophical writing, identified only a passing interest detailing the physical outcomes of Music Activity Therapy. In the experimental literature, there was a similar reluctance to consider how the intervention contributed to the sensorimotor development of individuals with an intellectual disability.

Only James et al. (1985), who introduced a programme of music and movement to 12 participants with severe or profound intellectual disability, and a control group (n=12), considered motor skill development. The programme paired auditory and vestibular stimulation (i.e. slow swaying, spinning, bouncing). The vestibular stimulation was presented so that it coincided with the beat of the music, and it “facilitated significant gains in motor skills for the experimental group” (page 32).

(b) Cognitive and social development:

The intellectual disability population possess a significantly below average intelligence level (based on an IQ test), and demonstrate difficulties in communication, self-care, home living, social/interpersonal skills, use of community services, self-direction, functional academic skills, work, leisure, health, and safety (American Psychiatric Association, 2000). The experimental evaluations of Music Activity Therapy suggest that it can enhance their cognitive and social skills.

Some studies considered the impact of music instruction; they detected improvements either in basic music ability (J. Walker, 1982; Wilson & Fredericks, 1982), or in rhythmical responsiveness (Leimohn, 1986; Luckey, Carpenter, & Steiner, 1967; Ross, Ross, & Kuchenbecker, 1973). Wilson and Fredericks (1982), who completed two pilot investigations, found that moderately and severely handicapped children were capable of making gains in keyboard skills, and increased the time they spent humming, singing, and trying to play musical instruments. Ross et al. (1973) compared the pre- and post training scores of fourteen experimental and fourteen control group participants with mild intellectual disability. The results indicated that teaching rhythm skills improved eight categories of rhythmical responses including clapping to a beat, imitating a rhythm, and keeping time with instruments.

Other research measured cognitive improvement either in terms of intelligence (Wingert, 1972), or time-on-task (Jellison & Gainer, 1995; Staples, 1968). Wingert (1972) administered the Peabody Picture Vocabulary Test, and demonstrated significant gains in the measured intelligence of children (n=10) attending Music Activity Therapy compared to a control group (n=10) who had musical participation in regular classes but no additional music treatment. The pre- and post-test

intelligence scores yielded a mean difference of 5.6 for the experimental group, and -1.6 for the control group. Jellison and Gainer (1995) compared the behaviour of an 11-year-old girl with mild intellectual disability throughout an entire year of music education and during Music Activity Therapy: in this case a programme of different music activities. The results revealed that her correct responses, and time-on-task, were twice as high in Music Activity Therapy, and there were fewer instances when she did not respond to prompts. Staples (1968) used music as a mediator in Paired-Associate learning, and improved performance when pairs of words and nonsense syllables were presented to individuals with mild intellectual disability in a rhythmic rather than a melodic or oral framework. This outcome suggested that music assisted cognitive development by improving retention and memory skills.

A more recent experiment suggests that Music Activity Therapy contributes to the social development of individuals with an intellectual disability. MacDonald, O'Donnell et al. (1999) compared the results of an experimental group (n=19) who participated in music workshops using a set of percussion instruments collectively known as the Gamelan, an intervention control group (n=24) that took part in cooking and art classes, and a non-intervention group (n=16). MacDonald et al. (1999) suggested that Music Activity Therapy facilitated understanding and expression at the single word level. Participants (n=59) had been asked to verbally identify one of four photographs on a single page, and the procedure involved conventional communication rules, such as appropriate focus of attention, question recognition, and constructing an appropriate answer. MacDonald et al. (1999) discovered a tautological relationship between musical ability and functional gain. They provided statistical evidence that "the gains in communication (identified by the research) were significantly correlated with gains in Simple Rhythm Production and Instrumental Rhythm Production (measured by the Elmes test of Musical Attainment)" (page 235). They commented that "at the same time as developing musical skills, the participants also appear(ed) to develop certain communication skills that (were) important in terms of inter-personal interactions" (page 235-236).

Other investigations have shown that music activities affect the social behaviour of children and adults with an intellectual disability. Braithwaite and Sigafos (1998) used an ABAB reversal design to compare rates of appropriate communication responses during a social interaction condition (A) and a musical antecedent condition (B) that embedded similar interaction opportunities in singing and playing activities. The results suggested, "that musical antecedents can facilitate communication responsiveness in some children with (intellectual) disabilities" (page 100). Five children (3 years 5 months to 4 years 10 months) were included in the study, and the music condition was associated with "moderate increases in communication responsiveness" (page 100) for three of them. McCarthy and Bakaitis (1976) measured changes in interaction and attention, and Thomas, Egnal, Van Eeden, and Bond (1974) examined changes in social age. Thomas et al. (1974), who compared the pre, and post, treatment scores of nine boys with profound intellectual disability, demonstrated that individual or small group music therapy, given bi-weekly for 11½ weeks, increased their social age and fine motor control. McCarthy and Bakaitis (1976) analysed the attentive and disruptive behaviour data of 300 students with moderate intellectual disability, physical, and multiple handicap, and discovered that music therapy increased attentiveness and decreased disruptiveness.

Humpal (1991), Hooper (2001), Jellison, Brooks, and Huck (1984), and Gunsberg (1988) considered the effect of Music Activity Therapy on peer interaction.

When Humpal (1991) examined a programme that structured the peer interactions of twenty-five people with an intellectual disability, the mean percentage of students who selected a partner when directed rose from 69% during pre-test to a post-test figure of 93%. Hooper (2001), who organised Music Activity Therapy and a control condition (ball games) to assist the social interactions of four people with an intellectual disability (33 to 51 years), found that both interventions increased peer interactions. Hooper suggested that the results affirmed the value of employing non-verbal interventions to encourage interaction. The participants had been able to interact in spite of limited linguistic skills, and the music activities and ball games had diffused the stress associated with doing so.

Finally, as well as encouraging peer interactions, Jellison, Brooks, and Huck (1984) and Gunsberg (1988) demonstrated that music, structured for the purpose, facilitated interactions between individuals with intellectual disability and their non-handicapped peers. Gunsberg (1988) suggested that music sustained social play in this way because it accommodated the varying playing styles and skills of nine children with intellectual disability, and three children without intellectual disability. DeBedout and Worden (2006) highlighted the key role the personal contact of a music therapist often played in the development of interactions. DeBedout and Worden (2006) monitored the movement responses (assumed to be a positive measure of an attempt to interact) of 17 children (5 years to 13 years). A music therapist singing to, and playing with, an intellectually disabled child evoked more movement responses than two impersonal interventions (switch activated toys and recorded music).

(c) Songs and singing:

Music Activity Therapy is an active music therapy intervention that employs a variety of activities, and, in particular, research has focused on how songs and singing meet the needs of individuals who have an intellectual disability.

There is evidence that these types of activities have assisted speech and language by developing imitation (Buday, 1995), articulation (Detzner, 1997; Moss, 1974), and expressive language (Hoskins, 1988). Buday (1995), for example, demonstrated that 10 children with autism and mild to severe intellectual disability (4 years 4 months to 9 years) correctly imitated more words when they were sung rather than spoken. Moss (1974), and later Detzner (1997), identified improvements in articulation. Detzner (1997) demonstrated how progressing from humming and tapping the rhythm of a target word, to adding the actual word to the tapping, and then independent vocalising, improved the articulation and self-confidence of 10 people with profoundly intellectual disability (12 years to 21 years). Moss (1974) compared the articulation and picture vocabulary test scores of 23 experimental and 23 control group participants (11-23 years), and indicated that singing improved the speech articulation and conversational skills of students with mild intellectual disability. Hoskins (1988), who reported a significant improvement in pre-/post-intervention Peabody Picture Vocabulary Test scores of 16 children (2 years to 5 years) with intellectual disability, also suggested that singing activities increased expressive language abilities. In each case, singing focused attention more intently on-task, and made for an enjoyable learning environment.

Songs and singing have also played a significant role assessing and treating Rett syndrome. Wylie (1996) increased the purposeful hand use of two children with Rett syndrome by using songs that encouraged them to touch, grasp, or hold instruments and objects. Elefant (2005), who used a single subject multiple probe case design to evaluate the individual choice of seven girls with Rett Syndrome (4 years to 10 years), and to monitor their response to familiar and unfamiliar songs,

found they acquired and sustained choice making skills. The participants had clear likes and dislikes (they preferred familiar songs that were faster, and included differences in tempo and vocal sounds), and this suggested that a motivational list could be put together for each child that would "ensure (their) co-operation in any activity calling for active participation" (page 158).

Finally, there are examples of songs and singing activities developing skills, and modifying behaviour. Orlando (1993) and Kern (2004) used original songs to increase the basic coin money skills, and childcare routines of children with mild intellectual disability. White and Allen (1966), Hooper, Lindsay, and Richardson (1991), Brownell (2002), and Pasiali (2004) employed singing interventions to modify behaviour. White and Allen (1966) demonstrated that participants with mild intellectual disability who sang out their psychological history (psychodramatics) (n=20), or took part in group singing (n=20), developed "more positive and healthy concepts of self" (page 71) than those who did not (n=20). Hooper et al. (1991) found that a daily singsong reduced displays of anxiety-related challenging behaviours when an institutionalised 36 year-old woman with moderate intellectual disability went back to the ward environment after music therapy. Brownell (2002) and Pasiali (2004) set a social story to music (a short story that shares relevant information about a person, skill, event, or social situation and describes appropriate responses (Gray, 1998)), and demonstrated that using songs in this way had the potential to decrease a targeted challenging behaviour.

(4) Discussion

Music Activity Therapy tended to be the most frequently evaluated approach. The clinical work carried out using Music Activity Therapy, and the evaluations of that work, reflected an awareness of the range of adaptive functions affected when an individual has an intellectual disability, and the importance not just of determining whether or not Music Activity Therapy contributed to alleviating the various impairments associated with the condition, but also of considering how, and why, it acted as a mechanism for change. However, on the negative side, confounding variables may have influenced some outcomes. For example, the practice of using group formats in investigations of social behaviour is a potential confound. The extent to which observational learning plays a part remains unclear, and it is possible that different results may have been obtained in a one-to-one format. Maturation, and/or any concurrently running treatments, may have contributed to observed improvements when results were based on pre- and post-test measures separated by a period of time. Short experimental periods, and the added interest of another person (the consequence of the strong interpersonal element in improvisation and Music Activity Therapy), may have increased the possibility of a Hawthorne effect when responses are due to the novelty of the intervention.

Second, any positive assessment of the improvisation and Music Activity Therapy research must be weighed against an overall absence of generalisation and maintenance data. In the main, the studies discussed in this part of the review did not determine the impact of improvisation and Music Activity Therapy on everyday behaviour outside of the treatment setting, and consequently stopped short of identifying any long-term effect. MacDonald et al. (1999) were a rare exception. They indicated that the developments made by the experimental group remained six months following the intervention. Likewise, Elefant (2005) performed maintenance sessions, and established that learning was sustained over time. Otherwise, the reported effects were limited to a particular stimulus, and a very specific context.

This section of the review started by observing a shortfall in the quantity of experimental research compared to material that *described* active music therapy. It is not alone in doing so. A review of music therapy in the education of adults with an intellectual disability (Stephenson, 2006), two meta-analyses (Gold, Voracek, & Wigram, 2004; Whipple, 2004), a Cochrane review (Gold, Wigram, & Elefant, 2006), and a Succinct and Timely Evaluated Evidence Review (STEER) (Ball, 2004) all arrived at the same conclusion. When Stephenson (2006) carried out an exhaustive search, she identified only seven studies published between 1995 and 2004 that included children aged 4 to 18 years old with moderate to profound intellectual disability or multiple disabilities (excluding autism spectrum disorders). Ball (2004), Gold et al. (2006), and Whipple (2004), who focused on autistic spectrum disorder, all found less than ten published studies.

In many respects, the paucity of experimental literature may reflect underlying concern within the music therapy profession that reducing a dynamic, interpersonal process to series of numbers ignores the musical content of active music therapy as a whole, and the psychodynamic orientation of models based on improvised music. Certainly we have seen that Lawes and Woodcock (1995) struggled with that notion, and questioned whether the experimental design may have interfered with the therapeutic process. Although the nature of active music therapy, which is grounded in one-to-one relationships, and often explores the emotional states of individuals, makes it a difficult task to gain scientific proof of its success, more studies are needed that provide valid clinical evidence from which to draw substantive conclusions about the efficacy of music therapy. However, music therapists must be careful how they achieve that aim. When Duffy and Fuller (2000) compared a non-music control group (n=15) and participants with moderate intellectual disability (5 to 10 years) who took part in a music therapy social skills training programme (n=16), the music therapy condition was a cassette tape of pre-recorded music and an instruction manual. Although it controlled for Hawthorne effect, the intervention failed to capture the spontaneity and creativity of active music therapy. As psychologists they may be excused for believing that Music Activity Therapy can be presented in this manner, however, the answer lies not in compromising active music therapy interventions but in finding a research methodology that retains the flavour of music therapy sessions, that takes account of the individuality of treatment, and that acknowledges how recruitment difficulties and the complex nature of intellectual disability make it difficult to create homogeneous control and experimental groups.

Only four out of seventy or so studies that examined Music Activity Therapy gathered qualitative data; they did so from interviews (Allgood, 2005), qualitative examination (Stough, 1994), and video analysis (Holck, 2004; Wheeler, 1999). It is difficult to explain why qualitative methodologies have not been employed more frequently. Qualitative research is a more naturalistic method of enquiry: it relies on observation, and uses words rather than numbers to describe the qualities of phenomena (Bowling, 1997). As such, qualitative research seems the natural extension of the descriptive writing so widely favoured by music therapists working with people who have an intellectual disability. An alternative may be to consider single-case design. The term originates from the fact that each participant serves as his/her own control, and a single-case study determines the relationship between *dependent variables* (the behaviour(s) measured) and *independent variables* (the interventions) (Goodwin, 1995). Elefant (2005) was quick to acknowledge how single-case design was suitable because it stayed close to the practice of a therapist, and another recent example (Kern 2004) demonstrated how this approach respected

individuality, and did not compromise the flexibility of active music therapy. Single-case experimental design enabled Kern to adapt Music Activity Therapy to the particular needs of a single child.

Receptive music therapy

(1) Background

Instead of making music, receptive music therapy always involves listening to either a contingent, contingent-interrupted, or non-contingent music stimulus (Wigram et al., 2002). The music, which may be pre-composed, specially composed, or improvised, is based on the client's need (Grocke & Wigram, 2007). Children's songs are used with younger individuals (Macurik, 1979), and adults are introduced to contemporary music, and contemporary music styles, that include rock and roll (Cotter, 1971), and country (Rapp, 2004). The stimulus may be presented 'live' (i.e. sung or played to the client by a music therapist), or it may be relayed via a CD player, computer, or through a vibroacoustic device that combines low frequency sound vibration and acoustic sound (music) (Grocke & Wigram, 2007). The client who attends receptive music therapy often responds silently. However, they may be encouraged to express their reaction, and they can do so either verbally, or they can choose a non-verbal approach. For example, music collage is a technique that allows clients to express their inner feelings by arranging illustrations, photographs, pieces of coloured paper or cloth, and other materials on to a piece of paper or cardboard (Grocke & Wigram, 2007).

(2) Contingent or contingent-interrupted stimuli

Fifty-six investigations either presented a music stimulus to people with an intellectual disability dependent (contingent) on the performance of a desired behaviour, or removed (contingent-interrupted) the stimulus when unwanted behaviour occurred. They used passive stimuli: recorded music (Cotter, 1971), the participant's preferred recorded music (Davis, Wieseler, & Hanzel, 1983; Hallum, 1984), music and vibration (McClure, Moss, McPeters, & Kirkpatrick, 1986), televised music lessons (Dorow, 1976), and record listening (J. M. Johnson & Phillips, 1971; Jorgenson, 1974). Although active stimuli were used less frequently, Talkington and Hall (1970) and Cook and Freethy (1973) reported the use of piano playing, Walker (1972) employed playing rhythm instruments in time to recorded music, and Garwood (1988) used an improvisational music therapy session.

This research demonstrated that intellectual disability population found contingent music rewarding enough, and contingent-interrupted music punishing enough, to either promote a desired behaviour, or reduce the incidence of an inappropriate one. The various contingent or contingent-interrupted music stimuli were used to:

- (a) Develop motor skills and promote better posture.
 - (b) Improve academic performance and work rate.
 - (c) Address challenging behaviour.
- (a) Developing motor skills and promoting better posture:

The participants had a physical as well as an intellectual disability, and a contingent stimulus was used to encourage head lifting (Hallum, 1984), and controlled head (Walmsley, Crichton, & Droog, 1981) and hand movements (Gutowski, 1996; Haskett & Hollar, 1978). It was also employed to develop upper body posture (C. M. Johnson, Catherman, & Spiro, 1981; Silliman-French, French, Sherrill, & Gench, 1998) and head positioning (Grove, Dalke, Fredericks, & Crowley, 1975; Macurik, 1979; Wolfe, 1980). Wolfe (1980), and Macurik (1979), for example,

presented recorded children's music dependent on erect head posture and correct head position respectively. Wolfe (1980) promoted correct head posture among some cerebral palsied participants with mild to profound intellectual disability. Macurik (1979) decreased the slouching of three patients with severe intellectual disability.

(b) Improving academic performance and work rate:

Miller (1976) used high preference (rock) and low preference music (classics), contingent on correctly calculated sums, to improve the arithmetic performance of four groups (n=6) of children with mild intellectual disability. Cotter (1971), and Bellamy and Sontag (1973), increased assembly line production rates. Cotter (1971) demonstrated that eight girls with moderate intellectual disability worked significantly faster under contingent music conditions than eight non-contingent participants.

(c) Addressing challenging behaviour:

Intellectual disability is associated with additional unusual behaviours that fall into the broad categories of aggression, destructiveness, self-injury, and stereotyped mannerisms. The term 'challenging behaviour' is used to describe these behaviours. It is a reminder that they are 'challenges' to services, and not problems that people with an intellectual disability carry around with them. Steele and Jorgenson (1971), for example, decreased the stereotypic hand movement and rocking of a 10-year-old child with profound intellectual disability by interrupting preferred music immediately after each challenging behaviour. Rapp (2004) decreased the stereotypy of a Down syndrome boy with moderate intellectual disability by taking away background country music and a guitar. Barmann and Croyle-Barmann (1980) interrupted rock and roll music, and this controlled the disruptive crying and head-banging of a child with severe intellectual disability during a bus ride.

A recent meta-analysis (Standley, 1996) confirmed the efficacy of this approach. Standley included 98 studies in the meta-analysis, and established a mean effect size by participant characteristic. The studies were carried out with normal participants, emotionally impaired, medically/physically impaired, and people with an intellectual disability, and the greatest effects were observed among the intellectual disability population (ES=3.16). However, there were possible methodological limitations and confounds. First, individual(s) may be unable to focus on a contingent auditory stimulus because surrounding noise distracts them. Second, the interrupted music conditions generally involved two contingencies: removing music contingent on disruptive behaviour, and re-presenting music contingent on non-disruptive behaviour. It is possible that either, or both, may have been responsible for the changes observed. Third, the treatment phases of each investigation rewarded an increase in performance. Consequently an experimental procedure, which ensured success bred more success, may have contributed to increased performance rather than the contingent musical stimulus.

(3) Non-contingent stimuli

A non-contingent stimulus must have an effect on behaviour: a process that begins with music altering mood state (a psychological change), and then influencing heart rate or pulse rate (a physiological change). Investigations that demonstrate both a positive and negative correlation between the tempo and volume of music and changes in general activity provide the theoretical basis for using non-contingent music with the intellectual disability population. For example, Adams, Tallon et al. (1980) found that four participants (23 to 56 years) with profound intellectual disability displayed significantly lower levels of stereotypic behaviour during quiet, and in the course of a music condition (an easy listening radio station), than when the television was on. On the other hand, Cunningham (1986) discovered that the

vocalisations of seventeen people with severe intellectual disability decreased when instrumental jazz-rock music was played loudly in the group room, and increased when it was played softly.

Non-contingent music has been widely used in the treatment of pre-op (Robb, Nichols, Rutan, Bishop, & Parker, 1995), post-op (Burke, 1997), and hospital out patients (Bampton & al, 1997). It has also helped the elderly by facilitating sleep (Lindenmuth, Patel, & Chang, 1992), reducing agitation (Tabloski, McKinnon-Howe, & Remington, 1995), and decreasing disruptive behaviours (Casby & Holm, 1994). However, despite evidence that it alters their activity level, only a small number of studies considered its effect on individuals with an intellectual disability: they looked at (a) productivity and task performance (n=14), (b) activity level and attention (n=7), (c) challenging behaviour (n=6), (d) range of movement (n=7), and (e) anxiety (n=8).

(a) Productivity and task performance:

Richman (1976), and later Groenweg, Stan et al. (1988), examined whether people with an intellectual disability performed monotonous workshop tasks any better with non-contingent background music. Both improved the accuracy and rate of performance. Richman (1976), for example, increased the mean number of envelopes filled, and then dropped into a wooden bin, by 30 participants with a severe intellectual disability.

Non-contingent background music also enhanced performance, in a learning environment, and during physical exercise. Riddoch and Waugh (2003) found that when it was compared to rock music, non-contingent classical music significantly improved paintings produced by students both with (n=12), and without (n=12), severe intellectual disability. Owlia et al. (1995) invited five adolescents with profound intellectual disability to ride a stationary ergometer. Time-on-task was significantly higher during the preferred music condition than when the participants received no reinforcement.

(b) Activity level and attention:

There are just a handful of investigations that examine the effect of non-contingent music on activity level and attention. Ayres (1987) compared elapsed feeding times, and oral functions, when six severely handicapped people dined in a school cafeteria with unpredictable noise, and in an environment where unpredictable noise was less intrusive and non-contingent music was played. The music condition relaxed the participant's high muscle tone, and improved their oral function. The elapsed feeding times were longer during the music condition, and the feeder's perceptions that they were either shorter or unchanged, suggested that the music had calmed them and they had not felt rushed. On the other hand, Gadberry, Borroni, and Brown (1981), and Kaufman and Sheckart (1985) found that non-contingent music did not change general activity level. Gadberry, Borroni, and Brown (1981) recruited ninety six institutionalised adults with an intellectual disability. The presence, or absence, of music "had no significant effect on overall attention or on selective attention" (page 314). Kaufman and Sheckart (1985) observed twenty adults with profound intellectual disability in their daily living environments, and did so during fast and slow tempo music, white noise, and no auditory stimulation (control condition). There was no significant difference in the auditory stimulation/activity level relationship of the different conditions.

(c) Challenging behaviour, range of movement, and anxiety:

The investigations of challenging behaviour, range of movement, and anxiety used sedative music as a non-contingent stimulus. It had a mixed effect on challenging behaviour. Caron, Donnell et al. (1996) reduced the teeth grinding of

four out of six of the adults with severe to profound intellectual disability. Coyne et al. (2000), who introduced classical music (60 bpm) into four classrooms for students with severe intellectual disability, decreased out of seat behaviour, lowered the noise level, and, in one case, "lightly-reduced" self-stimulatory behaviour. On the other hand, Barber (1999), and Kennedy and Souza (1995), completed investigations with less convincing results. Kennedy and Souza (1995) relayed background music via a portable radio, and discovered that it was not as effective as a hand-held video game competing with, and reducing, the eye-poking of a youth with profound intellectual disability. Barber (1999) carried out a single case study with a man who had severe intellectual disability and autism. It neither supported, nor disproved, the notion that relaxing music affected the severity of his agitated and aggressive behaviours.

Wigram used Vibroacoustic Therapy (VAT) to improve the range of movement of individuals with profound intellectual disability and spastic cerebral palsy (Skille & Wigram, 1995; Wigram, 1992, 1997), and to reduce the anxiety, restlessness and challenging behaviour of two out of three adult participants (26 to 31 years) (Wigram, 1993). (During VAT a client reclines on a chair, mattress or bed, and, as s/he listens, directly experiences the audio generated vibrations created by music that is being played through speakers built into these units (Wigram et al., 2002)). Finally, a series of controlled case studies (Hooper and Lindsay (1990; 1991; 1997)) demonstrated that recorded and live sedative music (singing to the participants) alleviated the anxiety of adults with mild and moderate intellectual disability. When Hooper and Lindsay (1990), and Hooper and Lindsay (1997), compared the interventions they identified an advantage of providing relaxing music in person; the participants "respond(ed) better to the attention of an individual" (Hooper & Lindsay, 1997, page 173).

(4) Discussion

This comment raises an important question about introducing non-contingent, or for that matter contingent and contingent-interrupted, music to people who have an intellectual disability. Will these receptive techniques command their attention? Ford (1999) suggested that they could. Ford compared a non-music activity (water play), an active (instrument playing) and receptive (listening) music intervention, and found that music listening was the only intervention that encouraged a strong downward trend in teeth-grinding. On the other hand, Luckey, Carpenter, and Steiner (1967) suggested the opposite. Luckey, Carpenter, and Steiner increased the motor activity, interest, and attention of fifteen adults with mild intellectual disability when the music therapist clapped, sang, and marched, compared to when the music therapist sat inactively while recorded music was playing. It appeared that, as Hooper and Lindsay were suggesting, the attention of an individual played an important role encouraging a positive response, and, that non-contingent music was often no substitute for the presence of a music therapist.

Although this may explain why Gadberry et al. (1981), and Kaufman and Sheckart (1985), discussed above, discovered that non-contingent music did not significantly alter the general activity level of individuals with an intellectual disability, it ignores the many occasions when receptive interventions did influence their motor skills, activity level, attention, academic performance, work rate, or challenging behaviour. Perhaps the choice of stimulus explains the lack of effect. Gadberry et al. (1981) acknowledged that they "did not independently verify the attractiveness of the musical accompaniment program" (page 315). Consequently, it appears that each researcher should endeavour to get this aspect of any receptive intervention correct. S/he can do this, either by identifying the participant's preferred

music, or, when this is not possible, by ensuring that careful attention is paid to the selection of contingent, contingent-interrupted, or non-contingent music, and by making certain that a procedure is put in place to identify the most appropriate stimulus.

Conclusion

Overall, the experimental writing encompasses a wide range of interventions and therapeutic outcomes, and, similar to the descriptive literature identified in part one of the review, it reflects the diverse way in which music therapy is employed with individuals who have an intellectual disability, and the array of functional skills that it encourages. In *Music Therapy: International Perspectives* Cheryl Maranto (1993) classified music therapy clinical practice, and defined fourteen schools of practice with six categories of musical experience, and no fewer than one-hundred-and-twenty-three music therapy techniques (Hooper, 2002). Clearly, this review does not identify each and every one of these techniques, but it does highlight the value of considering a range of options when introducing an individual who has an intellectual disability to music therapy. In addition, investigations of musical aptitude help understand the cognitive profile of diagnostic subgroups.

On the down side, the experimental literature leaves questions unanswered. Although studies have established that receptive methods achieve physical outcomes (there is evidence that a contingent stimulus develops motor skills and promotes better posture, and that VAT improves the range of movement of individuals with profound intellectual disability and spastic cerebral palsy), it is surprising, especially as interest grows in sensory integration theory, that more studies have not examined how active music therapy interventions effect physical systems.

Sensory integration is an innate neuro-biological process (Hatch-Rasmussen, 1995). It is how individuals organise and respond to the sensory information they receive through the receptors found in special sense organs - their eyes (visual system), inner ear (auditory system), and tongue, and in receptors found throughout their bodies in muscles and joints, internal organs and their skin (tactile, vestibular, and proprioceptive systems). The brain takes in information through the senses about the body and the environment (*input*), it sorts and screens that information (*integration*) and then, after it is put together with information, memories, and knowledge already stored in the brain, an individual responds appropriately to a given situation (*interpretation*) (M.R. James, 1984). In the normal course of events, the nervous system filters and inhibits non-essential incoming information (Spitzer, Roley, Clark, & Parham, 1996). However, problems can occur sorting and screening sensory information, and experts believe that these sensory modulation difficulties may be at the root of challenging behaviours displayed by people with an intellectual disability. They have suggested that autistic children engage in stereotyped movement, and perseveration, to help modulate hypo-reactive sensory systems (Baranek, Foster, & Berkson, 1997), and that they withdraw to block-out stimulation from a hyper-reactive system (Greenspan & Wieder, 1997). Self-stimulation and self-injury are viewed as attempts to obtain sensory stimulation (Wells & Smith, 1983). While it is suggested that individuals who scream or display temper tantrums may be doing so as they are overwhelmed by sensory input. It may be an expression of the feelings that arise when the most common of sensations are confusing and frightening and it is difficult to comprehend and communicate this experience (Gorman, 1997).

Playing any instrument is a physical experience that requires sensory integration. Playing the guitar, for example, stimulates the physical systems: the

tactile system as the client strums the guitar; the visual system that guides their limbs, and the auditory system that confirms the accuracy of their response and determines the future actions taken by the other sensory systems (Hooper, McManus, & McIntyre, 2004). James et al. (1985), discussed earlier, instigated a programme of music and movement based on sensory integration principles. However, the sensory systems involved when someone plays an instrument, and the process of sensory integration that occurs, suggest that more attention should be paid to evaluating the various elements of the physical response during active music therapy.

Second, evidence of generalisability and/or long-term effect strengthens any outcome of experimental research. It suggests that the results apply to the wider population of interest, and not just to particular participants in a specific setting. The review identified a shortage of literature that examined these aspects of the participant's response, and somehow, music therapists must undertake well-designed evaluations that ensure the external validity of their results. How they set about achieving that aim presents a challenge. There is the sense that the experimental writing compliments the descriptive accounts identified in part one of the review. The experimental writing mirrors the techniques and outcomes elucidated in those accounts. However, although this is the case, is experimental research really the best way to understand improvisation-based music therapy, for example? An earlier discussion section considered this issue. It highlighted the tension experienced by music therapists who believed they were deviating from normal working practices to accommodate experimental design. This will continue to concern music therapists, and perhaps the answer is to use qualitative, or single subject design methodologies.

Finally, the music and intellectual disability review was divided into categories. However, instead of distorting the literature by focusing on descriptive, philosophical, or experimental writing, it should be viewed as a body of work. It establishes the efficacy of introducing people with an intellectual disability to music, and music therapy, both by describing the richness of the clinical experience, and, in the case of this review, by exploring the cause-effect relationships that underlie those experiences.

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"Moonlight" Sonata in C#m

(1st movement: quasi una fantasia)

Ludwig van Beethoven

♩ = 55 Adagio sonstenuato

pp

Ped.

Ped.

Ped.

Ped.

This system contains measures 1 through 3. The treble clef staff features a continuous eighth-note melody. The bass clef staff has a single half-note chord in each measure. Pedal markings are present in the bass staff for measures 1, 2, and 3.

Ped.

Ped.

Ped.

Ped.

Ped.

This system contains measures 4 through 6. The treble clef staff continues the eighth-note melody. The bass clef staff has a single half-note chord in each measure. Pedal markings are present in the bass staff for measures 4, 5, and 6.

Ped.

Ped.

Ped.

Ped.

Ped.

This system contains measures 7 through 9. The treble clef staff continues the eighth-note melody. The bass clef staff has a single half-note chord in each measure. Pedal markings are present in the bass staff for measures 7, 8, and 9.

Ped.

Ped.

Ped.

Ped.

Ped.

This system contains measures 10 through 12. The treble clef staff continues the eighth-note melody. The bass clef staff has a single half-note chord in each measure. Pedal markings are present in the bass staff for measures 10, 11, and 12.

Ped.

Ped.

Ped.

Ped.

Ped.

This system contains measures 13 through 15. The treble clef staff continues the eighth-note melody. The bass clef staff has a single half-note chord in each measure. Pedal markings are present in the bass staff for measures 13, 14, and 15.

16
Ped. Ped. Ped. Ped. Ped. Ped. Ped. Ped. Ped.

19
Ped. Ped. Ped. Ped.

22
Ped. Ped. Ped. Ped.

25
cresc. *decresc.*
Ped. Ped. Ped. Ped. Ped. Ped. Ped. Ped.

28
p *mp* *mp* *mp*
Ped. Ped. Ped. Ped. Ped. Ped. Ped. Ped.

31
p
Ped. Ped. Ped. Ped. Ped. Ped.

34

Musical score for measures 34-36. The system consists of a treble clef staff and a bass clef staff. The key signature has three sharps (F#, C#, G#). The treble staff contains a melodic line with eighth and sixteenth notes, including a trill in measure 35. The bass staff contains a sustained pedal point with a long slur over measures 34-36. Pedal markings are present at the beginning of each measure.

37

Musical score for measures 37-39. The system consists of a treble clef staff and a bass clef staff. The key signature has three sharps. The treble staff contains a melodic line with eighth notes and slurs. The bass staff contains a sustained pedal point with a long slur over measures 37-39. Pedal markings are present at the beginning of each measure.

40

Musical score for measures 40-42. The system consists of a treble clef staff and a bass clef staff. The key signature has three sharps. The treble staff contains a melodic line with eighth notes and slurs. The bass staff contains a sustained pedal point with a long slur over measures 40-42. Pedal markings are present at the beginning of each measure.

43

Musical score for measures 43-45. The system consists of a treble clef staff and a bass clef staff. The key signature has three sharps. The treble staff contains a melodic line with eighth notes and slurs. The bass staff contains a sustained pedal point with a long slur over measures 43-45. Pedal markings are present at the beginning of each measure.

46

Musical score for measures 46-48. The system consists of a treble clef staff and a bass clef staff. The key signature has three sharps. The treble staff contains a melodic line with eighth notes and slurs. The bass staff contains a sustained pedal point with a long slur over measures 46-48. Pedal markings are present at the beginning of each measure.

49

Musical score for measures 49-51. The system consists of a treble clef staff and a bass clef staff. The key signature has three sharps. The treble staff contains a melodic line with eighth notes and slurs. The bass staff contains a sustained pedal point with a long slur over measures 49-51. Pedal markings are present at the beginning of each measure.

Musical score for piano, measures 52-66. The score is written for two staves (treble and bass clef) and includes dynamic markings such as *cresc.*, *p*, *pp*, and *decresc.*. Pedal markings (*Ped.*) are present throughout the piece, indicating sustained notes. The key signature is three sharps (F#, C#, G#).

Measures 52-54: Treble clef melody with eighth-note patterns. Bass clef accompaniment with chords and eighth notes. Pedal markings under the bass line.

Measures 55-57: Treble clef melody with eighth-note patterns. Bass clef accompaniment with chords and eighth notes. Pedal markings under the bass line.

Measures 58-60: Treble clef melody with eighth-note patterns. Bass clef accompaniment with chords and eighth notes. Pedal markings under the bass line. Dynamic markings: *cresc.* (measures 58-59), *p* (measure 60), *pp* (measure 60).

Measures 61-63: Treble clef melody with eighth-note patterns. Bass clef accompaniment with chords and eighth notes. Pedal markings under the bass line.

Measures 64-65: Treble clef melody with eighth-note patterns. Bass clef accompaniment with chords and eighth notes. Pedal markings under the bass line.

Measures 66: Treble clef melody with eighth-note patterns. Bass clef accompaniment with chords and eighth notes. Pedal markings under the bass line. Dynamic markings: *decresc.* (measures 66-67), *pp* (measure 66).

APPENDIX 4:**UNIVERSITY OF WALES INSTITUTE OF TECHNOLOGY
MOOD ADJECTIVE CHECKLIST (UMACL)**

- The UMACL is made up three factorial scales - Energetic arousal (EA), Tense arousal (TA) and Hedonic tone (HT), plus a composite General arousal (GA) scale.

- The three factorial scales consist of four positive and four negative items. The composite GA scale consists of six positive and six negative items.

Adjective	Scale(s)	Definitely		Slightly		Slightly not		Definitely not	
		R	S	R	S	R	S	R	S
Happy	HT+	1	4	2	3	3	2	4	1
Dissatisfied	HT-	1	1	2	2	3	3	4	4
Energetic	EA+ GA+	1	4	2	3	3	2	4	1
Relaxed	TA- GA-	1	1	2	2	3	3	4	4
Alert	EA+ GA+	1	4	2	3	3	2	4	1
Nervous	TA+ GA+	1	4	2	3	3	2	4	1
Passive	EA- GA-	1	1	2	2	3	3	4	4
Cheerful	HT+	1	4	2	3	3	2	4	1
Tense	TA+ GA+	1	4	2	3	3	2	4	1
Jittery	TA+ GA+	1	4	2	3	3	2	4	1
Sluggish	EA- GA-	1	1	2	2	3	3	4	4
Sorry	HT-	1	1	2	2	3	3	4	4
Composed	TA-	1	1	2	2	3	3	4	4
Depressed	HT-	1	1	2	2	3	3	4	4
Restful	TA- GA-	1	1	2	2	3	3	4	4
Vigorous	EA+	1	4	2	3	3	2	4	1
Anxious	TA+	1	4	2	3	3	2	4	1
Satisfied	HT+	1	4	2	3	3	2	4	1
Unenterprising	EA-	1	1	2	2	3	3	4	4
Sad	HT-	1	1	2	2	3	3	4	4
Calm	TA- GA-	1	1	2	2	3	3	4	4
Active	EA+ GA+	1	4	2	3	3	2	4	1
Contented	HT+	1	4	2	3	3	2	4	1
Tired	EA- GA-	1	1	2	2	3	3	4	4

R=Response; S=Score.

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How are the responses to each adjective scored and how is a single score obtained for each scale?

For each scale find the eight (or twelve) individual item scores (S) that correspond to the responses (R) given, and then add them together to give a total EA, TA, HT and GA score.

APPENDIX 5: Timings and description of musical factors in *No matter what (0:00-2:23)*

Musical factor	Definition of predictability	Selection 1 (Expt 1) Track 2 (Expt 3)
Form	Verse & chorus or introduction, verse & chorus structure.	1
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1
Texture	Remaining stable with subtle changes in style or instrumentation.	1
Melody - Line	Repetition of material.	1
- Line	Little embellishment, no unexpected pauses or breaks.	1
- Timbre	Gentle sound with gradual changes within and between instrument families.	1
- Pitch	Gradual changes between registers.	0 ¹ 1:33; 2:04 (<i>Sudden change</i>).
- Accents	Few – used to add expression rather than energy to a melodic line.	1
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1
PFSM SCORE		9

Introduction (0:00): The music begins with a flowing, gentle eight bar guitar introduction supported by a simple rhythmic bassline.

Verse (0:22): During the verse, the simple rhythmic bassline continues and a solo cello plays the melody accompanied by subtly introduced guitar phrases that do not interrupt the texture. The melody is then played in thirds (0:43) that further enrich the flowing, gentle and unembellished line.

Chorus (1:02): As the solo cello plays the chorus as a single melody line, strings are seamlessly added to the texture (1:08).

Verse (1:24): The melody is then taken up effortlessly by the strings and accompanied by a solo cello counter-melody. There is a sudden change of register in the counter-melody ¹(1:33). The melody passes back to the solo cello (1:43) before another sudden change of register ¹(2:04) marks the return of the chorus.

Chorus (2:04): The solo cello continues with the chorus melody and, until the extract ends (2:33), it is supported by strings and by the simple rhythmic bassline line that has set the steady tempo of the whole arrangement.

1 = presence of a predictable factor; 0 = absence of a predictable factor.

APPENDIX 6: Timings and description of musical factors in *The long and winding road (0:00-2:33)*

Musical factor	Definition of predictability	Selection 2 (Expt 1) Track 4 (Expt 3)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	1	
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	¹ 0:31; 0:59-1:05; 1:11 (<i>Embellished texture</i>). ² 2:02-2:04 (<i>Embellished line</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	1	
- Pitch	Gradual changes between registers.	1	
- Accents	Few – used to add expression rather than energy to a melodic line.	1	
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	0	
PFSM SCORE		9	

Verse (0:00) / Chorus (1:18)
Verse (1:32) / Coda (2:14):
 This is an arrangement of a Beatles song for solo classical guitar. It is performed sensitively and with subtle changes to the moderate tempo and quiet dynamic.

The melody is played throughout in a gentle timbre. It moves smoothly between register and is simply presented except for a momentary embellishment ²(2:02-2:04).

The melody is supported by a texture that subtly changes between and interweaves gently plucked and strummed chords, arpeggios, harmonising counter-melodies and a sonorous bass line. While this texture is generally unobtrusive, there are moments ¹(0:31; 1:11) and passages ¹(0:59-1:05) when it contains embellishments that interrupt the melodic line.

The entire arrangement was used and the extract ended after 2:33.

1 = presence of a predictable factor; 0 = absence of a predictable factor.

APPENDIX 7: Timings and description of musical factors in *Blue eyes (0:00-2:31)*

Musical factor	Definition of predictability	Selection 3 (Expt 1) Track 5 (Expt 3)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	1	
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	¹ 0:51-0:53; 2:23-2:25 (<i>Syncopation</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	1	
- Pitch	Gradual changes between registers.	1	
- Accents	Few – used to add expression rather than energy to a melodic line.	1	
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		9	

Verse (0:00): The music begins with a flute playing the melody supported by an electronic keyboard accompaniment and a simple rhythmic bassline. The flute sound is mellow and gentle, and the keyboard accompaniment unobtrusive. The music is harmonically predictable. The tempo, dynamic and texture all remain unchanged except for a short syncopated passage in the keyboard accompaniment ¹(0:51-0:53) that introduces unexpected pauses and breaks.

Chorus (0:58): As the chorus begins, the strings are seamlessly introduced and they play the melody with the flute. The texture is subtly altered. The melody is passed to the clarinet (1:10-1:13) before the flute takes it up again (1:14) and is then joined by the strings (1:21).

Verse (1:32): With the return of the verse, the mellow flute carries the melody on its own supported, as before, by an electronic keyboard accompaniment and a simple rhythmic bassline. The strings add a soaring sustained melody that blends into the texture. The tempo, dynamic and texture all remain unchanged. The music continues in this way until the end of the extract (2:31), and stops just after a short syncopated passage in the keyboard accompaniment ¹(2:23-2:25) that introduces unexpected pauses and breaks.

1 = presence of a predictable factor; 0 = absence of a predictable factor.

APPENDIX 8: Timings and description of musical factors in *I have a dream (Royal Philharmonic Orchestra)(1:09-3:29)*

Musical factor	Definition of predictability	Selection 4 (Expt 1) Track 3 (Expt 3)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	1	
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	¹ 2:45-2:47 (Pause and glissando).
- Timbre	Gentle sound with gradual changes within and between instrument families.	1	
- Pitch	Gradual changes between registers.	0	² 3:11-3:14 (Piccolo).
- Accents	Few – used to add expression rather than energy to a melodic line.	1	
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		8	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

Intro (1:09): The mood of the whole arrangement is set by a very restful introduction. The violins play a single sustained note. It is supported by a three-note phrase that is played in unison, and slowly ascends and descends by step in a gently pulsing rhythm.

Verse (1:37): A plaintive oboe emerges and plays the opening phrase of the verse. The opening phrase is then repeated by sonorous horns (1:44) and, after a second repetition delicately played by the flutes (1:53), the flutes carry on with the melody supported by a gently rocking string accompaniment. The warm tone continues as the wind section takes up the melody (2:18). The wind section is supported by string lines that gracefully fall and rise and gradually increase and decrease in volume.

Chorus (2:44): In the chorus the strings take on the melody and their gentle sound is complimented by subtle changes of instrumentation that introduce delicate touches of wind and brass. There are two unpredictable moments when first there is a dramatic pause and glissando in the melody line ¹(2:45-2:47) and then a piccolo passage ²(3:11-3:14) introduces a sudden change of register. The melody returns to the flute (3:20) supported by a gently rocking string accompaniment, and the music continues in this way until the end of the extract (3:29).

APPENDIX 9: Timings and description of musical factors in *Yesterday (James Last Orchestra)(0:00-2:54)*

Musical factor	Definition of predictability	Selection 5 (Expt 1) Track 1 (Expt 3)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	0	¹ 2:10 (<i>Sudden cresc.</i>).
Texture	Remaining stable with subtle changes in style or instrumentation.	1	
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	² 0:23-0:25;0:30-0:31; 0:44-0:48; 0:52; 2:10 (<i>Embellishment</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	1	
- Pitch	Gradual changes between registers.	1	
- Accents	Few – used to add expression rather than energy to a melodic line.	1	
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		8	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

Verse (0:00): The arrangement begins with a delicately strummed guitar introduction that carries on and supports the verse. The tempo and volume remain stable as the violas gently play the melody and a counter-melody. The counter-melody contains passages that interrupt the melodic line ²(0:23-0:25; 0:30-0:31; 0:44-0:48). As the verse progresses, the texture warms when first a bass (0:32) and then a gently soaring violin line (0:38) are seamlessly and subtly introduced.

²Chorus (0:52): The arrangement continues with a mellow viola melody. The viola melody is embellished by an interweaving counter-melody and supported by a steady rhythmic bass line and a subtle touch of warm strings (1:12-1:17).

Verse (1:18)/Chorus (1:41): The steady tempo and the warm, rich texture, are maintained in the reprise of the verse and chorus that follow. In the verse, a sonorous bass line and a soaring violin line merge with the viola melody and counter-melody before the violins, which emerge with a gradual crescendo, play the chorus melody. The violins are supported by a steady bassline and an, at times, barely audible piano accompaniment.

Verse (2:07): The emotional intensity, that has been gradually building throughout the arrangement, is heightened when the rest of the orchestra embellishes the violin melody with a sudden dramatic crescendo through a falling accompanying line ^{1,2}(2:10). The violins play the melody throughout the verse until they fade into the final phase of the verse. The final phrase is passed from the violas (2:30) to the full orchestra (2:37) with a care that allows the music to come gently to rest at the end of the arrangement (2:54).

APPENDIX 10: Timings and description of musical factors in *Ticket to ride (0:00-2:31)*

Musical factor	Definition of predictability	Selection 6 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	0	¹ 1:00-1:12; 2:43 ² 2:06-2:42 (<i>Sudden changes in style</i>).
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	³ 1:50-1:53 (<i>Syncopation</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	⁴ 0:13-1:12 (<i>Harsh guitar</i>).
- Pitch	Gradual changes between registers.	1	
- Accents	Few – used to add expression rather than energy to a melodic line.	1	
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		7	

**Introduction (0:00)/Verse (0:13)/
Chorus (0:40)/Verse (1:13)/
Chorus (1:40)/Verse (2:43):**

The tempo and mood of the entire arrangement are set by a gentle introduction. The introduction is a slowly rising four note arpeggio figure that is repeated four times.

The melody is shared between a harsh electric guitar which plays the opening verse and chorus ⁴(0:13-1:12); a mellow flute which plays the second verse and the first half of the chorus repeat (1:13-2:05) and a clarinet which plays the second half of the chorus repeat (2:06-2:31). The melody is unembellished except for a short syncopated flute passage ³(1:50-1:53) that introduces unexpected pauses and breaks.

The texture - a solo instrument supported by an arpeggio accompaniment - remains stable except for the sudden introduction of pizzicato strings ²(2:06-2:42) and an eerie string glissandi. The string glissandi ¹(1:00-1:12) join the first chorus and second verse together. The pizzicato strings accompany the clarinet that is playing the melody when the extract ends during the reprise of the second chorus (2:31).

1 = presence of a predictable factor; 0 = absence of a predictable factor.

APPENDIX 11: Timings and description of musical factors in *Love me tender (0:00-2:30)*

Musical factor	Definition of predictability	Selection 7 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	0	¹ 1:49 to end (<i>Sudden changes in style and instrumentation</i>).
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	² 0:10; 0:17; 0:25; 0:31; 0:41; 0:44; 0:55; 1:02 (<i>Embellished line</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	1	
- Pitch	Gradual changes between registers.	0	³ 1:49 to end (<i>Sudden changes</i>).
- Accents	Few – used to add expression rather than energy to a melodic line.	1	
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	0	⁴ 1:14-1:18 (<i>Unexpected harmonies</i>).
PFSM SCORE		6	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

Verse (0:00): Throughout the verse the volume and texture remain stable as a solo trumpet plays the melody supported by delicate and, at times, barely audible harp arpeggios. The trumpet player introduces subtle changes of tempo and embellishes the simple line by sliding between notes ²(0:10; 0:17; 0:25; 0:31).

Chorus (0:35): The tempo and volume remain stable as the solo trumpet continues to play and embellish the chorus melody ²(0:41; 0:44; 0:55; 1:02). A luscious string accompaniment, seamlessly introduced, adds to the simple harp arpeggios and enriches the texture. The harp emerges from that texture and plays a gentle and graceful arpeggio (1:03-1:06). The arpeggio eases in a change of texture and timbre as the wind section of the orchestra repeats the final phrase of the chorus. The wind section introduces unexpected harmonies and modulations ⁴(1:14-1:18) before a subtle harp glissando (1:20) prepares the way for the return of the verse.

Verse (1:22): The strings reprise the verse in a warm and rich arrangement and this stable texture is complimented by a delicate touch of woodwind (1:34-1:35). A harp glissando (1:48) emerges from the texture and prepares the way for a reprise.

^{1,3}**Chorus (1:49):** There is a gradual increase in volume and in emotional intensity as the chorus melody is carried first by muted brass (1:49) and then, heralded with a swirling string passage (2:00-2:03), by strings and brass (2:04). This intensity is then gradually dissipated with more sudden changes of texture and pitch. The final phrase is repeated by the violas and cellos (2:18) and they are still playing when the extract ends (2:30).

APPENDIX 12: Timings and description of musical factors in *How deep is your love (0:00-2:50)*

Musical factor	Definition of predictability	Selection 8 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	0	¹ 0:57; 0:59;2:01; 2:03 (<i>Sudden changes in style</i>).
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	² 0:18 (<i>Sudden pause</i>). ³ 0:59-1:08; 2:03-2:12 (<i>Piano arpeggios</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	⁴ 0:00-0:19; 0:31; 0:41-0:42; 1:45-1:59 (<i>Harsh timbre</i>).
- Pitch	Gradual changes between registers.	1	
- Accents	Few – used to add expression rather than energy to a melodic line.	0	⁵ 0:00-0:19; 0:57; 0:59-1:24; 2:01; 2:03- 2:28 (<i>Accented line</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		6	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

^{4,5}**Introduction (0:00):** The pianist plays the six bar introduction at a steady tempo in a clipped and accented chordal style. A simple string line provides a gentle descant that is in marked contrast to the harsher tone of the piano. The section ends with a dramatic and unexpected pause ²(0:18) as the final string and piano notes are sustained.

Verse (0:20): The arrangement continues with the piano playing the verse. The melody line, played with subtle changes of tempo, is now mellower and supported by flowing piano arpeggios and a soaring and gentle string line. However the timbre of the piano becomes harsh when there are repeated notes in the melody ⁴(0:31; 0:41-0:42). The verse closes with a sudden change of texture ^{1,5}(0:57) as the accented chordal playing returns and drives the music forward to the chorus.

Chorus (0:59): The texture suddenly changes again ¹(0:59) as the melody, carried by the strings, is embellished by sparkling piano arpeggios ³(0:59-1:08). The piano arpeggios end in a flourish, and the melody is then taken up by the piano with a flowing violin counter-melody. The melody is played in marked and accented style throughout the chorus ⁵(0:59-1:24). The tempo remains unchanged except when it is subtly slowed (1:24) to mark the reprise of the verse.

Verse (1:25): The piano plays the melody supported by flowing piano arpeggios and a soaring and gentle string line. The melody is mellower, but the timbre becomes harsh when the melody is played at a higher pitch ⁴(1:45-1:59). The verse closes with a sudden change of texture ^{1,5}(2:01) as accented chordal playing drives the music forward to the reprise of the chorus.

Chorus (2:03)/Coda (2:29): The texture suddenly changes again ¹(2:03) as the melody, carried by the strings, is embellished by sparkling piano arpeggios ³(2:03-2:12). The piano arpeggios end in a flourish and the melody is then taken up by the piano with a flowing violin counter-melody. The melody is played in marked and accented style throughout the reprise of chorus ⁵(2:03-2:28). The tempo remains unchanged until it is subtly slowed (2:28) and a four bar piano and simple string line coda (2:29-2:50) brings the music to rest at the end of the arrangement (2:50).

APPENDIX 13: Timings and description of musical factors in *Michelle (0:00-2:31)*

Musical factor	Definition of predictability	Selection 9 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	1	
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	¹ 1:26; 2:12 (<i>Embellishment</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	² 0:23 (<i>Harsh guitar</i>). ³ 0:42-0:58 (<i>Harsh cello</i>).
- Pitch	Gradual changes between registers.	1	
- Accents	Few – used to add expression rather than energy to a melodic line.	0	⁴ 0:23 (<i>Guitar</i>). ⁵ 0:42-0:58 (<i>Cello counter-melody</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	0	⁶ 0:32; 0:51; 1:38; 2:26 (<i>Piano accompaniment</i>).
PFSM SCORE		6	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

Introduction (0:00): The tempo, volume and texture remain stable throughout the introduction. It combines sonorous piano arpeggios and a string melody (0:12) that glides effortlessly from one sustained single note to another.

^{2,4}**Verse (0:23):** The piano arpeggios continue to lend harmonic support, and to maintain a stable tempo, as a solo guitar plucks the verse. The accented and harsh melodic line is accompanied by unexpected dissonance in the piano accompaniment ⁶(0:32; 0:51) and an accented and harsh cello counter-melody ^{3,5}(0:42 - 0:58).

Chorus (0:59) / Verse (1:26) / Chorus (1:48): The volume gradually increases through the chorus, and through the reprise of the verse and the second chorus that follow. The guitar plays the melody with a lush string and piano accompaniment and, at the start of the second chorus (1:48 – 1:54), the melody is smoothly transferred to strings for half a phrase.

There are unpredictable musical factors in these closing sections. The melodic line is embellished ¹(1:26; 2:12) and there are unexpected dissonances in the supporting piano accompaniment ⁶(1:38; 2:26).

The tempo remains stable until the arrangement stops towards the end of the second chorus (2:31).

APPENDIX 14: Timings and description of musical factors in *I have a dream (Pop Orchestra)(0:00-2:31)*

Musical factor	Definition of predictability	Selection 10 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	
Texture	Remaining stable with subtle changes in style or instrumentation.	0	¹ 0:53-0:55; 1:03-1:05; 2:02-2:04; 2:11-2:14 (<i>Sudden change in instrumentation</i>).
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	² 1:58 (<i>Sudden pause</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	³ 0:00-0:12 (<i>Harsh guitar & sitar</i>). ⁴ 0:53-0:55; 1:03-1:05; 2:02-2:04; 2:11-2:14 (<i>Sitar</i>).
- Pitch	Gradual changes between registers.	0	⁵ 1:21-1:24; 1:31-1:34; 2:31 (<i>Sudden change</i>).
- Accents	Few – used to add expression rather than energy to a melodic line.	0	⁶ 0:00-0:12 (<i>Accented guitar & sitar</i>). ⁷ 0:15-0:49 (<i>Guitar</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		5	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

^{3,6}**Introduction (0:00):** The introduction, played by the guitar and sitar, has a harsh tone. The guitar accompanies an accented sitar melody with energetic broken chords that establish the rhythm and maintain the stable tempo of the arrangement.

Verse (0:13): The strings take up the verse melody and are accompanied by the guitar playing strongly accented broken chords ⁷(0:15-0:49).

Chorus (0:51): As the chorus begins a simple rhythmic bass line is added and this reinforces the stable tempo. The strings continue playing the melody and when the sitar echoes the melody ^{1,4}(0:53-0:55; 1:03-1:05) its harsh tone provides a sudden contrast to the gentler string sound.

Verse (1:19): The arrangement continues with the strings playing the verse melody. A string counter melody introduces a sudden change of register ⁵(1:21-1:24; 1:31-1:34), and, along with snatches of sitar playing, it is added to the guitar and rhythmic bass line accompaniment.

Chorus (1:57): The strings begin the reprise of the chorus with a sudden pause ²(1:58) and after the sustained note their gentle string sound is punctuated by harsher sitar playing ^{1,4}(2:02-2:04; 2:11-2:14). The extract ends (2:31) with the strings playing the melody, with a string counter melody introducing a sudden change of register⁵, and with snatches of sitar playing being added to the guitar and rhythmic bass line accompaniment.

APPENDIX 15: Timings and description of musical factors in *Let it be (0:30-3:01)*

Musical factor	Definition of predictability	Selection 11 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	0	¹ 1:22; 2:46 (<i>Sudden cresc.</i>). ² 1:49(<i>Sudden dim.</i>).
Texture	Remaining stable with subtle changes in style or instrumentation.	0	³ 1:22; 1:51; 2:46 ⁴ 0:50; 1:16; 2:29 (<i>Sudden -style</i>).
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	⁵ 1:48; 1:54 (<i>Breaks</i>). ⁶ 2:23(<i>Embellishment</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	⁷ 0:42-0:47; 0:57-0:59; 1:10-1:12; 2:06-2:24 (<i>Harsh timbre</i>).
- Pitch	Gradual changes between registers.	1	
- Accents	Few – used to add expression rather than energy to a melodic line.	0	⁸ 1:22; 2:46 (<i>Accents</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		5	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

Verse (0:30): The verse is performed twice by twelve cellists. It is played with vibrato that provides emotional intensity but, especially during some passages ⁷(0:42-0:47; 0:57-0:59; 1:10-1:12), results in a very harsh timbre. It is accompanied by a lush counter-melody. The counter-melody adds warmth and harmonic interest to the arrangement but introduces a short glissando at the end of each repetition ⁴(0:50, 1:16) that intrudes on the melody. The gradual decrease in tempo and volume, that marked the end of first performance of the melody (0:52-0:55), is repeated (1:17-1:21) as this section draws to a tender and hushed close.

^{1,3,8}**Chorus (1:22):** The chorus interrupts the momentary silence and introduces a dramatic change of volume and texture. The melody is hammered out as accompanying off beat accents add further energy to the arrangement. As the melody is developed (1:45-1:58), there are sudden, unpredictable changes in volume ²(1:49) and texture ³(1:51) and unexpected breaks in the melodic line ⁵(1:48; 1:54). This section closes with a gradual decrease in volume (1:51-1:56).

Verse (1:58): The verse emerges from a gentle pizzicato and sustained chord texture (2:06). It is performed with an emotional intensity that produces embellishment ⁶(2:23) and an accented and harsh line ⁷(2:06-2:24). The verse is repeated and an intrusive counter-melody ⁴(2:29) is introduced. The melody and counter-melody interweave, supported by a gentle pizzicato, until they come to rest (2:45).

^{1,3,8}**Chorus (2:46):** The chorus interrupts the momentary silence with another dramatic change of volume and texture. The melody is played with clipped phrasing and accompanying off beat accents, and the music continues in this way until the end of the extract (3:01).

APPENDIX 16: Timings and description of musical factors in *Money, money, money (0:00-2:31)*

Musical factor	Definition of predictability	Selection 12 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	0	¹ 0:54-0:58; 1:02-1:06; 1:47; 2:09-2:11; 2:17-2:19 (<i>Sudden cresc.</i>).
Texture	Remaining stable with subtle changes in style or instrumentation.	0	² 0:37; 1:24; 2:04 (<i>Sudden changes of instrumentation</i>).
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	³ 0:33 (<i>Pause</i>). ⁴ 0:36 (<i>Glissando</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	⁵ 0:55-1:15 (<i>Xylophone</i>). ⁶ 0:37; 1:24; 2:04 (<i>Sudden changes</i>).
- Pitch	Gradual changes between registers.	0	⁷ 0:37; 1:24; 2:04 (<i>Sudden changes</i>). ⁸ 1:24, 1:32, 1:40 (<i>Strings</i>).
- Accents	Few – used to add expression rather than energy to a melodic line.	0	⁹ 0:31-0:32; 0:37; 1:49-1:54 (<i>Accents</i>). ¹⁰ 1:10; 2:25 (<i>B/line</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		4	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

Introduction (0:00): The solo violin introduction begins as a sweeping melody before it settles on a few notes and circles around these in shorter value notes and with increasing intensity. The dramatic introduction closes with strongly accented notes ⁹(0:31-0:32), a sudden pause ³(0:33) and a glissando ⁴(0:36).

^{2,6,7,9}**Verse (0:37):** The texture, timbre and pitch are all constantly and suddenly changing as the accented melody is tossed between the different sections of the orchestra and is accompanied by snatches of harsh, brittle xylophone ⁵(0:55-0:58; 1:04-1:06; 1:10-1:11; 1:14-1:15). There are also bursts of brass playing ¹(0:54-0:58; 1:02-1:06) that produce sudden crescendos, and a punched out brass bassline ¹⁰(1:10-1:23) that drives the music forward to the chorus.

^{2,6,7}**Chorus (1:24):** The string section play the chorus and introduce sudden changes of register as the melody jumps from a menacing low ⁸(1:24), to the middle ⁸(1:32) and then finally the higher range ⁸(1:40). The texture remains unpredictable as the brass, wind, and percussion sections all add splashes of colour and moments of interest. A sudden brass crescendo ¹(1:47) leads into a section when the whole orchestra hammer out the melody ⁹(1:49-1:54) and is followed by a string diminuendo (2:00-2:03).

^{2,6,7}**Verse (2:04):** The diminuendo at the end of the chorus prepares the way for subdued string playing and increases the impact of the changes of texture and eruptions of sound ¹(2:09-2:11; 2:17-2:19). The music is passed to the clarinet (2:21) and the extract ends (2:31) at the bottom of a descending bassline ¹⁰(2:25-2:31) punched out by accompanying strings.

APPENDIX 17: Timings and description of musical factors in *Mamma mia* (0:00-2:32)

Musical factor	Definition of predictability	Selection 13 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	1	
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	0	¹ 1:01; 2:00; 2:06; 2:08-2:09 (<i>Cresc.</i>); ² 2:17 (<i>Diminuendo</i>).
Texture	Remaining stable with subtle changes in style or instrumentation.	0	³ 0:00-1:56 ⁴ 1:01; 1:10; 1:12; 1:16; 1:37 (<i>Style suddenly changes</i>). ⁵ 1:57; 2:19 (<i>Instrumentation</i>).
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	⁶ 1:01; 1:37; 2:08-2:09 (<i>Embellished</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	⁷ 0:00-end (<i>Harsh</i>). ⁸ 1:57; 2:19 (<i>Piccolo</i>).
- Pitch	Gradual changes between registers.	0	⁹ 1:10; 1:12; 1:16; 1:24-1:56 (<i>Sudden</i>). ¹⁰ 1:57; 2:19 (<i>Piccolo</i>).
- Accents	Few – used to add expression rather than energy to a melodic line.	0	¹¹ 2:32 (<i>Accented notes</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		4	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

^{3,7}**Verse (0:00)/Chorus (0:49):** The verse and chorus are played by the string section and both the violin melody and the alternating pizzicato and bowed accompaniment have a marked, hard-edged sound. In the chorus an embellished melody line ^{1,4,6}(1:01) creates a sudden crescendo and coincides with a particularly dramatic change from pizzicato to bowed accompaniment. The arrangement continues with sudden changes of pitch and texture within the string section ^{4,9}(1:10; 1:12; 1:16) that maintain the energy and urgency of the arrangement.

^{3,7}**Verse (1:18):** In the reprise of the verse the strings toss the melody between high and low pitches supported by an accented bowed accompaniment that drives the music forward ⁹(1:24-1:36). The melody is then embellished ^{4,6}(1:37) and this coincides with a dramatic change to a pizzicato accompaniment. The accented melody, supported by alternating pizzicato and bowed playing, continues to be tossed between high and low pitches ⁹(1:37-1:56).

⁷**Chorus (1:57):** The chorus begins with a sudden change of texture, pitch and timbre as a piccolo begins playing the melody ^{5,8,10}(1:57). Strings add a lively pizzicato accompaniment interspersed with two beats of bowed playing ¹(2:00; 2:06) and a descending glissando ^{1,6}(2:08-2:09) that create sudden bursts of sound. The melody is returned to the strings ²(2:10) before a sudden decrease in volume ²(2:17) dramatises the moment when a shrill piccolo briefly plays the chorus melody ^{5,8,10}(2:19-2:22). The strings then complete the melody and are driving the music forward with accented repeated notes when the extract ends (2:32)¹¹.

APPENDIX 18: Timings and description of musical factors in *Suspicious Minds (0:41-3:12)*

Musical factor	Definition of predictability	Selection 14 (Expt 1)	
Form	Verse & chorus or introduction, verse & chorus structure.	0	¹ 2:11 (<i>Interlude</i>).
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	0	² 1:36-1:42 (<i>Disrupted</i>).
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	0	³ 1:08; 2:45 (<i>Sudden crescendo</i>).
Texture	Remaining stable with subtle changes in style or instrumentation.	0	⁴ 1:22 (<i>Sudden instrument change</i>). ⁵ 1:36-1:42 (<i>Style</i>)
Melody - Line	Repetition of material.	1	
- Line	Little embellishment, no unexpected pauses or breaks.	0	⁶ 1:09 (<i>Pause</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0	⁷ 0:41 (<i>Shrill wind</i>). ⁸ 0:56 (<i>Shrill strings</i>).
- Pitch	Gradual changes between registers.	0	⁹ 1:42; 2:10 (<i>Glissando</i>).
- Accents	Few – used to add expression rather than energy to a melodic line.	0	¹⁰ 0:41 (<i>Ostinato</i>). ¹¹ 0:56; 1:36-1:39; 2:46 (<i>Accents</i>). ¹² 1:02 (<i>Bassline</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	
PFSM SCORE		2	

1 = presence of a predictable factor; 0 = absence of a predictable factor.

Verse (0:41): The extract begins with shrill wind instruments playing the melody supported by a hammered out bass ostinato figure^{7,10}(0:41). The strings take up the melody and maintain the harsh timbre and accented line^{8,11}(0:56). The brass section add their support before punching out a descending bassline¹²(1:02) that underpins an abrupt crescendo³(1:08) and builds to a sudden momentary pause⁶(1:09).

Chorus (1:09): After the momentary pause, the violins carry the melody as the rest of the string section provides a busy accompaniment. The brass section burst through with a fanfare supported by full orchestra⁴(1:22).

Verse (1:30): The brass section takes up the melody. The addition of crashing off beat accents¹¹(1:36 - 1:39) and a glissando⁹(1:42) maintain energy and dynamism as they introduce sudden changes of texture and disrupt the tempo^{2,5}(1:36-1:42).

Chorus (1:57): As the arrangement returns to the chorus, the stings and brass play the melody supported by the full orchestra. The melody breaks off and there is a sudden change of register as a high-pitched string glissando⁹(2:10) leads breathlessly to an interlude section.

¹Interlude (2:11): In this section the melody is developed by first a very plaintiff oboe (2:11) and then a mellow french horn (2:35). The rhythmic energy, that has been suspended throughout the section, returns (2:43) to drive the music forwards with a sudden crescendo³(2:45) to the return of the verse.

¹¹Verse (2:46): The brass and wind instruments play an accented and detached melody with off beat strings (3:00-3:06) keeping up the energy of the arrangement. The music continues with the brass and wind instruments until the end of the extract (3:12).

APPENDIX 19: Timings and description of musical factors in *Yesterday (12 Cellists)(0:00-2:33)*

Musical factor	Definition of predictability	Selection 15 (Expt 1)
Form	Verse & chorus or introduction, verse & chorus structure.	0 ¹ 1:33 (<i>Interlude</i>).
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	0 ² 2:30-2:33 (<i>Accelerando</i>).
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	0 ³ 1:00-1:01; 1:56-1:57; 2:30-2:33 (<i>Cresc.</i>).
Texture	Remaining stable with subtle changes in style or instrumentation.	0 ⁴ 0:22; 1:17 (<i>Sudden contrast in style</i>).
Melody - Line	Repetition of material.	1
- Line	Little embellishment, no unexpected pauses or breaks.	0 ⁵ 0:43-0:51 (<i>Embellished</i>). 0 ⁶ 0:17-0:21; 1:56-1:57 (<i>Pause</i>).
- Timbre	Gentle sound with gradual changes within and between instrument families.	0 ⁷ 0:00; 0:58; 1:33-1:39; 1:55; 2:30 (<i>Harsh</i>).
- Pitch	Gradual changes between registers.	0 ⁸ 0:00-0:10 (<i>Sudden</i>). 0 ⁹ 1:33-1:39 (<i>Chop & Pizzicato</i>).
- Accents	Few – used to add expression rather than energy to a melodic line.	0 ¹⁰ 0:13-0:16; 0:58; 1:33-1:39; 1:55 (<i>Accents</i>).
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	0 ¹¹ 0:00-0:02; 0:04-0:06; 0:08-0:10 (<i>Dissonance</i>).
PFSM SCORE		1

1 = presence of a predictable factor; 0 = absence of a predictable factor.

⁷Introduction (0:00): The introduction is dark and foreboding. It begins with three sets of harsh repeated dissonant chords ¹¹(0:00-0:02; 0:04-0:06; 0:08-0:10) which, in a sudden change of register, are separated by a deep tremolo (0:00-0:10)⁸. These are followed by a strongly accented falling line ¹⁰(0:13-0:16) before the music pauses on a single note ⁶(0:17-0:21).

Verse (0:22): The start of the verse ⁴(0:22) provides a dramatic contrast of texture and mood. A jaunty broken chord accompaniment supports warm luscious playing as the melody is first supported (0:29-0:42) and then embellished ⁵(0:43-0:51) by a counter-melody.

^{7,10}Chorus (0:58): The chorus melody is played without the jaunty accompaniment and there is a sudden crescendo ³(1:00-1:01) and accented, and often unison, playing that recaptures the intensity of the introduction.

Verse (1:17): The start of the verse ⁴(1:17) is another sudden change of texture. The warm playing returns and the melody is accompanied by a modern percussive technique, often referred to as the chop, in which the hair near the bottom of the bow is struck against the strings.

¹Interlude (1:33)/Verse (1:40): In the short interlude ^{7,9,10}(1:33-1:39) the cellists carry the arrangement forward using the chop and high-pitched pizzicato. The chop and pizzicato then provide a striking contrast to the warm tone of the melody they go on to accompany (1:40-1:54).

^{7,10}Chorus (1:55): In the reprise of the chorus, a sudden crescendo through a momentary pause ^{3,6}(1:56-1:57), and accented, and often unison playing, re-establishes an intense mood.

Verse (2:14): The verse is reprised for a second time with a jaunty broken chord accompaniment supporting a warm melody and counter-melody.

⁷Coda (2:30): The extract ends (2:33) with a dramatic crescendo and accelerando through a harsh tremolo line ^{2,3}(2:30-2:33).

APPENDIX 20: Record of the predictable musical factors in all 15 selections (1 = presence; 0 = absence)

Musical factor	Definition of predictability	Music selection														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Form	Verse & chorus or introduction, verse & chorus structure.	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Tempo	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Volume	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0
Texture	Remaining stable with subtle changes in style or instrumentation.	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0
Melody - Line	Repetition of material.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
- Line	Little embellishment, no unexpected pauses or breaks.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Timbre	Gentle sound with gradual changes within and between instrument families.	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
- Pitch	Gradual changes between registers.	0	1	1	0	1	1	0	1	1	0	1	0	0	0	0
-Accents	Few – used to add expression rather than energy to a melodic line.	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Harmony	Modulations, cadences that don't introduce unexpected harmonies or dissonance.	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0
PFSM SCORE		9	9	9	8	8	7	6	6	6	5	5	4	4	2	1

APPENDIX 21: RESPONSE SHEET FOR EXPERIMENT 1

LISTENING ACTIVITY

After each extract:

1. Circle the six words that best describe your reaction to each extract of music.
As you listened, how did that particular extract of music make you feel?

<u>Extract 1</u>	<u>Extract 2</u>	<u>Extract 3</u>	<u>Extract 4</u>	<u>Extract 5</u>
1. Energetic	1. Energetic	1. Energetic	1. Energetic	1. Energetic
2. Relaxed	2. Relaxed	2. Relaxed	2. Relaxed	2. Relaxed
3. Alert	3. Alert	3. Alert	3. Alert	3. Alert
4. Nervous	4. Nervous	4. Nervous	4. Nervous	4. Nervous
5. Passive	5. Passive	5. Passive	5. Passive	5. Passive
6. Tense	6. Tense	6. Tense	6. Tense	6. Tense
7. Jittery	7. Jittery	7. Jittery	7. Jittery	7. Jittery
8. Sluggish	8. Sluggish	8. Sluggish	8. Sluggish	8. Sluggish
9. Composed	9. Composed	9. Composed	9. Composed	9. Composed
10. Restful	10. Restful	10. Restful	10. Restful	10. Restful
11. Vigorous	11. Vigorous	11. Vigorous	11. Vigorous	11. Vigorous
12. Anxious	12. Anxious	12. Anxious	12. Anxious	12. Anxious
13. Unenterprising	13. Unenterprising	13. Unenterprising	13. Unenterprising	13. Unenterprising
14. Calm	14. Calm	14. Calm	14. Calm	14. Calm
15. Active	15. Active	15. Active	15. Active	15. Active
16. Tired	16. Tired	16. Tired	16. Tired	16. Tired

LISTENING ACTIVITY

After each extract:

1. Circle the six words that best describe your reaction to each extract of music.
As you listened, how did that particular extract of music make you feel?

<u>Extract 6</u>	<u>Extract 7</u>	<u>Extract 8</u>	<u>Extract 9</u>	<u>Extract 10</u>
1. Energetic	1. Energetic	1. Energetic	1. Energetic	1. Energetic
2. Relaxed	2. Relaxed	2. Relaxed	2. Relaxed	2. Relaxed
3. Alert	3. Alert	3. Alert	3. Alert	3. Alert
4. Nervous	4. Nervous	4. Nervous	4. Nervous	4. Nervous
5. Passive	5. Passive	5. Passive	5. Passive	5. Passive
6. Tense	6. Tense	6. Tense	6. Tense	6. Tense
7. Jittery	7. Jittery	7. Jittery	7. Jittery	7. Jittery
8. Sluggish	8. Sluggish	8. Sluggish	8. Sluggish	8. Sluggish
9. Composed	9. Composed	9. Composed	9. Composed	9. Composed
10. Restful	10. Restful	10. Restful	10. Restful	10. Restful
11. Vigorous	11. Vigorous	11. Vigorous	11. Vigorous	11. Vigorous
12. Anxious	12. Anxious	12. Anxious	12. Anxious	12. Anxious
13. Unenterprising	13. Unenterprising	13. Unenterprising	13. Unenterprising	13. Unenterprising
14. Calm	14. Calm	14. Calm	14. Calm	14. Calm
15. Active	15. Active	15. Active	15. Active	15. Active
16. Tired	16. Tired	16. Tired	16. Tired	16. Tired

LISTENING ACTIVITY

After each extract:

1. Circle the six words that best describe your reaction to each extract of music.
As you listened, how did that particular extract of music make you feel?

<u><i>Extract 11</i></u>	<u><i>Extract 12</i></u>	<u><i>Extract 13</i></u>	<u><i>Extract 14</i></u>	<u><i>Extract 15</i></u>
1. Energetic	1. Energetic	1. Energetic	1. Energetic	1. Energetic
2. Relaxed	2. Relaxed	2. Relaxed	2. Relaxed	2. Relaxed
3. Alert	3. Alert	3. Alert	3. Alert	3. Alert
4. Nervous	4. Nervous	4. Nervous	4. Nervous	4. Nervous
5. Passive	5. Passive	5. Passive	5. Passive	5. Passive
6. Tense	6. Tense	6. Tense	6. Tense	6. Tense
7. Jittery	7. Jittery	7. Jittery	7. Jittery	7. Jittery
8. Sluggish	8. Sluggish	8. Sluggish	8. Sluggish	8. Sluggish
9. Composed	9. Composed	9. Composed	9. Composed	9. Composed
10. Restful	10. Restful	10. Restful	10. Restful	10. Restful
11. Vigorous	11. Vigorous	11. Vigorous	11. Vigorous	11. Vigorous
12. Anxious	12. Anxious	12. Anxious	12. Anxious	12. Anxious
13. Unenterprising	13. Unenterprising	13. Unenterprising	13. Unenterprising	13. Unenterprising
14. Calm	14. Calm	14. Calm	14. Calm	14. Calm
15. Active	15. Active	15. Active	15. Active	15. Active
16. Tired	16. Tired	16. Tired	16. Tired	16. Tired

LISTENING ACTIVITY

Declaration:

_____ (PRINT NAME) confirms that he/she (delete as appropriate) gave his/her consent to participate in the Listening Activity and is happy for his/her (delete as appropriate) responses, which will be kept anonymous, to be included in any publications or presentations of the results.

_____ (Signed) (D.O.B)

_____ (Date)

Musician/Non-musician (delete as appropriate)

APPENDIX 22:**MEDIAN NON-AROUSING (NA) ADJECTIVES CHOSEN BY MUSICIANS & NON-MUSICIANS AND BY MALE AND FEMALE PARTICIPANTS**

Median non-arousing (NA) adjectives chosen for each song
by musicians (Mus) and non-musician (N-Mus)

Song	Mus	Rank	N-Mus	Rank
No matter what	5	10	6	11.5
The long and winding road	5	10	6	11.5
Blue eyes	5	10	6	11.5
I have a dream (RPO)	6	14.5	6	11.5
Yesterday (James Last)	5	10	6	11.5
Ticket to ride	6	14.5	6	11.5
Love me tender	5.5	13	6	11.5
How deep is your love	4	6	6	11.5
Michelle	5	10	5	7
I have a dream (Pop Orchestra)	4	6	3.5	5
Let it be	4	6	2.5	4
Money, money, money	1	2	1	2.5
Mamma mia	1	2	0	1
Suspicious minds	1	2	1	2.5
Yesterday (12 cellists)	2	4	4.5	6
Mean		13.7		17.3

Median non-arousing (NA) adjectives chosen for each song
by male (M) and female (F) participants

Song	M	Rank	F	Rank
No matter what	6	11.5	5	9.5
The long and winding road	6	11.5	5	9.5
Blue eyes	6	11.5	6	14
I have a dream (RPO)	6	11.5	6	14
Yesterday (James Last)	6	11.5	5.5	12
Ticket to ride	6	11.5	6	14
Love me tender	6	11.5	5	9.5
How deep is your love	6	11.5	4	7
Michelle	5	7	5	9.5
I have a dream (Pop Orchestra)	4	5	3	5.5
Let it be	4.5	6	3	5.5
Money, money, money	1	2	0.5	2
Mamma mia	0.5	1	0	1
Suspicious minds	1.5	3	1	3
Yesterday (12 cellists)	3.5	4	2.5	4
Mean		17.57		13.43

APPENDIX 23: RECORDING FORM FOR EXPERIMENT 2

Burn a **SEDATIVE** selection on to one disc and a **STIMULATIVE** selection on to the other disc.

Code for **SEDATIVE** selection _____

- when selecting *classical music* please identify:

Composer _____

Title of composition _____

Performers (orchestra/conductor/soloists) _____

Record label/Catalogue Number of CD _____

- when selecting *popular music (i.e. jazz, folk, pop etc.)* please identify:

Name of band/solo performer _____

Name of album _____

Title of album track _____

Record label/Catalogue Number of CD _____

Code for **STIMULATIVE** selection _____

- when selecting *classical music* please identify:

Composer _____

Title of composition _____

Performers (orchestra/conductor/soloists) _____

Record label/Catalogue Number of CD _____

- when selecting *popular music (i.e. jazz, folk, pop etc.)* please identify:

Name of band/solo performer _____

Name of album _____

Title of album track _____

Record label/Catalogue Number of CD _____

Declaration:

_____ (PRINT NAME) confirms that he/she (delete as appropriate) gave his/her consent to participate, and is happy for his/her (delete as appropriate) reply, which will be kept anonymous, to be included in any publications or presentations of the results.

_____ (Signed)

(D.O.B)
d d m m y y

_____ (Date)

APPENDIX 24: SEDATIVE AND STIMULATIVE MUSIC CHOSEN BY PARTICIPANTS IN EXPERIMENT 2*(Sedative choices are identified * and stimulative choices # in the musician/composer column)*

Musician/Composer	Title-Album (Popular & Classical) Title (Classical) & (Duration)	Performer(s) (Classical)	Catalogue Number of CD
Adams, Brian *	<i>(Everything I do) I do it for you - Waking up the neighbours (6:33)</i>	-	A&M Records 397 164-2
Adams, John #	Short Ride in a Fast Machine (4:28)	Bournemouth Symp Orch (Marin Alsop)	NAXOS 8.559031
Adams, John #	Short Ride in a Fast Machine (4:24)	City of Birmingham Symp. Orch. (Rattle)	EMI 5550512
Amos, Tori #	<i>Cornflake Girl (Live) - Very Best of MTV Unplugged Volume 2 (5:32)</i>	-	5050466-2383-2-0
Barry, John *	<i>The Beyondness of Things - The Beyondness (ST) (4:17)</i>	English Chamber Orch (J Barry)	Decca 460092
Beethoven *	Piano Sonata No. 14 in C# Minor, Op. 27 No 2 (Moonlight) (5:41)	Mikhail Pletner	Virgin Classics 0946 363280 2 7
Beethoven *	Piano Sonata No. 14 in C# Minor, Op. 27 No 2 (Moonlight) (6:39)	Daniel Barenboim	HMV Classics HMV 5 86676 2
Benson, Brendan *	<i>Me Just Purely - One Mississippi (2:44)</i>	-	Virgin CDVUS117
Björk *	<i>All is full of love - Homogenic (4:47)</i>	-	TPLP71CD
Björk #	<i>Violently Happy (Fluke - Well Tempered) (5:46)</i>	-	142tp7cdl
Camarao #	<i>Forro Pro Quartinha - South America Travelogue (2:06)</i>	-	TRAVCD001
Camilo, Michel #	<i>As one - Rendezvous - Live (7:38)</i>	-	SNY53754.2
Chaurasia, Hariprasad *	<i>Raga Bihag - Moonlight moods (28:21)</i>	-	VCDSP138
Chieftains #	<i>The Donegal Set - The Essential Chieftains (5:48)</i>	-	RCA Victor/Legacy 82876 83674 2
Chisholm, Duncan *	<i>The Rose of St Magnus - Red Point (4:12)</i>	-	Copperfish Records CPFCD001
Clor #	<i>Love + Pain - Clor (3:47)</i>	-	EMI REG122CD
Davis, Miles *	<i>Flamenco Sketches - Kind of Blue (9:26)</i>	-	LC00162

Musician/Composer	Title-Album (Popular & Classical) Title (Classical) & (Duration)	Performer(s) (Classical)	Catalogue Number of CD
De Graw, Gavin [#]	<i>Chariot</i> - Chariot (4:02)	-	Sony BMG J Records 82876704002
Du Prez, John [#]	<i>Bacchanalia</i> - The Alchemist (2:30)	Instrumental Ensemble (Pickett)	LinnCICD031
Eno, Brian [*]	<i>An Ending (Ascent)</i> - Apollo: Atmospheres & Soundtracks (4:26)	-	EGCD53
Finzi [#]	Grand Fantasia & Toccata, for piano & orch, Op.38, II Allegro vigoroso (5:33)	Northern Sinfonia (Donohoe/Griffiths)	NAXOS 8.555766
Flaming Lips [#]	<i>The Yeah Yeah Yeah Song</i> - At war with the Mystics (4:51)	-	Warner Bros 9362-49966-2
Flook [#]	<i>Blackberry Blossom/The Independence</i> - Flook! Live! (4:20)	-	Small CD 9405
Hall, Jim [*]	<i>Concierto de Aranjuez</i> - Concierto (19:13)	-	CTI ZK65132
Hindemith [#]	Symphonic Metamorphoses on Themes of Weber, IV Marsch (4:40)	London SO (Abbado)	Decca 4674422
Keane [*]	<i>A Bad Dream</i> - Under the Iron Sea (5:06)	-	Universal Island CID8167/9878227
Makarakit [*]	<i>The Pearl</i> - Life in the fast lane (3:27)	-	Beechwood cjw030
Matteis [#]	<i>Concerto for Two Trumpets, 1687: Allegro</i> - Essential Hyperion (1:31)	Steven Keavy/Crispan Steele Perkins	HYP12
Moby [*]	<i>Porcelain</i> - Play (4:02)	-	Mute CDStumm172
Mozart [*]	Clarinet Quintet in A, K581, II Larghetto (7:07)	Jack Brymer & The Allegri String Quartet	BELART 450-056-2
Pärt, Arvo [*]	Spiegel im Spiegel (for violin and piano) (8:18)	Spivakov (violin), Bezrodny (piano)	ECM1591 449 958-2
Pärt, Arvo [*]	Spiegel im Spiegel (for violin and piano) (8:16)	Little (violin), Roscoe (piano)	EMI 7243 5 75805 2 5
Pärt, Arvo [*]	<i>Spiegel im Spiegel (for violin and piano)</i> - Classical Chillout (8:16)	Little (violin), Roscoe (piano)	EMI CLASSICS 7243 5 67737 2

Musician/Composer	Title-Album (Popular & Classical) Title (Classical) & (Duration)	Performer(s) (Classical)	Catalogue Number of CD
Pink [#]	<i>Who knew</i> - I'm not dead (3:28)	-	SONY BMG LaFace 82876-80330-2
Rachmaninov [*]	Symphony No 2 in E minor, Op. 27, III Adagio (15:44)	London Symphony Orchestra (Previn)	HMV Classics HMV 5 86753 2
Rökysopp [*]	<i>Sparks</i> - Melody AM (5:25)	-	Wall of Sound WALLCD027
Saint-Säens [#]	Allegro appassionato in C# minor, Op. 43 (for violincello & piano) (3:44)	Orpheus Chamber Orch (Maisky/Hovora)	Deutsche Grammophon 457 599-2
Sakamoto, Ryuichi [*]	<i>Merry Christmas Mr Lawrence</i> - Pure Cinema Chillout (4:37)	-	VTDCD454
Satie [*]	<i>Gnossienne No. 4</i> - Sketches of Satie (2:41)	John Hackett (flute), Steve Hackett (guitar)	CAMCD20
Schubert [*]	Piano Sonata No 18 in G. Op. 78, D894, I Moderato e cantabile (18:28)	Mitsuko Uchida	Philips 454 453-2
Shostakovich [#]	Symphony No 10 in E minor, Op. 93, II Allegro (4:13)	Berlin Philharmonic (Karajan)	Philips 429 716-2
Shostakovich [#]	Symphony No 5 in D minor, Op. 47 IV Allegro non troppo (11:28)	Czecho-Slovak RSO (Ladislav Slovak)	NAXOS 8-556684
Sinding [#]	Rustle of Spring Op.32 No 3 (2:45)	Peter Nagy (solo piano)	NAXOS 8.550646
Squarepusher [#]	<i>Fat Controller</i> - Hard Normal Daddy (5:38)	-	WARP CD50
Stravinsky [#]	Rite of Spring: Danses des adolescentes (3:13)	Oslo Philharmonic Orchestra (Jansons)	EMI 7243 5 86440 2 9
This Mortal Coil [*]	<i>Song to the Siren</i> - It'll end in tears (3:35)	-	CAD411
U2 [#]	<i>Bullet the blue sky</i> - Rattle & Hum (5:36)	-	CIDU27
Vaughan Williams [*]	<i>The Lark Ascending</i> - The Most Peaceful Classical Album (6:26)	New Philharmonia Orchestra (Bean/Boult)	VTDCD340
Verdi [#]	Aida: Act II Sc II, Triumphal March (6:06)	New Philharmonia Orchestra (Muti)	EMI CDS5562462
White Stripes [#]	<i>Hello operator</i> - De Stijl (2:36)	-	XLCD150

APPENDIX 25: RESPONSE SHEET FOR EXPERIMENT 3**LISTENING ACTIVITY**

Please complete the table BEFORE and AFTER you listen to the music.

You should use this table BEFORE listening to the music.

Please circle one score for each word listed below. For example you should indicate if you are at present feeling either **definitely** happy, **slightly** happy, **slightly not** happy or **definitely not** happy, by circling either 1, 2, 3 or 4 on the table.

DOES THE ADJECTIVE DEFINE YOUR PRESENT MOOD?

	Definitely	Slightly	Slightly Not	Definitely Not
1. Happy	1	2	3	4
2. Dissatisfied	1	2	3	4
3. Energetic	1	2	3	4
4. Relaxed	1	2	3	4
5. Alert	1	2	3	4
6. Nervous	1	2	3	4
7. Passive	1	2	3	4
8. Cheerful	1	2	3	4
9. Tense	1	2	3	4
10. Jittery	1	2	3	4
11. Sluggish	1	2	3	4
12. Sorry	1	2	3	4
13. Composed	1	2	3	4
14. Depressed	1	2	3	4
15. Restful	1	2	3	4
16. Vigorous	1	2	3	4
17. Anxious	1	2	3	4
18. Satisfied	1	2	3	4
19. Unenterprising	1	2	3	4
20. Sad	1	2	3	4
21. Calm	1	2	3	4
22. Active	1	2	3	4
23. Contented	1	2	3	4
24. Tired	1	2	3	4

PLEASE REMEMBER TO CIRCLE **ONE** SCORE FOR **EVERY** WORD LISTED

LISTENING ACTIVITY

You should use this table AFTER listening to the music.

Please circle one score for each word listed below. For example you should indicate if you are at present feeling either **definitely** happy, **slightly** happy, **slightly not** happy or **definitely not** happy, by circling either 1, 2, 3 or 4 on the table.

DOES THE ADJECTIVE DEFINE YOUR PRESENT MOOD?

	Definitely	Slightly	Slightly Not	Definitely Not
1. Happy	1	2	3	4
2. Dissatisfied	1	2	3	4
3. Energetic	1	2	3	4
4. Relaxed	1	2	3	4
5. Alert	1	2	3	4
6. Nervous	1	2	3	4
7. Passive	1	2	3	4
8. Cheerful	1	2	3	4
9. Tense	1	2	3	4
10. Jittery	1	2	3	4
11. Sluggish	1	2	3	4
12. Sorry	1	2	3	4
13. Composed	1	2	3	4
14. Depressed	1	2	3	4
15. Restful	1	2	3	4
16. Vigorous	1	2	3	4
17. Anxious	1	2	3	4
18. Satisfied	1	2	3	4
19. Unenterprising	1	2	3	4
20. Sad	1	2	3	4
21. Calm	1	2	3	4
22. Active	1	2	3	4
23. Contented	1	2	3	4
24. Tired	1	2	3	4

PLEASE REMEMBER TO CIRCLE ONE SCORE FOR EVERY WORD LISTED

Declaration:

_____ (PRINT NAME) confirms that he/she (delete as appropriate) gave his/her consent to participate in the Listening Activity and is happy for his/her (delete as appropriate) responses, which will be kept anonymous, to be included in any publications or presentations of the results.

_____ (Signed) (D.O.B)

_____ (Date)

Musician/Non-musician (delete as appropriate)

APPENDIX 26: RESPONSE SHEET FOR EXPERIMENT 4

I want you to listen to fifteen pieces of music.

After each piece is finished, either circle the relaxing man if it made you feel chilled out, or the dancing man if it made you want to move about.

1. Chilled out



Move about



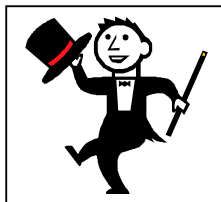
2. Move about



Chilled out



3. Move about



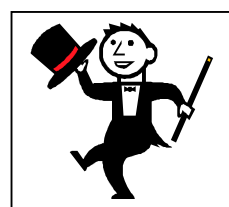
Chilled out



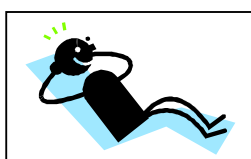
4. Chilled out



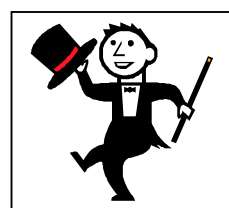
Move about



5. Chilled out



Move about



I want you to listen to fifteen pieces of music.

After each piece is finished, either circle the relaxing man if it made you feel chilled out, or the dancing man if it made you want to move about.

6. Chilled out



Move about



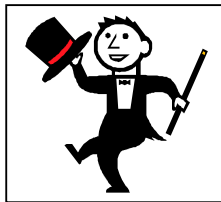
7. Move about



Chilled out



8. Move about



Chilled out



9. Chilled out



Move about



10. Chilled out



Move about



I want you to listen to fifteen pieces of music.

After each piece is finished, either circle the relaxing man if it made you feel chilled out, or the dancing man if it made you want to move about.

11. Chilled out



Move about



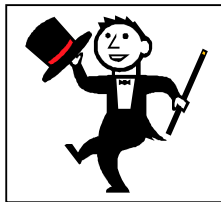
12. Move about



Chilled out



13. Move about



Chilled out



14. Chilled out



Move about



15. Chilled out



Move about



APPENDIX 27:**NUMBER OF PARTICIPANTS WITH AN INTELLECTUAL DISABILITY WHO SELECTED THE 'CHILLED OUT' MAN AND THE NUMBER OF NON-INTELLECTUALLY DISABLED PARTICIPANTS WHO RECORDED A NON-AROUSED RESPONSE**

Number of participants with an intellectual disability from the sample (n=48) who responded to each song by selecting the 'chilled out' man, and the number of non-intellectually disabled participants from the sample (n=48) who recorded a non-aroused response

Song	Intellectually Disabled Participants	Rank	Non-Intellectually Disabled Participants	Rank
No matter what	41	3.5	38	5
The long and winding road	39	7	40	4
Blue eyes	38	8.5	36	6
I have a dream (RPO)	43	1	41	2.5
Yesterday (James Last)	38	8.5	41	2.5
Ticket to ride	42	2	43	1
Love me tender	41	3.5	32	7
How deep is your love	40	5.5	28	8
Michelle	40	5.5	27	9
I have a dream (Pop Orchestra)	34	10.5	18	10
Let it be	34	10.5	15	11
Money, money, money	19	13	1	14.5
Mamma mia	12	15	3	13
Suspicious minds	17	14	1	14.5
Yesterday (12 cellists)	31	12	14	12

APPENDIX 29:
DEPENDENT MEASURE DEVELOPED TO RECORD THE INCIDENCE OF
DISRUPTIVE MEALTIME BEHAVIOUR

Setting: Session: Baseline / Music / Non-Music		Date: Meal: Lunch / Dinner
Aggressive behaviours	Physical harm (<i>record each incidence against staff or peers</i>)	
	Grabbing food (<i>record each grab within a series and each isolated occurrence</i>)	
	Shouting/swearing (<i>record each outburst</i>)	
Physically non-aggressive behaviours	Stripping (<i>record each attempt or actual incidence</i>)	
	Restlessness (e.g. pacing, in and out of seat) (<i>record each occurrence</i>)	
	Refusing food (<i>record each refusal within a series and each isolated occurrence</i>)	
	Handling objects inappropriately (e.g. throwing food, cutlery, crockery, over turning furniture, banging implements) (<i>record each incidence</i>)	
	Self-injury (<i>record any physical aggression against self irrespective of intention to harm</i>)	
	Repetitious mannerisms (<i>Record each change of mannerism as separate incidence. If constant only record as separate incidences if there is a break of 30 sec – 1 min. DON'T record as separate incidences when behaviour stops & starts for subject to eat</i>)	
Verbal behaviours	Complaining (<i>record each complaint within a series and each isolated incidence</i>)	
	Requests for attention (<i>record each complaint within a series and each isolated incidence</i>)	
	Vocalisations (e.g. shouts, screams, shrieks, wails) (<i>Record each outburst. If constant only record as separate incidences if there is a break of 30 sec – 1 min. DON'T record as separate incidences when behaviour stops & starts for subject to eat</i>)	
	Verbal repetition (<i>Record each change of phrase as a separate incidence. If constant only record as separate incidences if there is a break of 30 sec – 1 min. DON'T record as separate incidences when behaviour stops & starts for subject to eat</i>)	



APPENDIX 30: STAFF QUESTIONNAIRE

PLAYING SEDATIVE MUSIC AT MEALTIMES – STAFF QUESTIONNAIRE

In the past three weeks, during one meal each day, I have been carrying out a research study that looks at how your patients respond when background music is played while they eat. I have collected information about how they behaved and about how much food they ate while the background music was playing.

As part of my research I am also interested in finding out, from staff members who experienced the use of sedative music at mealtimes, their opinions about the study.

I would be very grateful if you would help me collect this valuable information by spending five or ten minutes completing the attached questionnaire.

Thank you.

PLAYING SEDATIVE MUSIC AT MEALTIMES

There are nine statements about the research project, recently carried out in your workplace that investigated the use of sedative music at mealtimes.

Read each statement carefully, especially those expressed in the negative (e.g. **I did not** like the choice of music ...), and then respond by ticking one box to indicate whether you **Strongly Agree, Agree, Neither Agree or Disagree, Disagree, Strongly Disagree.**

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
<u>About the music:</u>					
◆ Overall I <u>did not</u> like the choice of music played at mealtimes.	()	()	()	()	()
◆ On the whole the music contributed to a pleasant eating environment.	()	()	()	()	()
<u>About the patient's response:</u>					
◆ Generally it <u>did not</u> help the patients to have music played at mealtimes.	()	()	()	()	()
◆ Overall I noticed the patient's disruptive behaviours increase when music was played at mealtimes.	()	()	()	()	()
◆ The amount of food consumed by the patients generally decreased when music was played at mealtimes.	()	()	()	()	()
◆ Overall the patients were <u>not</u> easier to care for when music was played at mealtimes.	()	()	()	()	()
<u>About your response:</u>					
◆ Overall I found it an unwelcome distraction to have music playing at mealtimes.	()	()	()	()	()
◆ I recall that, with music playing, I generally <u>did not</u> feel more relaxed caring for the patients at mealtimes.	()	()	()	()	()
◆ When the music was playing I recall that I was often more accepting of the patient's disruptive behaviours.	()	()	()	()	()

These addenda update the literature review and revise parts of the text.

- Original text is in normal type.
- New text is highlighted in **bold**.
- An amendment to the original text is shown in *bold italics*.
- New references are listed under each addenda point for clarity.

ADDENDA 1:

Page 25, starting at line 3

This section of the thesis classifies mental illness into the four major categories described in *Psychology: The science of mind and behaviour* (Gross, 1996): psychotic, neurotic, mood and eating disorder. This is neither the most precise nor the most current classification system. ICD10 (World Health Organisation, 1992) facilitates a more accurate diagnostic formulation (Nolen-Hoeksema, Fredrickson, Loftus & Wagenaar, 2009), and DSM-IV-TR (American Psychiatric Association, 2000), which eschews the terms psychotic and neurotic, is more up-to-date. Nevertheless, by persisting with these four categories this thesis still remains in line with the terminology used in current text books (e.g. Nolen-Hoeksema et al., 2009) and recently published prevalence studies (e.g. McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2009), added to which these categories link with information about the prevalence of mental illness in intellectual disability presented later in this chapter (section 2.4.3).

Schizophrenia is a psychotic disorder. The affected individual loses contact with reality, and experiences thought disturbances, auditory hallucinations and primary delusions (F. Schneider, 1959).

McManus, S., Meltzer, H., Brugha, T., Bebbington, P., Jenkins, R. (2009). *Adult psychiatric morbidity in England, 2007 Results of a household survey*. Leeds, UK: The NHS Information Centre for health and social care.

Nolen-Hoeksema, S., Fredrickson, B.L., Loftus, G.R., Wagenaar, W.A. (2009). *Atkinson & Hilgard's Introduction to Psychology* (15th ed.). Andover, UK: Cengage Learning EMEA.

ADDENDA 2:

Page 28, starting at line 22

2.4.2 Prevalence of mental illness in intellectual disability

There is statistical evidence that the various factors, just discussed, increase the likelihood of someone with an intellectual disability experiencing mental illness. Although the prevalence of anxiety disorder (27%) matches the level detected in the general population (Stavrakaki & Mintsioulis, 1997), there have been higher incidences of schizophrenia, bi-polar affective disorder and psychosis **among the intellectual disability population. When recent studies are reported alongside earlier ones there is evidence that this is not a new phenomenon. The established prevalence of schizophrenia was 3% (Fraser & Nolan, 1994) and 3.7% to 5.2% (Morgan, Leonard, Bourke & Jablensky, 2008) compared with 0.4% in the general population (Meltzer, Gill, Petticrew, & Hinds, 1995; Saha, Chant, Welham & McGrath, 2005). Bi-polar affective disorder was diagnosed in 4% of those with an intellectual disability (Deb & Hunter, 1991) compared to only 1% of those without (Weissman, et al., 1988), and in 2006 continued to be two to three times more frequent than in the regular population (Reynolds & Dombeck, 2006). People with psychotic disorders remained more common place in the intellectual disability population (6.3% - Lund, 1985; 2.6% to 4.4% - Cooper et al., 2007) than in the general population (0.3%) (Bland, Newman, & Orn, 1988; McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2009). Finally, psychiatric disorder occurred around four times more among adolescents with an intellectually disability than their non-disabled peers (Rutter & Graham, 1970), and nearly forty years later Cooper, Smiley, Morrison, Williamson and Allan (2007) found that “more than a third of our cohort (1023 participants) had mental ill-health” a prevalence rate “higher than (that) observed in the UK general population” (page 32).**

Cooper, S-A., Smiley, E., Morrison, J., Allan, L., Williamson, A., Finlayson, J., Jackson, A., Mantry, D. (2007). Psychosis and adults with intellectual disabilities. *Social Psychiatry and Psychiatric Epidemiology* 42(7), 530-536.

Cooper, S-A., Smiley, E., Morrison, J., Williamson, A., Allan, L. (2007). Mental ill health in adults with intellectual disabilities: prevalence and associated factors. *The British Journal of Psychiatry*, 190, 27-35.

Morgan, V.A., Leonard, H., Bourke, J., Jablensky, A. (2008). Intellectual disability co-occurring with schizophrenia and other psychiatric illness: population-based study. *The British Journal of Psychiatry*, 193, 364-372.

Reynolds, T., Dombeck, M. (2006). *Mental retardation and co-morbid disorders*. Retrieved 31st August, 2010.

Saha, S., Chant, D., Welham, J., McGrath, J. (2005). A systematic review of the prevalence of schizophrenia. *PLoS Med.*, May;2(5), e141. Epub 2005 May 31.

ADDENDA 3:

Page 49, starting at line 8

However, doubts need to be raised about generalising these results. First, the CBT treatment packages included classic behavioural methods such as self-monitoring, relaxation training, self-instruction, problem solving, role-play and skill rehearsal (Sturme, 2006). The outcome studies were confounded by these procedures, as they could not make it clear which component was responsible for change. As part of a recent debate, Sturme (2006) suggested that because “some studies have found that relaxation training alone may reduce aggressive behaviour in people with intellectual disabilities, in the absence of component analyses of these CBT treatment packages, it may be more parsimonious to attribute change to behavioural components that have already been evaluated” (p. 114) “than to cognitive components of undemonstrated efficacy” (p. 109).

Complex interventions like CBT are difficult to assess. However the Medical Research Council (MRC) has designed a framework that ought to help produce robust evaluations of CBT and any intervention for that matter. The MRC framework encourages researchers to begin each trial with a clear understanding of the context, the problem, the intervention and the evaluation. Context includes background information about the characteristics of the population and the severity of the condition under investigation. Researchers who use the MRC framework “will be in a strong position to conduct a worthwhile, rigorous, and achievable definitive trial” (Campbell et al., p. 458) if attention to the context of an intervention

is coupled with an appreciation of the complexity or otherwise of the factors that cause the problem under investigation, an understanding of how an intervention is likely to work, and outcomes that are plausibly linked to the intervention.

Campbell, N.C., Murray, E., Darbyshire, J., Emery, J., Farmer, A., Griffiths, F., Guthrie, B., Lester, H., Wilson, P., Kinmonth, A.L. (2007). Designing and evaluating complex interventions to improve health care. *British Medical Journal*, 334, 455-459.

ADDENDA 4:

Page 94, starting at line 26

5.2 Music psychology, ethnomusicology and sociology of music

The term musicology literally means reasoned discourse concerning music. Music psychology, ethnomusicology and sociology of music are three disciplines from within the field of musicology, and each have distinct interests (Sadie, 2001).

At the theoretical and experimental end of the research spectrum, music psychologists believe that “the aesthetic response to music is behaviour and is amenable to an empirical approach” (Carterette & Kendall, 1999, p. 726). **Carterette and Kendall (1999) commented that** music psychologists ignored the subtleties of the musical frame, and focused instead on the perceptual and cognitive functions of music. **Certainly, this observation might apply to those who study various aspects of musical learning by (1) looking at the different strategies musicians use when they practise (Drake & Palmer, 2000), (2) considering the type of support musicians receive from their families (Garland, 2005) and from institutions and teachers (Saunders, 2006), (3) exploring the cognitive processes and neurological systems engaged by sight reading (Fine, Berry, & Rosner, 2006) and performing from memory (Williamson & Valentine, 2002), and (4) determining the effect of music instruction on the cognitive abilities of children (Zafranias, 2004).**

However, the diversity of music psychology research means that Carterette and Kendall’s observation is not a fair reflection of several areas of study either in part or in their entirety. When this thesis goes on to discuss the emotional response to music in some detail (section 5.4) it looks at one such area, and there are other areas of music psychology research that also do not ignore the subtleties of the

musical frame but instead consider perceptual and cognitive responses to elements of music.

For example, there are investigations of tonal cognition that have established how ‘tonal hierarchies’ (the regularities in pitch prevalent in all types of tonal music) influence the perception of melodic contour (Dowling, 1986) and the memorisation of melody (Bigand, 1997), and there is psychological research on the perception of timbre (McAdams, 2003), metre and rhythm (Large & Palmer, 2002), and on the processing of pitch (Verschuure & van Meeteren, 1975) and melody (Dowling & Harwood, 1986). Dowling and Harwood (1986) suggested that melodies were heard and remembered by a few salient perceptual features; **in particular their tonal structure and melodic contour**. The search for these features was governed by mental schemas that developed during childhood from the melodies of a culture. They were a level of information higher than specific pitches or tempos, and they could be affected by a variety of factors including an individual’s musical training. **Although the understanding of melodic processing has grown since Dowling’s original insights nothing has emerged to undermine the fundamental role played by tonality and contour (Schmuckler, 2009).**

Psychology of music research also focused on the subtleties of the music frame as it looked at the differences between musicians and non-musicians. Early research demonstrated that musicians outperformed non-musicians identifying pitches (Cuddy, 1970) or recognising a chord played with different instruments (Beal, 1985), not because being a musician was associated with different cognitive or perceptual processing systems, but because musicians had stored more patterns and strategies related to musical structures (Carterette & Kendall, 1999). **Recent neuroscientific work has compared musicians and non-musicians as it studied the effect of acquiring the range of highly complex sensorimotor skills needed to play musical instruments (Meister et al., 2005).** It has also explored the relationship between language and music processing (Patel, 2003), and turned its attention to elements of music by precisely locating lesions associated with specific music listening deficits and by using that information to determine the parts of normal networks critical for

individual aspects of musical processing (Hattiangadi et al., 2005; Samson, Zatorre & Ramsay, 2002).

At the anthropological, humanistic, end of the research spectrum, sociology of music and ethnomusicology employ observational and descriptive field methods (Carterette & Kendall, 1999). **In recent times sociology of music has become a vibrant field of study (Roy & David, 2010). It has examined** how people ‘consume’ music and what it does in their social life, **it has considered how the collective production of music is made possible, and it has looked at how music relates to broader social distinctions, especially age, class, race and gender.** For example, DeNora (1997) examined the role of music during intimate occasions, *focusing* on its connection to love and courtship, and *highlighting* how it was viewed as a non-verbal accomplice. The interviewees (in particular the two younger age groups) described how they used ‘mood’ music which had served as a ‘soundtrack’ on previous occasions, to reproduce feeling states, and to structure the grammar and style of intimate interaction. **Chong (2003) described how Chinese opera survived in Singapore by setting up apprenticeship schemes and by adopting aspects of consumerist culture and amateur opera. Finally, Bennett (2006) looked at how older fans of punk rock still connected with the music and its associated visual style. Bennett (2006) interviewed 15 punk rock fans (35-53 years) in the East Kent region of south-east England and found they legitimised their continuing punk status by creating a new punk aesthetic. Although they had to tone down their visual punk image due to domestic and/or work commitments they replaced punk’s visual shock-tactics with a general punk ethos.**

Ethnomusicology is widely regarded as the anthropology of music (Titon, 1997). Ethnomusicology examines music in its cultural context. It endeavours to understand music by recording and transcribing it, or by interviewing musicians. An ethnomusicologist who is a universalist looks for common behaviours or beliefs, while a particularist is interested in differences (Becker, 2001). Baily (1988) carried out particularist ethnomusicological research that used the observations, descriptions and verbal reports of expert musicians to compare the music cultures of North India and the Afghan city of Herat. Baily (1988) provided a link with music psychology by concluding that Heratans learnt to play by ear, whereas North Indians thought musically in schemas.

Ethnomusicologists have gradually shifted from field studies of remote musical traditions like this one, and they are looking at the music of minorities and diaspora communities in the context of modern industrial societies (Nettl, 2005). For example, Meintjes (2004) examined the place of Zulu ngoma song and dance within post-apartheid South Africa. Emoff (2008) studied how the gwo ka drumming of Marie-Galante, a small out-of-the-way island in the French Antilles, connected a département of France with France.

The next section of this chapter continues to look at the relationship between the different musicology disciplines.

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Drake, C., Palmer, C. (2000). Skill acquisition in music performance: relations between planning and temporal control. *Cognition*, 74, 1-32.

Emoff, R. (2008). Truth, Talk and History in the Non-Nation: *Gwo Ka's* Place on Marie-Galante, French Antilles. *Ethnomusicology Forum*, 17(2), 203-224.

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Schmuckler, M.A. (2009). Components of melodic processing. In S. Hallam, I Cross & M. Thaut (Eds.), *The Oxford Handbook of Music Psychology* (pp. 93-106). Oxford, England: Oxford University Press.

Verschuure, J., van Meeteren, A.A. (1975). The effect of intensity on pitch. *Acustica*, 32, 33-44.

Williamson, A., Valentine, E. (2002). The role of retrieval structures in memorizing music. *Cognitive Psychology*, 44, 1-32.

Zafranias, N. (2004). Piano keyboard training and the spatial-temporal development of young children attending kindergarten classes in Greece. *Early Child Development and Care*, 174, 199-211.

ADDENDA 5:**Page 114, starting at line 19**

Nater et al. (2005) were alone in setting a standard that will be followed in the empirical work described in this thesis. **Nater et al. (2005) may not have stated the criteria they used when they selected sedative music for research, but Table 5 (choice of sedative music) shows that they did identify the catalogue number of the compact disc that provided a recording of Miserere by Allegri.**

ADDENDA 6:**Page 116, starting at line 28**

However, despite these comments, table 5 shows that only thirteen investigations used participant selected sedative music. In some of the investigations the participants were not involved in the selection of a sedative stimulus because researchers were controlling extraneous variables as they examined physiological responses, consumer attitudes and grip strength, **and two studies with premature infants (Kaminiski & Hall, 1996; Calabro et al., 2003) ought to be excluded from the total sample because new-borns cannot select music. Consequently the thirteen investigations that used participant selected sedative music are 25% of the forty-two investigations that remain.**

ADDENDA 7:

Page 123, starting at line 1

Table 6: Predictable Factors in Sedative Music (PFSM)

<i>Musical factor</i>	<i>Description of predictability</i>
Form^a	Verse & chorus or introduction, verse & chorus structure.
Tempo^b	Remaining stable with gradual increases (accelerandos) or decreases (ritardandos).
Volume^c	Remaining stable with gradual increases (crescendos) or decreases (diminuendos).
Texture^d	Remaining stable with subtle changes in style or instrumentation.
Melody -Line^e	Repetition of material.
- Line^f	Little embellishment, no unexpected pauses or breaks.
- Timbre^g	Gentle sound with gradual changes within and between instrument families.
- Pitch^h	Gradual changes between registers.
- Accentsⁱ	Few: used to add expression rather than energy to a melodic line.
Harmony^j	Modulations, cadences that don't introduce unexpected harmonies or dissonance.

Table 6 shows the PFSM which is a tool to guide the choice of commercially recorded non-contingent sedative music for research.

The PFSM has two columns: a list of musical factors (column 1) and alongside a statement about the predictable quality of each factor (column 2). The PFSM was carefully assimilated from all the descriptors of sedative music, and some of the descriptors of stimulative music in Wigram et al. (2002) (page 122). Some descriptors of sedative music were used in column 1 as a musical factor, and some appeared within the statements about predictability (column 2). The meaning of three statements about the potential elements in stimulating music was reversed and used in column 2. Only the **highlighted sections** of the PFSM were not assimilated from Wigram et al. (2002), and of those sections the descriptions of texture and timbre merit comment at this stage.

It is probably more usual to describe texture as either close together (thick) or sparse (thin). When chapter 8 looks at other methods that formalise the process of selecting sedative music it discusses the Structural Model for Music Analysis (SMMA). The SMMA was devised by Erdonmez Grocke (1999) to standardise phenomenological descriptions of music. Grocke (1999) describes texture as

consistently thick/thin or variable, and by way of further explanation adds the musical terminology “monophonic, polyphonic, homophonic”.

The PFSM was devised for people with limited musical knowledge as well as for experienced musicians. Consequently it is free from complex musical terminology. The PFSM does not describe texture as thick/thin nor does it ask the listener about the complexity of the layering of a piece of music and whether it is monophonic, polyphonic or homophonic. Instead, the PFSM opens up judgments about texture to less experienced listeners. It asks them to consider the subtlety of any changes to style (e.g. from a single melody line to a melody and counter melody to a chordal texture) and/or instrumentation (e.g. from a full orchestral sound to a solo instrument and an arpeggio accompaniment). Clearly there is a more obvious link between instrumentation and timbre than between instrumentation and texture as a change of instrumentation may not always affect the texture but it will change timbre. This link has been identified in the definition of timbre; it indicates that timbre is only stable when there are gradual changes with and between instrument families.

The process described above produced a carefully assembled tool that had six musical factors. A single factor (melody) has five separate items because Wigram et al. (2000) made statements about the timbre, pitch, and accents in melody, and described structural (repetition of material) and linear aspects (predictable melodic lines).

Table 7, that follows on page 124, carefully sets out how each descriptor in Wigram et al. (2002) was assimilated into the PFSM, and some of the material in the discussion that follows on page 125 confirms the appropriateness of producing a tool with six musical factors and a single factor (melody) with five separate items.

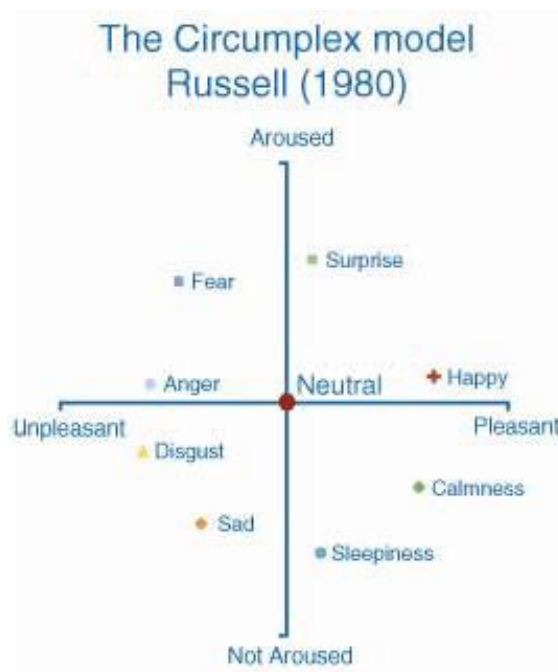
ADDENDA 8:

Page 131, starting at line 23

It is clear from personal experience that affect and arousal are often linked. For example, in a lively party positive affect is generally associated with increased arousal (Geen & Geen, 1995). This emotion is the interplay of directional and intensity components. The directional component is either a positive or a negative cognitive

evaluation. It is a judgement about the pleasantness or unpleasantness (valance) of an emotional state. Intensity, in its most simplistic form, is high versus low arousal (Geen & Geen, 1995).

Academics have examined the interplay between the evaluation and intensity components to find which is primary in the experience of an emotion. Schacter and Singer (1962), for example, completed a seminal piece of work (the ‘adrenaline experiment’¹) that demonstrated the primacy of the evaluative component. **Russell (1980) devised a two-dimensional map of the relationship between the directional and intensity components. Russell’s Circumplex Model of Affect has two axes labelled displeasure/pleasure (horizontal axis) and high/low arousal (vertical axis), and, as the diagram below demonstrates, each affective concept falls into a different quadrant of this spatial representation.**



Finally, categorisation systems (Adjective Checklists) **were developed** that measured emotions via self-report. Thayer (1978), Mackay, Cox, Burrows and Lazzarini (1978) and Russell (1979) drew up checklists with two bi-polar dimensions: energetic arousal and tense arousal. Thayer (1978) used awake-tired adjectives to measure energetic arousal, and tense-calm adjectives to measure tense arousal. Mackay et al.

(1978) and Russell (1979) had a single arousal dimension, and added hedonic tone (i.e. feelings of pleasantness-unpleasantness).

Russell, J.A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39, 1161-1178.

ADDENDA 9:

Page 222, starting at line 17

Experiment 1 and experiment 3 looked at how gender and musicality affected the response of participants without an intellectual disability. In experiment 1 they reacted in the same way to the fifteen pieces of instrumental music irrespective of their gender, and whether or not they were musicians. In experiment 3 gender and musicality did affect how the participants responded to a selection of sedative music. **It is not possible to determine whether the omission of hedonic tone adjectives in experiment 1, and their subsequent inclusion in experiment 3, influenced the gender differences that did not emerge in experiment 1 but that did occur in experiment 3.**

ADDENDA 10:

Page 175, starting at line 10

6.7.4 Discussion

The distribution of the participant's non-aroused (people without an intellectual disability) and 'chill out' responses (people with an intellectual disability) offer an interesting and telling insight into the relative sophistication of the two tools devised to gather their responses. **However, first of all, the distributions themselves merit comment.**

At the start of this experiment great care was taken to only recruit participants with mild intellectual disability who understood what it felt like to be aroused and what it felt like to be relaxed. Four people were excluded because they did not demonstrate that level of understanding. Consequently, those who did participate used the scoring sheet in front of them (Appendix 26) to make an informed decision about how each piece of music made them feel. It is not possible to determine why each person responded the way s/he did to the different pieces of music, but the participant's collective reaction is worthy of comment.

Previous research demonstrated that members of the intellectual population who completed subtests from standardized psychometric batteries displayed diminished degrees of musical aptitude compared to the non-intellectual disability population (Braswell, Decuir, Hoskins, Kvet, & Oubre, 1988; McLeish & Higgs, 1982). In this experiment the participants with an intellectual disability scored twelve of the fifteen pieces of music as sedative. It suggests that their music appreciation skills also did not match their non-disabled counterparts. The participants without an intellectual disability did not group their responses together like this, and instead recorded a range of reactions along the sedative/stimulative continuum. So why was there a statistically significant correlation when there appears to be such a difference in the music appreciation skills of the two participant groups?

The non-parametric analysis used in this experiment ranked the participants responses, and this was the source of the correlation between the two participant groups rather than comparable affective reactions. In other words, people with and without intellectual disability agreed about where the different pieces of music fell in relation to one another on a sedative-stimulative continuum but not necessarily about the sedative worth of every individual composition. This observation qualifies the statistically significant outcome reported in the results section however it should not detract from the fact that this experiment confirmed the choice of sedative music for the experiments in chapter 7 by using people from the population under investigation.

[ADDENDA 11:](#)

[Page 259, starting at line 17](#)

9.1.7.2 Experiment 5 and experiment 6

Experiment 5 (pilot study) and *experiment 6* (main investigation) were carried out to determine the effect of the sedative music identified by the PFSM, and experiments 3 and 4, on the disruptive mealtime behaviours of adults with an intellectual disability. They are summarised in the table showing the main features of experiment 5 and experiment 6.

Main features of experiment 5 and experiment 6

Experiment 5 (CSO funded pilot study)	Experiment 6 (main investigation)
38 participants (29-67 years) moderate (mod.) intellectual disability	24 participants (29-63 years)* mild/mod./severe intellectual disability
<i>Observation period:</i> 3 weeks	<i>Observation period:</i> 2 days
<i>3 conditions:</i> BL/music/non-music	<i>2 conditions:</i> music/non-music
<i>Design:</i> 17 participants: Week 1 - BL (Group A) Week 2 - Music Week 3 - Non-music 21 participants: Week 1 - BL (Group B) Week 2 - Non-music Week 3 - Music	<i>Design:</i> Day 1: Participant A - Music Participant B - Non-music Day 2: Participant A - Non-music Participant B - Music <i>Music & non-music introduced at the same time as the participants sit together.</i>
<i>Music:</i> No matter what (PHILIPS 468362-2) The long and winding road (459692-2) Blue eyes (724353543129) I have a dream (EMPRCD585) Yesterday (529556-2)	<i>Music:</i> No matter what (PHILIPS 468362-2) The long and winding road (459692-2) Blue eyes (724353543129) I have a dream (EMPRCD585) Yesterday (529556-2)
<i>Presenting music:</i> Free field	<i>Presenting music:</i> MP3 player & earbuds
<i>Dependent measures:</i> 1. Food & fluid inventory (calculates amount consumed as % of that served). 2. Agitation inventory (13 behaviours). 3. Intra session agitation (record pre- and post- meal level on Likert scale). 4. Staff questionnaire (20 respondents answer questions about music, patient's response, their response).	<i>Dependent measure:</i> 1. Agitation inventory (13 behaviours). <i>Only record 'anxiety provoked' disruptive behaviours. They had been distinguished from habitual, perserverative, or manneristic ones.</i>
<i>Data collection (Agitation inventory):</i> Each incidence of agitation as it occurred.	<i>Data collection (Agitation inventory):</i> Record incidence & duration from video.
<i>Data collection period:</i> April-July '03	<i>Data collection period:</i> March-June '07

*30 were recruited

ADDENDA 12:

Page 267, starting at line 26

9.2.7.2 Forsøg 5 og forsøg 6

Forsøg 5 (pilot-undersøgelse) og forsøg 6 (hovedundersøgelse) blev udført for at kunne afgøre effekten af den beroligende musik identificeret via PFSM samt forsøg 3 og 4 på forstyrrende spiseadfærd hos voksne med betydelige psykiske funktionsnedsættelser. De er opsummeret i tabel hovedtræk ved forsøg 5 og forsøg 6.

Hovedtræk ved forsøg 5 og forsøg 6

Forsøg 5 (CSO støttet pilot undersøgelse)	Forsøg 6 (hovedundersøgelse)
38 deltagere (29-67-årige) moderat psykisk funktionsnedsættelse	24 deltagere (29-63-årige)* mild/moderat/betydelig psykisk funktionsnedsættelse
<i>Observationsperiode: 3 uger</i>	<i>Observationsperiode: 2 dage</i>
<i>3 forhold: BL/musik/ikke-musik</i>	<i>2 forhold: musik/ikke-musik</i>
<i>Design:</i> 17 deltagere: Uge 1 - BL (Gruppe A) Uge 2 - Musik Uge 3 - Ikke-musik 21 deltagere: Uge 1 - BL (Gruppe B) Uge 2 - Ikke-musik Uge 3 - Musik	<i>Design:</i> Dag 1: Deltager A - Musik Deltager B - Ikke-musik Dag 2: Deltager A - Ikke-musik Deltager B - Musik <i>Musik & ikke-musik blev introduceret, mens alle deltagerne sad samlet.</i>
<i>Musik:</i> No matter what (PHILIPS 468362-2) The long and winding road (459692-2) Blue eyes (724353543129) I have a dream (EMPRCD585) Yesterday (529556-2)	<i>Musik:</i> No matter what (PHILIPS 468362-2) The long and winding road (459692-2) Blue eyes (724353543129) I have a dream (EMPRCD585) Yesterday (529556-2)
<i>Præsentation af musik:</i> Free field	<i>Præsentation af musik:</i> MP3 player & høretelefoner
<i>Afhængige variabler:</i> 1. Mad og væske indtagelse (målte mængden af indtaget mad som % af det serverede mad). 2. Agitation inventory (13 typer af adfærd). 3. Intra session agitation (notere niveauet før og efter måltidet på Likert scale). 4. Personale spørgeskema (20 respondenter besvarede spørgsmål om musik, patient respons og deres egen respons).	<i>Afhængige variabler:</i> 1. Agitation inventory (13 typer af adfærd). <i>Kun notere "angstprovokeret" forstyrrende adfærd. Disse blev adskilt fra vane-, udholdenheds- og velopdragenhedsafhængige typer af adfærd.</i>
<i>Dataindsamling (Agitation inventory):</i> Et hvert tilfælde af agitation.	<i>Data indsamling (Agitation inventory):</i> Notere de enkelte tilfælde og længden af dem ud fra videooptagelser.
<i>Data indsamlingsperiode: April-Juli '03</i>	<i>Data indsamlingsperiode: Marts-Juni '07</i>

*30 blev rekrutteret