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Making a connection: randomised controlled trial of family centred music therapy for young children with autism spectrum disorder.

Grace Thompson

Submitted in total fulfilment of the requirements of the degree of Doctor of Philosophy.

September, 2012

Melbourne Conservatorium of Music

The University of Melbourne

Abstract

Young children with autism spectrum disorder vary greatly in their social and communication skills, from non-verbal and difficult to engage socially, to using some sentences and showing social interest in other people. For those children who are non-verbal and difficult to engage socially, there is minimal evidence to help parents and early childhood intervention service providers determine which interventions will most successfully foster the social communication development of these young children. There is, however, increasing awareness in the literature of the positive impacts a strong parent-child relationship can have on social communication development in both typically developing children and children with ASD.

The use of music therapy to assist children with autism to develop social communication skills has a long history, dating back to the 1960s. While the use of music therapy with children who have social communication impairments has been widely described, evidence into the effectiveness of music therapy with children with autism spectrum disorder has primarily taken the form of case studies, small quasi experimental research and small experimental designs.

This mixed-methods study aimed to investigate whether family-centred music therapy positively influenced the social communication development of preschool aged children with severe autism spectrum disorder. 23 children between the ages of 3 and 6 years and their families were randomly allocated to either the treatment group or the control; with each participant receiving 16 weeks of family-centred music therapy sessions which took place in the family home. A variety of data was collected including 4 standardised measures, 1 non-standardised measure, a survey of the use of music in the home, and a structured interview with the participating parent.

Quantitative analysis showed that children in the treatment group made improvements in the quality of their social interactions in the home and community, as well as their level of engagement within the music therapy sessions. The qualitative and mixed data analysis suggested that there were also improvements in the closeness of the parent-child relationship. Further, parents were able to adapt music activities to support their child in various activities in the home and community. These outcomes provide preliminary support for family-centred music therapy's effectiveness in promoting developmental change in children's social communication skills, and fostering greater closeness in the parent-child relationship.

Declaration

This is to certify that:

i. The thesis comprises only my original work towards the PhD

ii. Due acknowledgement has been made in the text to all other material used

iii. The thesis is fewer than 100 000 words in length, exclusive of tables, maps, bibliographies

Signed:

Grace Thompson

Acknowledgments

It is often said that, similar to raising a child, it takes a village to write a thesis. I was fortunate to have so many wonderful, helpful and honest people in my village, and I am indebted to them all.

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Dedication

To families

"Meeting cannot be forced or manufactured – it simply happens when the level of listening and consciousness is right and when the music acts like gravity, pulling the players into relationship." (Ansdell, 1995, p. 74)

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Chapter 1
Introduction

In 2007 I attended an information night presented by Professor Margot Prior in Melbourne. Prior had completed a review for the Australian Government into effective models of practice with children with autism spectrum disorders (Roberts & Prior, 2006) and was going to explain her findings at this open forum. The night was much anticipated, especially by parents hoping to learn which therapies were recommended for their children. Many professionals also attended with interest to see what the report would recommend. I was running a little late, and sat at the back of the full auditorium that held approximately two hundred people.

Prior presented a rather deflating report. She explained that there was 'no evidence' for many of the therapies/interventions/approaches that were currently being accessed by children with autism spectrum disorders (ASD) and their families. A behavioural intervention, known as Applied Behavioural Analysis (ABA), was the only intervention with 'good enough' empirical research. While the report also outlined that there are "substantial short and long term benefits from early, intensive, family-based treatment programs" (Roberts & Prior, 2006, p. 14), the importance of this message appeared to be lost in the emotion of the night.

The view that there is a lack of scientific evidence for most interventions for ASD has had wide spread Government policy implications in Australia. Funding of therapeutic interventions for people with ASD has become almost exclusively based on empirical research findings in areas of skill improvement.

Autism Spectrum Disorder

People with ASD are characterised by impairments in three areas of functioning; social interaction, communication, and behaviour (American Psychiatric Association, 2000). As the inclusion of 'spectrum' in the name suggests, there is a great deal of variety in the severity of these impairments. While some children can use language to communicate in full sentences with only mild pragmatic difficulties, others are entirely non-verbal. With regard to social skills, some children will seek out the company of others and try to engage with them on topics of interest, whilst those at the other end of the spectrum will seem unaware of the presence of other people. Children with ASD who have mild communication and social skill deficits are able to participate in many

programs in the community with little or no supports. Children who have severe communication and social deficits are more limited in their capacity to participate in social interactions; often requiring assistance from people who understand their idiosyncrasies. Children with severe ASD will frequently have a concurrent intellectual disability (Fombonne, 2009), which further complicates their social communication development.

Influences on my Approach to Music Therapy Practice

As a music therapy undergraduate student, I completed a clinical placement at St. Paul's Special Development School in Melbourne. My music therapy supervisor, Tony Meadows, was a powerful influence on my understanding of music therapy practice. As I understood it then, his work with profoundly and multiply disabled children focused on improving their quality of life by promoting their independent participation in music making. When I finished my studies, I was employed at St. Paul's for around three years. I had the opportunity to work in a team environment (with my friend and colleague Katrina Skewes McFerran), video my work, and engage in therapeutic relationships with children that continued for up to 3 years (the length of my employment). I had access to a piano, and continued to develop my improvisation skills influenced by the writings of Paul Nordoff and Clive Robbins, as well as Juliet Alvin. Around 1996, I read an article by Mercedes Pavlicevic titled "Dynamic Interplay in Clinical Improvisations" (1990) which influenced me greatly. This article discussed the dynamic forms in musical improvisations relative to mother-infant interactions. Pavlicevic's ideas informed my practice from then on, and lead me to read further about attachment and theories that would later be labelled communicative musicality (Malloch, 2000).

Around the same time, I read Gary Ansdell's "Music for Life" (1995). Ansdell's emphasis on the importance of relationship between the players within musical improvisations resonated with me. Informed by the philosophical writings of Martin Buber (1958), Ansdell (1995) describes the goal of music therapy as arriving at a point of "meeting" (p. 69) between the players along the journey of developing relationship within music making. Meeting in the music is described by Ansdell (1995) as a "being together" (p. 73), where the 'I' of the client and the 'thou' of the therapist become 'we'. This overarching goal of 'developing relationship' has informed my practice ever since.

However, the biggest influences on this research were my experiences while employed at Broad Insight Group (an early childhood intervention centre) from 2000 to 2009. As music therapist and later as team leader, I was guided and challenged by Broad Insight Group's family-centred philosophy. During my time there, I gradually shifted from a traditional 1:1 therapy model where the therapist works alone with a child (as I did at St. Paul's School) to a collaborative, partnership model.

At Broad Insight Group our collaborative approach involved therapists providing support to the families of children with disabilities. Our belief, guided by ecological theories (Dunst et al., 2001), was that the best way to support a child's development was to support their environments. The main environment of preschool aged children is most often their family, and the importance of supporting the environments and systems around a child were first described by Winnicott (1952). Since then, ecological practices have been incorporated to varying degrees in Early Childhood Services around the world, with music therapists increasingly acknowledging the importance of supporting the parent-child relationship (Edwards, 2011).

Family-centred practice at Broad Insight Group involved early intervention workers from a variety of different professions respectfully collaborating with families to design, implement and evaluate their child's developmentally focussed program. Workers supported families to enhance the developmental opportunities available to their child through modelling methods and techniques in a facilitated rather than directed way. As well as being a gentle and respectful way to work alongside parents, collaborative approaches help parents come to their own understanding of what is and isn't helpful in interacting with their child (Aldred, Green, & Adams, 2004; Green et al., 2010). This is in contrast to a training approach which is characterised by therapists teaching parents a prescribed set of skills and helping the parent develop competence in applying them. Training approaches are more closely aligned with contemporary behavioural interventions (Baker-Ericzen, Stahmer, & Burns, 2007; Rogers et al., 2006; Vismara, Colombi, & Rogers, 2009). While at times direct instruction was part of working with parents, in general a training approach was seen to be at odds with the family-centred practice ethos.

The title of this thesis includes the phrase "making a connection", which reflects the general aim of the music therapy sessions I facilitate with children with ASD and their families. The children I find the 'easiest' to work with are those for whom music

therapy has sparked an intrinsic motivation to interact/participate. My experience is that until intrinsic motivation happens for a child with ASD, engaging the child will feel mechanical and dependent on either myself or the parent offering extrinsic motivators. The parents I have worked with face many challenges in raising their children, and have often commented that the most difficult thing to deal with is their child's apparent lack of desire to interact with others. I have spent many hours as a music therapist supporting children and their parents to make a connection with each other through the use of songs, instrument playing and movement to music; aiming to facilitate interpersonal engagement between the child and others, rather than a behavioural response to a reward.

Further, the importance of thriving interpersonal engagement between children and their parents is well recognised as being an essential contributor to successful early social communication development (Moore, 2009; Stern, 1985, 2010; Stern, Hofer, Haft, & Dore, 1985) which typically precedes language development. Early social communication skills are therefore foundational, and include skills such as: shared attentiveness (Adamson & Bakeman, 1991); interpersonal engagement (Bakeman & Adamson, 1984; Prizant, Wetherby, & Rydell, 2000); affect attunement (Stern, 1977, 1985, 2010; Stern et al., 1985); joint attention; and emergence of language and gestures (Bruner, 1995; Tomasello, 1995).

My practice has led me to consider relationships as central to learning and development, and to perceive a spiralling effect that occurs for children with ASD when they have difficulty connecting with others. When repeatedly faced with a child who has limited or foreign ways of engaging, naturally and reasonably the parent-child relationship may become strained. In my experience, parents have anecdotally described feeling invisible, ineffective, or even disliked by their child with ASD. Music making offers children with ASD and their families novel opportunities to connect and engage with each other. These opportunities are valued by parents because these rare and precious moments feel, as parents have frequently commented to me, so 'normal'.

Rationale for the Study

In contrast to my own beliefs about the importance of relationships in music therapy with children with ASD, the music therapy literature privileges social and communication skills as the most commonly reported, and assumedly important, goals when working with children with ASDs (Gold, Wigram, & Elefant, 2006; Kaplan &

Steele, 2005; Reschke-Hernandez, 2011; Walworth, 2007). In my own practice too, social and communication skills were also a strong focus, as I observed that children with ASD seemed to be participating more actively in music therapy sessions compared to other situations. I became curious to know whether this participation was leading to improvements in general social communication development for these children, and what the implications were for the parent-child relationship.

However, the challenges of providing the type of empirical evidence for music therapy called for by the Roberts and Prior (2006) review are immense. While a Cochrane review titled "Music therapy with autistic spectrum disorder" (Gold et al., 2006) found a clinically significant effect for music therapy in the area of communication skills, this finding was based on 3 small studies with a total number of only 24 participants. Soon after this Cochrane review was published, another small empirical study of 10 preschool aged children with ASD was completed which reported significant results in favour of music therapy for joint attention skill development (Kim, 2006).

Music therapy, as a temporal therapy, will always struggle with providing the type of empirical evidence privileged in Roberts and Prior's report (2006); namely randomised controlled trials with large sample sizes. After all, music therapy is not a pill; instead, the effect of the session is dependent on both the quality of the music therapist's "craftsmanship" (DeNora, 2006, p. 90) and the resources the client brings to therapy (DeNora, 2006; Rolvsjord, 2004). While there is an abundance of literature describing music therapy with children with ASD, most of the research designs involve case studies and small quasi-experimental and experimental studies (Gold et al., 2006). The use of case study and small experimental designs is understandable given the complexities of both children with ASD and music therapy practice.

Despite the challenges, it is important for music therapists to engage in different forms of research in order to discover new knowledge about their practice (Bradt, 2012; Wigram, 2006). Engaging in empirical types of enquiry, while sometimes seen as being a poor fit for a therapy so dependent on the local context in which it takes place (DeNora, 2006), may lead to new ways of describing and understanding music therapy's effectiveness (Bradt, 2012). Even with the many challenges of conducting empirical research into music therapy, it may still be possible to conduct "good enough" (Wigram, 2006, p. 95) experimental research.

A Real-World Approach to Research

Experimental studies often involve quantitative approaches to data collection and are underpinned by a post-positivist philosophy that privileges objectivity (Creswell, 2009). However, my clinical work is based on collaborative philosophies that could be seen as better aligned with constructivist or participatory approaches to research. In order to keep the music therapy intervention as real-world (Robson, 2002) as possible – that it, resembling actual clinical practice – a tension between clinical practice and research design was created. I attempted to address this tension through the use of a flexible treatment protocol and by choosing parent-report outcome measures. These, and other choices to be described throughout the thesis, would hopefully preserve the collaborative, flexible music therapy approach within a solid comparative study design.

I also chose to involve myself in all aspects of the study and fulfilled multiple roles, including the responsibilities of both principal researcher and therapist. As therapist, I am accountable first and foremost to the children and families I support. This accountability ethically compels me to candidly evaluate any intervention I facilitate to ensure it is useful and beneficial (Hauser-Cram, Erickson Warfield, Upshur, & Weisner, 2000). Just as the involvement of the parents in the evaluation is seen as being complementary to ecological practice, so too are the perspectives and evaluations of the therapist (Williams, 2010).

The decision to involve myself to such an extent in the study has helped the study to remain true to real-world clinical practice; however, this decision may also be seen as introducing a new predicament. Evidence based research strives for objectivity in the quest for proof of a causal relationship between treatment and outcomes (Robson, 2002). My involvement in the treatment protocol can be construed as compromising objectivity when viewed from a post-positivist paradigm (Creswell, 2009). Whether objectivity is possible in social science research at all is highly contentious (Hauser-Cram et al., 2000; Robson, 2002). By adopting a realist stance – which accepts that any knowledge generated is specific to a particular time, culture or situation (Robson, 2002) – I believe that a valuable contribution to experimental research with complex, collaborative approaches can be made.

Aim

Anecdotally, it seems that the children with ASD most often referred to music therapy are those who are significantly delayed in their social communication development, with many early skills that typically emerge in the first 18 months of life unconsolidated or undeveloped. Despite this observation, preschool aged children with severe ASD have been the focus of only one small RCT (Kim, 2006). The study's aim stemmed from my clinical experiences and was framed in response to my genuine interest in trying to explain 'what' happens in music therapy. I therefore aimed to investigate:

> *Does family-centred music therapy positively influence the social communication development of preschool aged children with severe ASD.*

Overview of the Study

To achieve the above aim, Chapter 2 examines the literature central to the study. Music therapy is defined, and an historical context for the use of music therapy with children with ASD is provided. ASD is described, with attention given to the symptoms of ASDs most commonly addressed by music therapy. Music therapy research outcomes for children with ASD are presented and discussed.

Subsequently, social communication skill development in typical children is compared to children with ASD. Literature describing ways in which these skills can be promoted and enhanced is presented.

Finally, family-centred practice is defined, with the evolution of this model of practice since its conception in the 1980s being outlined. The application of family-centred practice in contemporary Early Intervention services is described, as well as how music therapists have incorporated this model into their practice.

Chapter 3 describes the research design, with the hypotheses for the study presented. Challenges in researching complex therapies are discussed, and the method and measures are explained. The family-centred music therapy treatment model is presented and described in detail.

Chapter 4 reports on the outcomes of the study relevant to the numeric data, while Chapter 5 reports on the qualitative analysis of descriptive data from a structured interview with the parents who participated in the study. Chapter 6 then presents a comparison of the results of the mixed data.

Finally, these outcomes are discussed in Chapter 7, with the numeric and descriptive data integrated to respond to various hypotheses. Chapter 7 concludes with a discussion of the implications of the findings relevant to parents, music therapists and early intervention workers. Recommendations for future research are also provided.

Chapter 2
Literature Review

Introduction

The breadth of literature related to Autism Spectrum Disorders (ASD) is vast. With so much information available, constructing a useful review of the literature has many challenges. The age of the participants in this study and the outcomes under investigation defined the boundaries of this review. Therefore, literature related to: preschool aged children with ASD; social communication skill development; music therapy with children with ASD; and family-centred practice, will be focussed on. Music therapy literature with ASD is also vast, and has been woven into the literature review in 3 main sections, namely: a broad history of the use of music therapy with ASD; the application of music therapy to promote social communication skills in children with ASD; and the development of music therapy within family-centred practices.

The literature review begins by defining music therapy and ASD. The symptoms of ASD, as well as the effects on the families of young children with ASD, are explained. Literature describing the historical use of music therapy as an intervention with children with ASD will be presented, as well as the types of aims historically addressed by music therapy. Social communication skills, being the outcome under investigation in this study, are defined and the development of these skills in children with ASD is compared to typically developing children. Early development of social communication skills usually occur in the context of family relationships, and so theories explaining early social learning are presented.

Since the early 1970s, there has been an evolution in the way interventions are offered to support children with ASD. This evolution will be described, with particular emphasis on interventions targeting social communication skill development. Music therapy methods used with children with ASD to support the child's development of social communication skills will be described, leading to a presentation of music therapy research outcomes in this area.

Finally, family-centred practice will be defined and set in historical context since its conception in the 1980s. Literature describing the application of family-centred practice in early childhood intervention services for children with ASD will be presented, as well as how music therapists have incorporated this model into their

practice. Music therapy research within the context of family-centred (or ecological) approaches will be discussed. Throughout this chapter, the term 'parent' will be used to signify the primary carer relationship with the child.

Defining Music Therapy

In 1989, Bruscia compiled various definitions of music therapy from around the world, highlighting the variety – sometimes subtle, sometimes disparate – of definitions in use (Bruscia, 1989). While some music therapists rejected the boundaries that these definitions placed around practice, other's found it useful to define what music therapy is; and by implication, what music therapy is not (Bruscia, 1998). In the context of a research study, locating the music therapy practice underpinning this study is desirable.

The World Federation of Music Therapy (WFMT) defines music therapy as an intervention which uses music and all its elements in a variety of settings with a variety of people. Music therapy is used to "optimize quality of life" (WFMT, 2012) and improve wellbeing in a variety of domains including physical, social and communicative. The definition emphasises that music therapy has professional standards for "research, practice, education and clinical training." (WFMT, 2012).

As music therapy is a profession practiced worldwide, the local context of this study is relevant. The Australian Music Therapy Association (AMTA) defines music therapy as an intervention for a variety of needs including physical, cognitive and social; similar to that of the WFMT, with the omission of communicative needs. There is an emphasis on professional standards, also similar to the WFMT's definition. Usefully, the AMTA's definition explains that the needs of the individual are addressed within a therapeutic relationship, which distinguishes music therapy from musical "entertainment or music education" (Australian Music Therapy Association, n.d.). The AMTA's definition highlights that "people of any age or ability may benefit from a music therapy program, regardless of music skill or background" (Australian Music Therapy Association, n.d.).

The definition of music therapy adopted for this study is taken from Bruscia's second edition of Defining Music Therapy (1998). Music therapy is "a systematic process of intervention wherein the therapist helps the client to promote health, using music experiences and the relationships that develop through them as dynamic forces of change." (p. 20). This definition is useful as it simply states the aim of music therapy as being to *'promote health'*; leaving the application of music therapy with the client open.

In this way, 'health' can be defined by the client and/or the therapist depending on the context of the therapy intervention. The emphasis on the relationships which develop out of musical experiences being vital to change, similar to the AMTA's definition, fits well with this study's grounding in family-centred, ecological approaches.

Defining ASD

The diagnostic history of ASD began when a psychiatrist named Leo Kanner first identified a group of children with similar unusual social and behavioural traits in the 1940s, which he named 'Autistic' (Roberts & Prior, 2006). Dr Kanner presented 11 case studies on children under the age of 11, noting that the children all had an "inability to relate themselves in the ordinary way to people and situations from the beginning of life" (Kanner, 1943, p. 242). He paid particular attention to the reports of the children's parents who described what he termed an "extreme autistic aloneness" (Kanner, 1943, p. 242), which led him to believe that these children were not schizophrenic.

It took some 40 more years for the Diagnostic and Statistics Manual of Mental Disorders (DSM) to assign a separate diagnostic category titled "infantile autism" in its third release in 1980 (Hincha-Ownby, 2008; Reschke-Hernandez, 2011). When the DSM-IV was released in 1994, "infantile autism" was renamed "autistic disorder" and was listed under the category of "Pervasive Developmental Disorders" (Hincha-Ownby, 2008). Since then, the diagnosis of Autistic Disorder has been considered relatively stable (Roberts & Prior, 2006).

Currently, the DSM is undergoing another revision – DSM-5 – which is due for release in May, 2013. The proposed revision for Pervasive Developmental Disorders was published in January, 2011, adopting the term "Autism Spectrum Disorder". This category now includes autistic disorder, Asperger's disorder, childhood disintegrative disorder and pervasive developmental disorder not otherwise specified. As this study has occurred during a time of transition, a decision needed to be made in regards to terminology. The terminology of 'ASD' was adopted for this study, ensuring that the outcomes are understood in the context of the revisions to the DSM.

Features of ASD: DSM-IV-TR compared to DSM-5.

ASD is a group of neurological disorders with lifelong implications. The defining feature for every age, stage and level of functioning of people with an ASD is

the "lack of reciprocal social interaction" (Prior & Ozonoff, 1998, p. 83). As the diagnostic criteria for ASD is transitioning from DSM-IV-TR to DSM-5, the similarities and differences in the conceptualisation of the core impairments are important to clarify.

DSM-IV-TR: Autistic Disorder.

The DSM-IV-TR identifies three essential features in the diagnosis of Autistic Disorder, including:

1. an impairment in social interaction
2. an impairment in communication, and
3. restricted, repetitive and stereotyped patterns of behaviour and interests.

These three features have often been described as the "triad of impairments of social interactions" (Wing, 1988, p. 92). Each of the three features contains four specific criteria, making a total of 12 items. To receive a diagnosis of Autistic Disorder, an individual must have at least 6 of the 12 criteria (with at least two from the first area and one each from the second and third areas). Individuals can therefore have a variety of different combinations of criteria and still receive a diagnosis of Autistic Disorder, resulting in a variety of abilities, limitations and behaviours. Onset must occur before the age of 3. The following descriptions of these items are summarised from the DSM-IV-TR (American Psychiatric Association, 2000).

In the area of social interaction, there must be impairments in at least two of the following:

a) Non-verbal behaviours: such as eye-to-eye gaze, facial expression, social gestures
b) Developmentally appropriate peer relationships
c) Spontaneous social sharing
d) Social or emotional reciprocity

In the area of communication, there must be impairments in at least one of the following:

a) Delayed, or lack of, spoken language
b) Initiations of conversation if language skills are present
c) Stereotyped, repetitive or idiosyncratic use of language
d) Make-believe play or social imitative play

In the area of restricted, repetitive and stereotyped patterns of behavior, interests and activities, there must be at least one of the following behaviours present:

a) Preoccupation with stereotyped and restricted interests; abnormal in intensity or focus
b) Inflexible need for specific, nonfunctional routines or rituals
c) Repetitive motor mannerisms
d) Preoccupation with parts of objects.

Dr. Lorna Wing's early descriptions of Autistic Disorder as a spectrum of impairments are still widely used today to help parents understand the nature of ASD and how it is that children with such different abilities and challenges can all be diagnosed with the same condition (Autism Victoria, 2011; Wing, 1988). Impairments in social interaction can range from aloofness and indifference towards others, through to lack of perceptiveness about other people's feelings and motivations (Wing, 1988). People with autistic disorder may fail to develop appropriate peer relationships, and lack the spontaneous sharing of enjoyment or interests with other people as seen through a lack of showing, bringing or pointing out objects of interest (American Psychiatric Association, 2000).

Communication impairments range from a lack of any desire to communicate with others, through to an inability to engage in truly reciprocal conversations. For those people with no spoken language, there is often no attempt to use an alternative method of communication such as gesture (American Psychiatric Association, 2000; Wing, 1988). There is also a lack of symbolic or imaginative play that can range from a complete lack of copying and pretend play, through to playing in a mechanical and repetitive way (American Psychiatric Association, 2000; Wing, 1988).

Restricted, repetitive and stereotyped patterns of behaviour and interests may include preoccupations with one area of interest, obsessions about parts of objects, an inflexible performance of routines and rituals, and repetitive motor patterns of activity such as rocking, flicking, pacing, and teeth grinding (American Psychiatric Association, 2000). These behaviours can range from obsessive behaviours, such as fascination with sensory stimuli, to the acquiring of specialised and focussed knowledge in areas of interest to the person (Autism Victoria, 2011).

The DSM-IV-TR identifies other features which are common in people with autistic disorder, but are not essential for a diagnosis. These also vary considerably in their severity and include: an obsessive need for sameness; hyperactivity; self-injurious behaviours; abnormalities in the social use of language such as echolalia, syntax and semantics; difficulties with motor coordination; and unusual responses to sensory

stimulation, such as indifference or oversensitivity to visual, auditory or tactile inputs (Wing, 1988).

Children with Autistic Disorder often also have an impairment of cognitive skills (American Psychiatric Association, 2000); 70% of children also have an intellectual disability (Fombonne, 2003), and many of these children have an IQ of less than 49, placing them in the severe intellectual disability range (Prior & Ozonoff, 1998; Wing, 1988). Some people with ASD may have splinter skills in visuospatial and mathematical skills, or in areas of interest (Wing, 1988).

DSM-5: Autism Spectrum Disorder.

By contrast, the DSM-5 describes only two categories of impairments:

1. Persistent deficits in social communication and social interaction, and
2. Restricted, repetitive patterns of behaviour, interests, or activities.

Similar to DSM-IV-TR, symptoms must be present in early childhood, although no cut-off age is given. The following descriptions of these items are summarised from the DSM-5 proposed revision (American Psychiatric Association, 2011).

In the category of social communication impairments, deficits must be present in all 3 of the following:

a) Social-emotional reciprocity
b) Non-verbal communicative behaviours used for social interaction
c) Developing and maintaining relationships, appropriate to developmental level (beyond those with caregivers)

In the category of restricted, repetitive patterns of behaviour, at least 2 of the following behaviours must be present:

a) Stereotyped of repetitive speech, motor movements or use of objects
b) Excessive adherence to routines, or excessive resistance to change
c) Highly restricted, fixated interests that are abnormal in intensity or focus
d) Hyper or hypo reactivity to sensory input, or unusual interest in sensory aspects of environment

A useful visual comparison of the differences between DSM-IV-TR and DSM-5 is given by Lord (2011), and reproduced in Figure 2.1. The DSM-IV-TR understanding of ASD is as a grouping of the 3 core impairments. Intellectual disability is seen as something separate to ASD, but often related to speech communication deficits. By contrast, DSM-5 separates language disorders from ASD, as they are now not

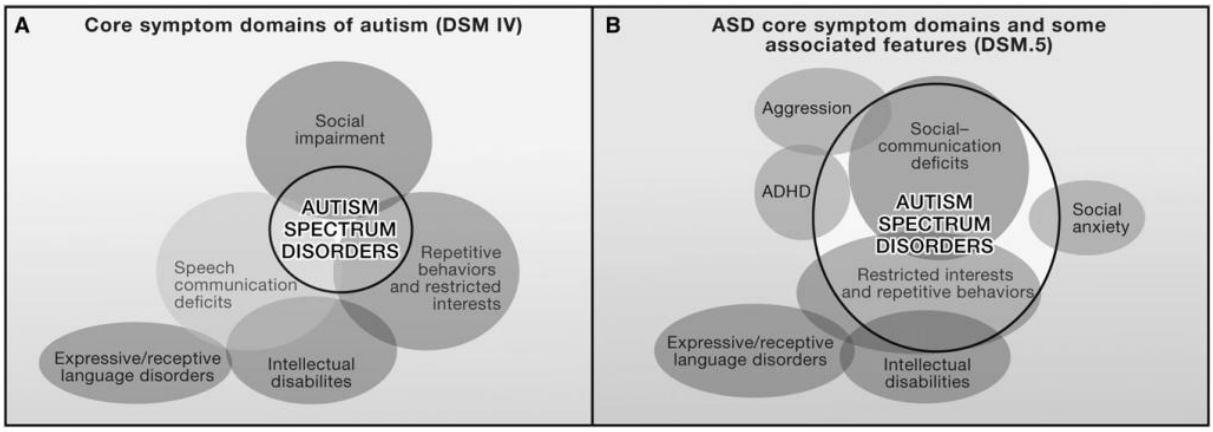

Figure 2.1 Differences between DSM-IV and DSM-5 core symptoms of ASD. Reproduced from Lord, C. (2011). Unweaving the Autism Spectrum. *Cell, 147*(1), 25.

considered to be universal in ASD. Social and communication deficits are combined as one category in the DSM-5, which emphasises: the contextual aspect of impairments in the person's ability to develop and maintain relationships with others; social-emotional reciprocity; and non-verbal communication. Intellectual disability is depicted as likely to be associated with ASD, as well as social anxiety, aggression and ADHD (American Psychiatric Association, 2011).

Rather than requiring only one item in the domain of restricted, repetitive behaviours, DSM-5 requires two of the listed behaviours to be present. An important aspect of these items is that there must be a history of "fixated interests, routines or rituals and repetitive behaviours" (American Psychiatric Association, 2011). Similar to Kanner's (1943) early work in identifying ASD, the DSM-5 notes that clinical observation combined with caregiver report will improve the accuracy and stability of the diagnosis (American Psychiatric Association, 2011).

DSM-5 indicates 3 levels of severity for ASD, including:

Level 1 – "requiring support": the person has decreased interest in, and difficulty initiating, social interactions. These social communication impairments are noticeable when supports are not in place. Rituals and repetitive behaviours (RRBs) significantly interfere with the person's functioning in more than one context.

Level 2 – "requiring substantial support": social impairments are obvious even when supports are in place, evident in marked deficits in nonverbal and verbal communication skills. RRBs are obvious to casual observers and interfere with functioning in a variety of contexts.

Level 3 – "requiring very substantial support": the person has severe deficits in nonverbal and verbal communication, with very limited initiations of social interactions. RRBs markedly interfere with all areas of the person's life, and the person is highly distressed when RRBs are interrupted.

Prevalence and incidence of ASD.

Prevalence describes the total number of cases that exist within the population at a particular point in time, while incidence describes the expected number of new cases and is therefore often expressed as a rate. The epidemiology of ASD is at present based on the DSM-IV-TR diagnostic criteria. The current estimate of the prevalence of all Pervasive Developmental Disorders is 60-70 per 10,000 people (or 1 in every 150 children), and within this estimate an average of 20 per 10,000 have Autistic Disorder (Fombonne, 2009). The Australian Advisory Board on ASDs recently reported an estimated prevalence of 1 in 160 children in Australia (MacDermott, Williams, Ridley, Glasson, & Wray, 2006). However, the reported prevalence of ASD can vary depending on the diagnostic procedures used (American Psychiatric Association, 2000; Roberts & Prior, 2006).

The current data supports the view that ASDs are currently much more prevalent than previously reported (Fombonne, 2009). However, whether the incidence of ASD is increasing or not is difficult to calculate as there are no biological markers of ASD displayed at birth (Roberts & Prior, 2006). Both incidence and prevalence are therefore particularly sensitive to changes in diagnostic criteria, which mean that the current data cannot adequately explain the basis for the increase in prevalence (Fombonne, 2009).

Effects on families of young children with ASD.

Having a child with special needs challenges many aspects of parent's lives, including family relationships, social supports, work and career, and mental well being (Barnett, Clements, Kaplan-Estrin, & Fialka, 2003). As a result, the social, emotional and cognitive responses of parents to their child's condition influences family functioning. The additional challenges faced by parents of children with special needs can lead to higher levels of stress and depression in parents, leaving them with fewer personal resources to be able to respond sensitively to the needs of their child, family and themself (Barnett et al., 2003). Further, parents who "rated themselves as more

depressed appear to rate their children as demonstrating a greater number of ASD behaviours" (Bennett et al., 2012, p. 95) relative to clinicians.

The ongoing and unfolding nature of disabilities results in unique experiences of grief and loss for families. As the child moves through different ages without achieving the associated milestones, feelings of grief can be constantly reawakened. The ongoing reappearance of grief and loss challenges the ability of parents to adapt and adjust their expectations and hopes for their child. Parents' abilities to deal with grief and loss can be exacerbated by conditions where the full implications of the diagnosis takes considerable time to be known, such as with ASD (Barnett et al., 2003).

Supporting the development of psychosocial resources in parents, including: perceived control; access to social supports; and increased abilities to cope with stress, has positive effects on parental well-being which in turn positively impacts the quality of their interactions with their child (Barnett et al., 2003). There is some evidence to suggest that parent mental health and child outcomes are "inter-related in a complex manner" (Williams, 2010, p. 106). However, the way support is provided to parents can help or hinder the outcomes for families (Dempsey, Keen, Pennell, O'Reilly, & Neilands, 2009). The more comfortable parents are with their relationship with therapists and early childhood intervention workers, the less stress they experience and the more likely they are to build up psychosocial resources (Dempsey et al., 2009).

A History of Music Therapy with Children with ASD

This is first of three sections presenting literature for the use of music therapy with children with ASD. A broad overview of music therapy with children with ASD is presented in this section in order to provide a sense of the long history music therapists have with this client group. In subsequent sections, literature relevant to the context of this study will be examined, including: the use of music therapy in the acquisition of social communication skills; and music therapy within natural settings, particularly with families.

As far back as 1953, clinicians have observed the "unusual interest in music" (Sherwin, 1953, p. 823) apparent in children with ASD, and the musical abilities these children sometimes possess (Reschke-Hernandez, 2011). The history of the use of music therapy as an intervention for children with ASD is provided in detail by Reschke-Hernandez (2011). Reschke-Hernandez describes this history of music therapy intervention alongside the history of the development of the profession of music therapy

in America and the UK. This is a useful way of reviewing the history of music therapy as an intervention for children with ASD, given that ASD was one of the first client groups music therapists wrote about and researched (Reschke-Hernandez, 2011). However, Reschke-Hernandez's systematic review focuses primarily on journal articles, and excludes many books and doctoral dissertations describing music therapy with ASD.

A summary of Reschke-Hernandez's (2011) historical systematic review is provided in Table 2.1, with exemplars of the literature relevant to each decade from the 1950s to 2000s provided. Two additional books which were omitted from the Reschke-Hernandez systematic review – one by Juliette Alvin (1978) and one by Müller and Warwick (1993) – have been included in the summary table as they particularly informed this study.

In the 1950s, not long after ASD was first identified by Leo Kanner, the musical abilities of children with ASD were first described. In the 1960s, music therapy pioneer Juliette Alvin described the potential for music therapy to promote communication with children with ASD when a child-led approach was adopted (Alvin, 1969, as cited in Reschke-Hernandez, 2011). Around the same time, Paul Nordoff and Clive Robbins, two pioneers in improvisational music therapy, described how children with ASD were more likely to become engaged in a musical experience than in other environments. These pioneers went on to publish theoretically grounded literature in the 1970s, which outlined models for work with children with ASD: "Creative Music Therapy" (Nordoff & Robbins, 1977) and "Music Therapy for the Autistic Child" (Alvin, 1978).

In the 1980s, music therapists began to write about the possibilities of using music therapy within interdisciplinary teams. At the same time, articles describing the "sensory sensitivities" (Reschke-Hernandez, 2011, p. 176) of children with ASD manifest in music therapy sessions, and the musical preferences and abilities of children with ASD (Thaut, 1987, 1988), were published. The 1990s saw music therapists base their work on special education and psychology approaches, as well as focus their publications on how music therapy addresses the diagnostic criteria of ASD. By the end of the 1990s, evidence based medicine was widely supported in the general research community, and this influenced the direction of music therapy research and publications from 2000 onwards.

Table 2.1

Summarised Historical Timeline of Music Therapy as an Intervention with Children with ASD.

Year	History of exemplar publications in music therapy with ASD
1950s	**The musical abilities of children with ASD documented:**
	Sherwin, A. C. (1953). Reactions to music of autistic (schizophrenic) children. *The American Journal of Psychiatry, 109*(11), 823-831.
1960s	**Landmark publications describing music therapy with children with ASD:**
	Nordoff, P., & Robbins, C. (1965). Improvised music for autistic children. In E. T. Gaston (Ed), *Music in Therapy* (p. 191-193). New York: MacMillan Publishing Company.
	Stevens, E., & Clark, F. (1969). Music Therapy in the treatment of autistic children. *Journal of Music Therapy*, 6(4), 98-104.
	Alvin, J. (1969). Work with an autistic child. In British Society for Music Therapy (Ed.), *Music Therapy for Autistic Disability.*
1970s	**Emergence of theoretically grounded music therapy literature:**
	Nordoff, P., & Robbins, C. (1977). *Creative Music Therapy: Individualized Treatment for the Handicapped Child.* New York: John Day Co.
	*Alvin, J. (1978). *Music Therapy for the Autistic Child.* London: Oxford University Press.
1980s	**American music therapists document music therapy within an interdisciplinary team:**
	Brusica, K. (1982). Music in the assessment and treatment of echolalia. *Music Therapy, 2,* 25-41.
	Staum, M., & Flowers, P. (1984). The use of stimulated training and music lessons in teaching appropriate shopping skills to an autistic child. *Music Therapy Perspectives, 1,* 14-17.
	Thaut, M., (1984). A music therapy treatment model for autistic children. *Music Therapy Perspectives, 1,* 7-13.
	International music therapists focus on the sensory aspects of ASD
	Warwick, A. (1984). The autistic child. *British Journal of Music Therapy, 15(1),* 2-8.
1990s	***Music therapy practice with children with ASD becomes more focussed:***
	Music therapy in early intervention
	Humpal, M. (1990). Early intervention: The implications for music therapy. *Music Therapy Perspectives, 8,* 30-35.
	Music therapy for ASD with maternal involvement
	*Müller, P., & Warwick, A. (1993). Autistic children and music therapy: the effects of maternal involvement in therapy. In M. Heal & T. Wigram (Eds.), *Music Therapy in Health and Education* (pp. 214-234). London: Jessica Kingsley Publishers.
	Therapeutic strategies borrowed from psychology and special education.
	Griggs-Drane, E., & Wheeler, J. (1997). The use of functional assessment procedures and individualized schedules in the treatment of autism: Recommendations for music therapists. *Music Therapy Perspective, 15,* 87-93.
	Starr, E., & Zenker, K. (1998). Understanding autism in the context of music therapy: Bridging theory and practice. *Canadian Journal of Music Therapy, 6(1),* 1-19.
2000s	**New wave of evidence based research with children with ASD.**
	Brownell, M. D. (2002). Musically adapted social stories to modify behaviors in students with autism: four case studies. *Journal of Music Therapy, 39*(2), 117-144.
	Kaplan, R. S., & Steele, A. L. (2005). An analysis of music therapy program goals and outcomes for clients with diagnoses on the autism spectrum. *Journal of Music Therapy, 42*(1), 2-19.
	Kim, J., Wigram, T., & Gold, C. (2008). The effects of improvisational music therapy on joint attention behaviours in autistic children: a randomized controlled study. *Journal of Autism and Developmental Disorders, 38*, 1758-1766.
	Music therapy identified as helpful in diagnosis of ASD
	Wigram, T. (2000). A method of music therapy assessment for the diagnosis of autism and communication disorders in children. *Music Therapy Perspectives, 18,* 13-22.
	Walworth, D. D. (2007). The use of music therapy within the SCERTS model for children with autism spectrum disorder. *Journal of Music Therapy, 44*(1), 2-22.
	Music therapy with children with ASD in family-centred models
	Allgood, N. (2005). Parents' perceptions of family-based group music therapy for children with autism spectrum disorders. *Music Therapy Perspectives, 23*, 92-99.
	Woodward, A. (2004). Music therapy for autistic children and their families: A creative spectrum. *British Journal of Music Therapy, 18,* 8-14.

Music therapy with children with ASD in non-traditional settings	
Kern, P., & Aldridge, D. (2006). Using embedded music therapy interventions to support outdoor play of young children with autism in an inclusive community-based child care program. *Journal of Music Therapy, 43*(4), 270-294.	
Meta analysis of music therapy with ASD	
Whipple, J. (2004). Music in intervention for children and adolescents with autism: a meta-analysis. *Journal of Music Therapy, 41*(2), 90-106.	
Cochrane Review in music therapy with ASD	
Gold, C., Wigram, T., & Elefant, C. (2006). Music therapy for autistic spectrum disorder. *Cochrane Database of Systematic Reviews, Issue 2. Art. No.: CD004381.*	

Adapted from Reschke-Hernandez, 2011.

* publications not included in the Reschke-Hernandez article.

Tony Wigram wrote extensively about the use of music therapy in the diagnosis of ASD in the early 2000s (Wigram, 2002a; 2002b; Wigram & Gold, 2006), as well as writing his influential book "Improvisation: Methods and Techniques" (Wigram, 2004) which drew heavily from his work with children with ASD. Notably missing from the Reschke-Hernandez (2011) systematic review was the work of Amelia Oldfield who, like Wigram, described her work in the diagnosis of ASD (2006a) and with the families of children with ASD (2006b).

A Cochrane review titled "Music therapy for autistic spectrum disorder" was conducted in 2006 (Gold et al., 2006) which highlighted the need to conduct further evidence based research in music therapy. While based on a limited sample of three small studies, this review highlighted that communication skills, both non-verbal and verbal, improved significantly as a result of music therapy interventions (Gold et al., 2006). Further detail about music therapy research with ASD will be provided in 'Music therapy experimental research' section to follow.

Aims historically addressed in music therapy with children with ASD.

Reschke-Hernandez (2011) identified 7 broad goals in the literature between 1990 and 2009, including: communication (7 authors); social (10 authors); behaviour (9 authors); emotional development (4 authors); motor skills (1 author); activities of daily living (1 author); and pre-academic skills (1 author). Clearly the three diagnostic criteria for ASD in the DSM-IV-TR – social, communication and behaviour – are the goals most often focussed on in music therapy literature published in journals in that period. Given that DSM-5 considers social and communication skills interdependent, the collapsing of these two goals in the music therapy literature make communication and social skill development the most commonly reported goals in music therapy when working with people with ASD.

The ability of music therapy to motivate, evoke and elicit responses from children with ASD has been widely described (Aigen, 1998; Aldridge, Gustroff, & Neugebauer, 1995; Brown, 1994; Holck, 2004b; Kim, Wigram, & Gold, 2008; Nordoff & Robbins, 1995). Assisting children to develop social communication skills through music therapy stems back to the 1970s with the pioneering work of Paul Nordoff and Clive Robbins (Nordoff & Robbins, 1995) and Juliette Alvin (Alvin, 1978). Since then, music therapy has been used to support and facilitate social participation between children with ASD and others, including their family (DeLoach Walworth, 2007; Müller & Warwick, 1993; Warwick, 1995) and peer group (DeLoach Walworth, 2007; Gunsberg, 1988; Kern & Aldridge, 2006; Skewes & Thompson, 1998).

Social Communication Deficits

As communication skills are necessary for successful social interactions, and social skills are required to engage in communication, these two developmental areas are intimately linked (Lord & McGee, 2001). This link is highlighted in the DSM-5 through the merging of the social and communication diagnostic criteria of DSM-IV-TR, with the rationale for this being that "deficits in communication and social behaviours are inseparable and more accurately considered as a single set of symptoms with contextual and environmental specificities." (American Psychiatric Association, 2011). Social communication skills as described in DSM-5 include: social-emotional reciprocity; non-verbal communication behaviours; and developing and maintaining relationships.

Social-emotional reciprocity deficits are defined by DSM-5 as ranging from "abnormal social approach and failure of normal back and forth conversation through reduced sharing of interests, emotions, and affect and response to total lack of initiation of social interaction." (American Psychiatric Association, 2011). Non-verbal communication deficits in ASD may range from "poorly integrated- verbal and nonverbal communication, through abnormalities in eye contact and body-language, or deficits in understanding and use of nonverbal communication, to total lack of facial expression or gestures." (American Psychiatric Association, 2011). Deficits in developing and maintaining relationships appropriate to the developmental level of the person with ASD range from "difficulties adjusting behaviour to suit different social contexts through difficulties in sharing imaginative play and in making friends to an apparent absence of interest in people". (American Psychiatric Association, 2011).

Social-emotional reciprocity, non-verbal communicative behaviours and relationship formation are abilities that can be evaluated or assessed in the context of relationship. These early skills are developed through intersubjective experiences (Stern, 2010), suggesting that a change in the child's early social communication skills will be reflected in a simultaneous change in the quality of the relationships in which the child engages. The lack of social communication skills in children with ASD are described in the context of relationship in the earliest writings about ASD, where parents described their child as being "happiest when left alone" (Kanner, 1943, p. 242).

Children with severe ASD aged 3 to 5 years are well past the typical developmental age that social communication skills emerge, however as their diagnosis indicates, they have significant deficits in this area. The impact that social communication deficits have on the quality of the relationships between the child with ASD and their parents (Rocha, Schreibman, & Stahmer, 2007) and peers (Adamson & McArthur, 1995; Sigman & Kasari, 1995) have been identified for some time. Children with ASD smile less frequently in response to their mother's smiles, and so not surprisingly, mothers of children with ASD display fewer smiles and are less likely to respond to their children's smiles (Dawson, Hill, Spencer, Galpert, & Watson, 1990). In social situations with peers, children with ASD's lack of sharing attention can make the other person feel invisible. While adults can adjust and accommodate for this, it is much harder for their peer group, resulting in an increased risk of social isolation (Adamson & McArthur, 1995; Sigman & Kasari, 1995).

While many children with ASD are able to form secure attachments with their parents (Moore, 2009), those who have ASD in conjunction with an intellectual disability are generally less well attached to their parents than children who: are typically developing; have a language disorder; or who have an intellectual disability without ASD (Rutgers et al., 2007). Children with ASD combined with an intellectual disability often have a severe social communication impairment, and behaviours which make attuned, responsive parenting challenging (Moore, 2009). Parents play a vital role in their child's social-emotional development (Mahoney & Wiggers, 2007), and promoting sensitive attunement and warm responsiveness in parents potentially has short and long term benefits on children's social-emotional competence (Moore, 2009).

Typical Social Communication Development

Given the significant deficits in social communication skills in children severely affected by ASD, it is useful to understand how these skills develop in typical children. Social communication development and learning begins from birth, and is highly developed by 18 months of age when the infant is capable of symbolic communication through words. Typically developing infants theoretically have an innate capacity to begin to interact and relate to their parents as seen through the face-to-face exchanges infants engage in with their parents (Stern, 2010; Trevarthen, 1998). There is increasing awareness of the importance of a strong parent-child relationship in the successful development of social communication skills in both typically developing children and children with ASD (Moore, 2009).

Early social learning.

Attachment theory, first introduced by John Bowlby in 1969, is still a significant framework for understanding the mechanisms of social-emotional development (Bowlby, 1969; Schore, 2005). From this framework, discovering who we are is initially understood through how our parents respond to us (Hughes, 2009). In a reflection of the theories currently influencing developments in paediatrics, Schore (2005) notes the shift in psychology research from "cognition to emotion" (Schore, 2005 p. 205) where the importance of establishing emotional communication between parent and infant is of primary importance to the infant's general development.

Social play between parent and infant is an important and prevailing feature of the first year of life. Social play paves the way for the infant to be able to develop relationships with others (Stern, 2010) and communicate effectively with others (Adamson & Bakeman, 1991). The quality of the early relationship between the parent and infant impact significantly on the infant's general development (Hughes, 2009; Schore, 2005). Daniel Stern's early research which detailed and poetically described the early reciprocal relationships between infants and parents provides valuable clarification of the stages of infant development in the crucial first eighteen months of life. Within this primary relationship, a cultural learning takes place; the infant is given the message that "people are playful" (Stern, 1977, p. 82). This message is reinforced by the parent's intuitive use of song, mime and dance to interact with their infant (Stern, 1977).

From 0 – 2 months of age, the infant's experiences are bound up in physiological regulation such as establishing sleep/wake, day/night and hunger/satiation cycles (Stern, 1985). These biosocial processes of the infant provide opportunities for shared attentiveness between the infant and parent (Adamson & Bakeman, 1991). Even at this early age, parents naturally and intuitively treat their infant's behaviour as intentionally communicating a message to them (for example, when the infant cries parents may conclude that infant is hungry). The infant therefore learns to regulate themselves within the context of social interactions (Stern, 1985).

Infant directed speech, also called 'motherese' or 'baby talk' abounds in the first months of the infant's life. These interactions between parent and infant rely on the non-verbal features of the interaction rather than the words used by the parent (Robb, 2000; Trevarthen & Malloch, 2002). In his recent theories for child development, Stern (2010) reflects on the lengthy period that infants take to learn language, suggesting that this early stage is where valuable interpersonal skills are learnt:

> [Infants] have to learn the forms of dynamic flow that carry social behaviours. In addition, they have to learn this before language arrives to mess it all up. The basic structures are all non-verbal, analogic, dynamic Gestalts that are not compatible with the discontinuous, digital, categorical nature of words. (p. 110)

Infants respond to many subtle, musical features of the parent's vocal interactions with synchronous body movements. Parent and child also tend to vocalise in a coordinated and rhythmic manner (Malloch, 2000; Nadel, Carchon, Kervella, Marcelli, & Reserbat-Plantey, 1999; Trevarthen & Malloch, 2002). Through spectrographic analysis of vocal exchanges between infants aged 6 – 12 weeks old and their mothers, Malloch (2000) showed very precise pitch and rhythmic matching by infants to their mothers' vocalisations. Analysis also showed that mothers altered the sound of their voice to match the timbre of the infant's voice.

Two months of age is an important milestone in the infant's social development (Adamson & Bakeman, 1991; Schore, 2005; Stern, 1977, 1985). The first tasks of the infant are to become attached and socially and emotionally competent, not to be independent (Stern, 2010). At around 2 months of age, there is an awakening of social awareness by the infant as they start to make eye contact, smile and coo with their parent. Through social play with their parent, the infant's development continues to

progress, with many developmental skills relying on interactions with a sensitively focussed, responsive parent (Moore, 2009; Prizant et al., 2000; Schore, 2005; Stern, 1985). For example, arousal and self regulation are inherent in many of the people games introduced by parents, such as 'peek-a-boo' and mutual smiling. Security and attachment are fostered through interactions involving mutual looking, cuddling and being held. The parent synchronises their behaviours with the infant in order to keep the infant in an optimum level of arousal to maintain social interactions (Prizant et al., 2000; Trevarthen & Malloch, 2002). Parents continually interpret the infant's behaviour and affect – an emotion or mood expressed through an action or facial expression – and assign meaning to it (Hughes, 2009). The same infant facial expression could be interpreted in a number of ways, for example, amusement, surprise or fear. The way that the parent interprets and then responds to the infant's behaviour teaches the infant about affect. The social interaction between the parent and infant is crucial to the infant's learning and understanding about themselves and the world around them (Schore, 2005; Stern, 1985, 2010).

In this early stage, interactions between the parent and infant take various forms, including: clear turn-taking; overlapping of behaviours; and simultaneous behaviours. Moments of engagement are usually characterised by a "repetitive run" (Stern, 1977, p. 9) where the same interaction is presented to the infant in the form of theme and variations. Parent and infant build up jointly created motives that are repeated over time, and this familiarity allows the pair to anticipate the interaction (Malloch, 2000). The variations slightly change each time which gives the child experience with the ever changing nature of social interactions (Malloch, 2000; Stern, 1977). The creative and dynamic forms of early social learning are warmly described by Stern (1977): "I suspect that being a primary caregiver is more like being a creative artist than anything else, performing in your own work as you create it: a choreographer-dancer or a composer-musician." (p. 145).

From around 6 months of age, face-to-face interactions between parent and infant reach a peak, but then start to change again as the infant's motor skills start to develop as seen through a new interest in objects (Adamson & Bakeman, 1991). The infant relies on the parent to initiate and share their involvement with objects, and parents intuitively provide "supportive actions" (Adamson & Bakeman, 1991, p. 24) to assist the infant with object exploration. The parent naturally provides scaffolding for

their infant through play routines and predictable activities that make it easier for their child to make sense of the interaction (Bruner, 1995; Sigman & Kasari, 1995).

Affect attunement.

Between 9 – 12 months of age, the infant moves into a new developmental stage where they show an understanding of the primary relationship they have with their parent through their negative reactions to strangers and separation from their parents (Stern, 1977). It is also around this time that "affect attunement" (Stern, 1985, p. 140) is part of parent-child interactions.

Affect attunement is the process involved in parent-child interactions where the parent non-verbally reflects back to the infant their own experiences. This process is also known as: intersubjectivity; mirroring; echoing; affect matching; affect contagion; modifying imitation (Stern, 1985; Stern et al., 1985); and, more recently, vitality forms (Stern, 2010). These terms describe the presence of two skills: 1) the parent's ability to perceive the infant's affect from their behaviours, and 2) the infant's ability to perceive that the parent's behaviour is related to their own affect or experience. These experiences with the parent result in the infant's successful regulation and organisation of their emotional states, thoughts and perceptions (Hughes, 2009). This process theoretically allows the "infant to perceive *how* he is perceived." (Stern et al., 1985, p. 249). The process of affect attunement is illustrated best with an example:

> An 8½ month old boy reaches for a toy, just beyond reach. Silently, he stretches toward it, leaning and extending arms and fingers fully out. Still short of the toy, he tenses his body to squeeze out the needed extra inch of reach. At that moment, his mother says 'uuuuh....uuuuuh!' with a crescendo of vocal effort, the expiration of air pushing against her tensed vocal chords. The mother's accelerating vocal-respiratory effort matched the infant's accelerating physical effort. (Stern et al., 1985, p. 250)

This type of attuning happens commonly and frequently with young children, and is embedded naturally into the child's activities (Moore, 2009; Schore, 2005). The process happens quickly, almost automatically, and is presented by the parent at nearly the exact same time as the infant's behaviour, which distinguishes it from turn-taking

(Stern, 1985; Stern et al., 1985). The characteristics of parent behaviour within these attunements include: imitating the child, but not directly or in exactly in the same way; matching the child's affective behaviours using a different mode to the child's, such as in the above example putting a vocalisation to a stretching action; and reflecting the affect, not simply the behaviour, resulting in an act that refers to the internal state of the child (Stern, 1985).

Within this interaction, it is the child's feeling state that is being matched rather than just their behaviour (Schore, 2005), and the interaction is essentially non-verbal as the child is still at a pre-verbal stage. Affect attunement is part of the process of language acquisition, which progresses from: imitation; to learning that an action can represent something (affect attunement); to the use of symbols and language (Hughes, 2009; Stern, 1985; Stern et al., 1985).

Emergence of joint attention.

In this same developmental period of between 9 – 12 months, imitative learning, intentional communication and joint attention emerge (Adamson & Bakeman, 1991; Adamson & McArthur, 1995; Tomasello, 1995). Joint attention, also known as secondary intersubjectivity, is "a dynamic arrangement between infants, objects and social partners" (Adamson & McArthur, 1995, p. 205). Joint attention is demonstrated through either: 1) the infant's response to the joint attention bids of the parent, such as following the parent's gaze or point; or 2) the infant's initiation of joint attention towards the parent, such as looking at the parent and then looking at an object. The important element in joint attention is that the infant is actively trying to maintain communication with the parent (Sigman & Kasari, 1995). Successful joint attention is reflected in the infant's ability to orient and attend to social partners, shift their gaze between objects and people, and share affect and emotion with others (Lord & McGee, 2001).

The emergence of joint attention draws together four areas of the infant's development to this point: the infant's understanding and participation in dyadic parent-child interactions; the infant's ability to manipulate objects; experiences in interactions between the infant, object and parent; and the emergence of the use of symbols within parent-child interactions such as gesture (Adamson & Bakeman, 1991; Corkum & Moore, 1995). These four components necessarily happen within cultural constructs that provide the backdrop for parent-child interactions. For example, adults have learnt

that when someone is looking at an object they are likely to also be referring to that object in their conversation. Parents provide routines with their children for requesting and referring to objects based on their cultural conventions, and this enables the infant to develop the use of symbols such as words and gestures to communicate (Adamson & Bakeman, 1991; Adamson & McArthur, 1995; Tomasello, 1995).

The use of symbolic gestures and first words start to develop at around 13 – 14 months of age as the child moves out of infancy, indicating that the child is moving towards a broader understanding of joint attention (Baldwin, 1995; Tomasello, 1995). At this stage, the child shows awareness that their attention on something can be shared with another person. It is this "intersubjective awareness" (Baldwin, 1995, p. 132) that is considered most important for language development and communication skills.

Joint attention continues to develop, reaching a more sophisticated level at around 18 months of age, and is signified by a burst of language development where children learn new words rapidly and start to make multiword utterances (Baldwin, 1995; Corkum & Moore, 1995). Joint attention at this sophisticated level can be described as a "meeting of minds" (Bruner, 1995, p. 6), where successful attunement and engagement between the parent and child feature interactions that take place in a "close-textured pattern of reciprocity" (Bruner, 1995, p. 9). A summary of social communication development is provided in Table 2.2.

Social communication development in children with ASD.

With the defining feature of ASD being the lack of reciprocal social interaction, the early social communication development of children with ASD has attracted an abundance of research (Prior & Ozonoff, 1998; Wing, 1988). For some researchers, this has lead them to investigate whether the developmental sequence of social communication skills is different for children with ASD or whether it is simply delayed (Carpenter, Pennington, & Rogers, 2002; Chiang, Soong, Lin, & Rogers, 2008; Clifford & Dissanayake, 2008; Wetherby, Prizant, & Schuler, 2000).

Initiating joint attention interactions with others is considerably impaired in children with ASD (MacDonald et al., 2006; Sigman & Kasari, 1995). In particular, people with ASD have difficulty learning conventional, cultural and symbolic aspects of communication development. Young children with ASD use fewer vocalisations, and more primitive gestures such as pulling a person or manipulating their hand to communicate. They lack the use of more conventional gestures such as waving,

Table 2.2

Typical Social Communication Development from Birth to 18 Months of Age.

Developmental Phase	Age of onset	Characteristics
Shared attentiveness (Dyadic interactions)	Birth	– Infant alertness. – Parent and infant share moments of attentiveness. – Parents use infant directed speech.
Interpersonal engagement	2 months	– Affective reciprocity during face-to-face interactions. – Parent synchronises their behaviour with the infant. – Infant demonstrates inbuilt ability to respond to the tempo of interactions.
Object involvement	6 months	– Infant's interest in objects develops along with their manipulation skills. – Parents support and structure object exploration.
Affect attunement	9 months	– Infant develops an understanding of the relationship with their parent. – Infant reacts to strangers, separation from parent and reunion with parent.
Emergence of joint attention (Triadic interactions)	9 months	– Imitative learning and intentional communication emerges. – Adult provides routines for requesting and referring to objects. – Infant responds to joint attention bids – Infant initiates joint attention with parent
Consolidation of joint attention	13 months	– Infant's first words emerge. – Sustained and varied forms for joint attention develop.
Emergence of symbols	18 months	– Intersubjective awareness develops sophistication. – Infant uses decontextualised words and symbolic gestures.

Note: summary was based on the following literature: Adamson & Bakeman, 1991; Adamson & McArthur, 1995; Bruner, 1995; Hughes, 2009; Prizant et al., 2000; Stern, 1977, 1985; Stern et al., 1985; Tomasello, 1995.

nodding, showing and pointing (Adamson & McArthur, 1995; Wetherby et al., 2000).

In a study of 12 children with ASD and 11 children with developmental delay matched for chronological age, verbal mental age and non-verbal mental age, Carpenter, Pennington and Rogers (2002) tested children's skills in sharing attention, following attention and behaviour, directing attention and behaviour, imitation and object-related skills. The results were compared with those of typically developing children. Significantly fewer children with ASD successfully demonstrated gaze-following and declarative gestures (pointing, showing or giving objects to a parent to gain their attention) compared to typically developing and developmentally delayed children. However, imperative gestures (pointing to, reaching for, or giving an object to their parent in order to request) were at a more comparable level to the developmentally delayed peers, although were still impaired (Carpenter et al., 2002). These results support those noted earlier by Mundy and Stella (2000), who reported that children with

ASD can readily engage others in order to get help with acquiring objects similarly to typically developing children.

While the Carpenter et al. (2002) study was limited by a small sample size, the results indicated that children with ASD do not follow the typical order of skills leading to language acquisition. For typically developing children, the sequence is reliably:

1. Joint engagement
2. Communicative gestures
3. Attention following
4. Imitative learning
5. Language

While the study had a small sample size of 12 children with ASD, important differences in the ways children with ASD developed language were noted, such as starting to use words before engaging in some pre-verbal skills. Carpenter et al. (2002) observed the following trend in the emergence of language skills in children with ASD, however it should be noted that this pattern was not adhered to by all of the participants in the study:

1. Imitative learning
2. Referential language
3. Joint attention
4. Attention following
5. Communicative gestures

Therefore, for children with severe ASD, it may be useful to conceptualise social communication skills as a group of building blocks rather than as a sequence. This analogy acknowledges the important role early social communication skills play in promoting language development (Stern, 2010), but reasons that the order in which these skills occur may be less relevant for children with ASD.

Clifford and Dissanayake (2008) investigated whether joint attention skill deficits in children with ASD stem from earlier dyadic skill impairments. The study analysed in-depth parent interviews describing child behaviours from birth to two years of age, and home video recordings from four age periods (0-5, 6-11, 12-17 and 18-24 months) with 36 children with ASD and 27 control children, 19 of whom had a developmental delay. The study showed that children with ASD had impairments in dyadic behaviours such as eye-gaze from the first year of life, with differences in the quality of eye contact being particularly striking. Parents of children with ASD

reported lower rates and poorer use of eye contact, with these difficulties continuing and becoming most problematic around the ages of 18-24 months (Clifford & Dissanayake, 2008). With regard to eye-gaze combined with affect, children with ASD had differences in quality and frequency. The children with ASD engaged less in this type of social play behaviour than typically developing children (for example, social games such as 'peek-a-boo' require the coordination of gaze and affect). While there was an increase in this ability over time, children with ASD did not catch up to the typically developing group. This finding was similar to an earlier study (Dawson et al., 1990) which found that children with ASD were much less likely than their typically developing peers to combine affect (smiles) with gaze.

Further, children with ASD also had significant deficits in joint attention (triadic behaviours). In the period between 12-24 months, parents of the children with ASD variably reported that some triadic behaviours did occur, but they were significantly less frequent compared to the typically developing children. Clifford and Dissanayake (2008) propose that for children with ASD, sharing with another person (joint attention) may be less intrinsically rewarding than requesting desired objects. Similar to earlier studies (Mundy & Stella, 2000), they theorise that the child's motivation to engage in certain behaviours plays a part in their social communication development (Clifford & Dissanayake, 2008). Clifford and Dissanayake (2008) therefore conclude that the primary impairments of ASD are early dyadic behaviours, and these impairments then impact on the development of triadic behaviours.

A study by Chiang, Soong, Lin and Rogers (2008) investigated the nonverbal communication skills in children under 3 years with ASD. Their study of 104 children including 23 children with ASD, found that children with ASD had deficits in person-to-person skills (dyadic skills), including turn taking and social engagement, as well as triadic skills such as joint attention. Their finding further supports the theory that ASD is primarily an affective disorder as "the social impairment in autism possibly begins at the level of dyadic engagement, rather than difficulties with joint attention and coordination of mental states." (Chiang et al., 2008, p. 1904). These difficulties with dyadic interactions likely impact the quality of the relationship between the child with ASD and their parents (Rocha et al., 2007) and peers (Adamson & McArthur, 1995; Sigman & Kasari, 1995).

A social orienting model of ASD.

A social orienting model of ASD views the social communication deficits in dyadic behaviours as the primary impairment (Mundy & Stella, 2000). This contrasts with other models of ASD such as 'theory of mind' and 'executive functioning' which focus on the joint attention deficits of ASD. This view is justified by the fact that dyadic behaviours developmentally precede joint attention skills (Clifford & Dissanayake, 2008; Hobson, 2002), and that this lack of early social orienting has flow on effects for subsequent social communication development. The social orienting model provides a particularly useful theoretical framework for music therapy as it highlights the importance of developing strong relationships between children and parents as the foundation for social communication development.

Importance of the family in the child's social communication development.

There is increasing awareness of the importance of a strong parent-child relationship in the successful development of social communication skills in both typically developing children (Edwards, 2011) and children with ASD (Moore, 2009). The underlying goal of working with young children with ASD has therefore been described as:

> [For the child] to participate as a partner in social communicative exchange with peers and family members, and to experience interactions as successful and emotionally fulfilling. The development of trusting and secure relationships is both a foundation for and a product of success in social communication with others. (Prizant et al., 2000, p. 218)

The assumption in this goal is that development is transactional and affectively based, as it involves the interaction of the child with their environment. This view of development is upheld by current practices in early childhood intervention in Australia (Moore, 2009). A transactional model emphasises the importance of the relationship between the child and their social environment (Hughes, 2009; Prizant et al., 2000). Through social interactions, children learn about the impact that their communication attempts have on their environment. Social, cognitive and communication development is therefore grounded in trusting relationships with others who are emotionally attuned (Bruner, 1995; Prizant et al., 2000). Within this ecological framework, the child's

development has long been understood as promoted within the system of family relationships (Bronfenbrenner, 1975; Winnicott, 1952) .

The impairments experienced by children with ASD in core social-emotional areas of sharing attention and emotion present a particular challenge for providing developmental support and intervention. Social-emotional skills are abstract skills that are not easily trained or taught (Schertz & Odom, 2007). Supporting and influencing the child's drive and desire to communicate is vital for successful social development (Campbell, Milbourne, & Wilcox, 2008; Poulsen, Rodger, & Ziviani, 2006) and requires that learning environments and communication partners of the child including parents, siblings and peers, must also be a focus of the intervention (Schertz & Odom, 2007; Wetherby et al., 2000).

The challenge for parents and therapists is to create an environment that is conducive to child engagement. According to self-determination theory, a child who is intrinsically motivated will have higher levels of unprompted participation and persistence in activities (Poulsen et al., 2006). There are three categories of intrinsic motivators, namely: the acquisition of knowledge; mastery of skill; and sensory pleasure. Of these, sensory pleasure is arguably an intrinsic motivator particularly relevant to music therapy sessions with children with severe ASD.

Approaches to supporting the development of children with ASD.

With impairments in social communication being lifelong features of ASD (Prior & Ozonoff, 1998) with no cure available (Howlin & Goode, 1998), questions arise about how to best support the development of children with ASD. The pervasive and persistent nature of social communication impairment challenges the notion of 'treatment', with some practitioners explaining that the focus of any program for children with ASD should be aimed at helping them "to adjust more effectively to their environment." (Francis, 2005, p. 493). A full review of the therapy programs available to children with ASD is beyond the scope of this thesis; however the range of programs available will be briefly outlined.

The advent of American human rights legislation in the 1960s (Wolery, 2000) was the spring board for the Disability Discrimination Act being adopted in Australia in the 1970s (Ozdowski, 2002). These important legislations had impacts on the availability of education for children with disabilities. Since then, there have been a variety of approaches aimed at supporting the developmental skills of children with

ASD. The diversity of developmental programs available could be described as a continuum of philosophies from behavioural to relationship based models.

Behavioural models of learning were used extensively in general education in the 1970s. Child development and learning was understood as a result of consequences for behaviours (Wolery, 2000). Applied Behavioural Analysis (ABA) approaches, meaning behavioural theory applied to human behaviour (Wolery, 2000), were first developed for children with ASD by Lovaas in the 1970s (Francis, 2005). ABA was based on "discrete trial training conducted outside of social contexts" (Prizant et al., 2000, p. 193), with early research confirming that children with ASD could learn a variety of skills such as language and daily living skills (Lovaas, 1987; Prizant et al., 2000). While intensive ABA therapy requires a large investment of time and money, it is associated with good outcomes for children with ASD (Wolery, 2000); albeit more moderate outcomes (Francis, 2005) than the "recovery" (Lovaas, 1987, p. 8) from ASD that early research claimed.

At the other end of the continuum are relationship based, child-centred interventions that are individualised and based on a transactional model of development (Lord & McGee, 2001; Prizant et al., 2000). The adult is encouraged to sensitively respond to the child's attempt to communicate (Prizant et al., 2000). This style of adult-child interaction incorporates strategies such as: following the child's lead; offering choices; and modelling – all of which are characteristic of very early parent-child interactions (Stern et al., 1985) and aim to help the child understand the reciprocal nature of communicating (Prizant et al., 2000).

Many approaches combine behavioural models with relationship based models, in order to provide systematic opportunities for children that are grounded in the child's interests, relationships and developmental stage (Moore, 2009; Rogers et al., 2006). These combined approaches consider that the child's motivations or preferences (Koegel & Koegel, 2006), and natural reinforcers (Rogers et al., 2006) in the child's environment, are powerful. Exploiting these natural reinforcers results in positive social communication outcomes (Rogers et al., 2006).

Music Therapy to Promote Social Communication Development

Music therapists have been influenced by this continuum of theoretical frameworks in their work supporting social communication development in ASD. In

this second section examining music therapy literature, approaches to intervention and social communication research will be presented.

Behavioural frameworks were evident in the first comparative study of music therapy by Stevens and Clark (1969). This study described therapist-directed methods to attempt to gain the child's attention and promote positive social behaviour. While the therapist would follow the initiations of the child, this would be done only "if the child's inventiveness was appropriate" (p. 99). The child's responses would be shaped into something "meaningful" (p. 100) by the therapist; such as singing a number song if the child began counting for no apparent reason. After 18 weekly music therapy sessions, the 5 participants made significant gains in social behaviour (Stevens & Clark, 1969).

Psychodynamic and humanistic frameworks have also informed the application of music therapy with ASD with the aim for the child with ASD being the "development of interpersonal relationships" (Bruscia, 1987, p. 81). In the early stages of therapy, Alvin (1978) worked one-to-one with children with ASD; later progressing to include family members and peers in the child's therapy. This notion of relationship between the child and therapist occurring through music making was also the basis of Nordoff and Robbins' (Nordoff & Robbins, 1977; 1995) psychodynamically informed improvisational model of music therapy, which developed in part from their early work with children with ASD.

The use of contingent therapist responses within improvised approaches was a feature of subsequent research by Michael Thaut (1984) who described using a fusion of behavioural and relationship frameworks that "try to support and facilitate the desire or necessity for the child to communicate" (p. 12). Improvised music was used to match the child's activity, but was offered within a structured framework to discourage ritualised behaviours in the child (Thaut, 1984). Thaut's work would later embrace physiologically grounded theories that draw on the parallels between music and speech neural circuitry, known as Neurological Music Therapy (Thaut, 2008).

Relationship models of music therapy with children with ASD.

While a variety of music therapy methods, such as improvisation, re-creative (songs), creative (composing) and receptive (music listening) all have potential for use with children with ASD, it is the manner in which these methods are used that is most relevant to this study. Saperston's (1973) narrative description of a single case study

with an 8 year old boy with severe social impairments, described the aim of the therapy as being to "establish some type of communication with him through the use of music." (Saperston, 1973, p. 184). Saperston (1973) described matching the motor movements of the child with improvised piano music. After 20 sessions, a breakthrough occurred where the child laughed when the therapist matched his stomping with a crash of notes on the piano. Saperston (1973) considered that the child "was beginning to understand that he was able to control the music." (p. 186). The child developed from a seeming unawareness of the therapist's presence, to awareness of the interactions with the therapist. At times the therapist attempted to shape the behaviours of the child by playing music contingently, such as when the child made eye contact with them.

Since the 1970s and the early work of Alvin (1978) and Nordoff and Robbins (1977), relationship models of music therapy have continued to evolve. Parallels have been made between the dynamic forms in musical improvisations to mother-infant interactions (Pavlicevic, 1990). The musical attunement of the therapist to the child's mood or behaviour through the performance of songs, improvised vocal motifs and instrument playing exploits the non-verbal components of communication possible through music (Malloch, 2000). This musical "coordinated companionship" (Malloch, 2000, p. 32) is now known as "communicative musicality" (Malloch, 2000, p. 32). Commmunicative musicality describes the musical dialogue between carers and infants (Malloch, 2000), and consists of three features: "shared timing through pulse; shared shaping of the melodic contour, texture and intensity; and shared overall narrative form" (Ansdell, Davidson, Magee, Meehan, & Procter, 2010, p. 5). These three features enable a non-verbal moment of connection between partners to occur. Similar to the features of affect attunement, communicative musicality is an intersubjective experience between two people (Stern, 2010).

Ansdell (1995) described the relationships that occur within music making based on the philosophies of Martin Buber (1958) and Nordoff and Robbins (Ansdell, 1995). Improvisational music therapy strives for relationship, with Ansdell (1995) describing 4 types of relationship experiences between the therapist and client:

1. Contacting – the client is in a self contained bubble. The therapist reaches out to them by musically accompanying them, but the client is unaware that the therapist's music relates to them.

2. Responding – the client hears themself being heard in the therapist's music. The client begins to be aware that the therapist's music is related to them.
3. Relating – the client realises that they can intentionally influence the music, and that they can respond to the therapist's music. Dialogue occurs and allows for a "becoming together" (Ansdell, 1995, p. 73) rather than just "being together" (Ansdell, 1995, p. 73).
4. Meeting – a moment when client and therapist have shared intention in the music. The "music takes them up and almost, you could say, plays them" (Ansdell, 1995, p. 73); in this encounter, the "I" of the client and the "You" of the therapist become "We".

Through a "controlled attunement to a client's expressed intentions and feelings" (Wigram & Elefant, 2009, p. 425), the music therapist works to draw the child into a musical interaction that is by nature a social interaction. Relationship models of music therapy take a developmental theory perspective; a child must have the desire, ability and opportunity to influence their environment (Hughes, 2009; Prizant et al., 2000). Music therapy can therefore assist children to gain foundational relationship skills such as awareness of self and others (Carpente, 2009) through the use of "response evoking techniques" (Wigram, Pedersen, & Ole Bonde, 2002, p. 184), including: imitating the child's responses and behaviours (Holck, 2004b; Wigram et al., 2002) in order to create opportunities for natural and playful turn taking (Wigram et al., 2002) ; pausing or freezing the music to create unexpected and suspenseful breaks in the flow of the music (Holck, 2004b; Wigram et al., 2002); manipulating musical expectation to include surprising musical changes within a familiar musical play routine (Wigram et al., 2002); offering musical variations which create a challenge for the child to accept the unknown within the familiar (Brown, 1994; Holck, 2004b; Schumacher, 1994, cited in Holck, 2004a; Wigram et al., 2002); and the use of "small musical-drama sequences" (Wigram et al., 2002, p. 186) such as accelerating the tempo to bring a sense of humour and surprise to the music (Wigram et al., 2002).

From a transactional theory perspective, a history of relationship is created between the music therapist and child where the expectations each person has of the other is understood between them (Wigram et al., 2002). For example, when the music therapist and child have created a musical theme together, and this theme may then be varied or unexpectedly paused by the therapist; the child will only respond to this

change if they understand that this is different from what was expected. "Predictability and meaning are thus closely linked." (Wigram et al., 2002, p. 187).

Music as a form of social play.

Music making between the therapist and child has been theoretically compared to social play (Kim et al., 2008; Wigram & Elefant, 2009). Similar to social play with infants, music therapy techniques use a balance of structure and unpredictability to promote shared affect, attention and relatedness (Holck, 2004b; Kim, 2006; Kim et al., 2008; Wigram & Elefant, 2009). Supporting a child with severe social communication impairments to engage with others necessitates setting up an interaction that both partners find enjoyable (Holck, 2004a) .

Free improvisations between the child and therapist may generate musical themes and ideas that can be used later as part of more structured activities (Holck, 2004a). A "joint interaction history" (Holck, 2004a, p. 8) is created by these musical themes that allow the child and therapist to have shared expectations of their interactions. These expectations allow for a rich interplay to occur, where variations can be incorporated by both participants, but the familiar theme can be readily returned to. The "interaction theme" (Holck, 2004a, p. 3), makes it easier for the child and therapist to perceive and understand the other's actions as meaningful. In a review of music therapy literature from 1977 onwards, Holck (2004a) revealed that the use of interaction themes is a widespread phenomenon amongst music therapists supporting people with various social communication impairments across the world.

Music Therapy Experimental Research Targeting Improved Social Communication Skills

This section focuses on experimental research into music therapy with children with ASD, however this is not to diminish the valuable case study and qualitative research conducted by music therapists over the years. Qualitative research and case studies have provided important insights into the approaches and methods music therapist have employed to promote social communication development, with the work of many of these researchers presented in previous sections.

As mentioned earlier, the first experimental study investigating music therapy with children with ASD was published in 1969 by Stevens and Clark in the Journal of

Music Therapy. Five boys with ASD aged between 5 – 7 years participated in the study, with four of the five boys recording "improvement in their social behaviour" (Stevens & Clark, 1969, p. 103), and an increase in their developmental maturity as measured on a developmental rating scale. The study design did not include a control group, but instead relied on pre and post test comparisons where each child acted as their own control. Stevens and Clark (1969) made particular note of how difficult it was to assess the boys, as their behaviours made psychological testing unsuccessful.

The next experimental studies in music therapy with ASD occurred in the late 1980s, when Michael Thaut designed two studies that used a non-randomised comparison group to investigate whether children with ASD firstly preferred music to visual stimuli (Thaut, 1987) and secondly whether they had the ability to generate improvised tone sequences (Thaut, 1988). These studies provided important evidence of the capacity for musical responsiveness of children with ASD, however the studies were conducted in artificial conditions that reduced the generalisability of the findings.

The complexities and challenges of researching children with ASD are highlighted by the fact that, to my knowledge, the next experimental research into social communication outcomes was not published until the mid 1990s. Edgerton (1994) investigated whether improvisational music therapy positively affected communicative behaviours. Eleven children with ASD aged between 6 and 9 years received 10 weekly improvisational music therapy sessions based on Nordoff & Robbins Creative Music Therapy approach. A reversal design was used, where the children had 5 improvisational sessions, then one session with pre-composed songs, followed by 4 more improvisational sessions. Improvisational music therapy was significantly more effective in increasing communicative behaviours compared to singing pre-composed songs. While limited by a lack of standardised measures and no control group, the study importantly established that child-led approaches can have success with children with ASD.

A Cochrane review titled "Music Therapy for Autistic Spectrum Disorder" was published in 2006. Three small studies were included in the review: 2 case controlled studies (Brownell, 2002; Buday, 1995); and a randomised controlled trial (Farmer, 2003), totalling 24 participants across the three studies. In all three studies, receptive music methods including songs (Brownell, 2002; Buday, 1995; Farmer, 2003) and drum rhythmic patterns (Farmer, 2003) were used. These studies reported that music therapy: significantly improved the number of imitated signed and spoken words (Buday, 1995);

significantly improved target behaviours such as 'using a quiet voice'(Brownell, 2002); and increased the number of verbal and gestural responses (Farmer, 2003). However, apart from Brownell's (2002) study which set 'Social Stories'[1] to music, the music therapy methods employed were unrelated to clinical practice and had outcomes that were focussed on the imitation of language and gesture (Buday, 1995; Farmer, 2003) rather than functional communication. Across these three studies, music therapy improved both non-verbal and verbal communicative skills, reaching a medium positive effect size with non-verbal (gestural) skills, and a varied effect size ranging from small to medium in verbal skills. These effect sizes are considered to be of a clinically relevant level for studies comparing an active therapy (such as music therapy) to a placebo activity (Gold et al., 2006).

In 2006, Jinah Kim completed her doctoral research which investigated the effects of improvisational music therapy on joint attention with children with ASD. 10 children aged between 3 to 5 years were randomly allocated to the intervention group (improvisational music therapy) or the control group (play sessions). Kim's (2006) study used a cross over design with standardised outcome measures and video analysis. While the Pervasive Developmental Disorder Behaviour Inventory-C (PDDBI) showed no significant results for social approach behaviours, there were significant results for the Early Social Communication Scales (ESCS) in the children's initiation of early joint attention skills and responding to joint attention bids from adults (Kim et al., 2008). Further, significant results occurred in the video analysis of eye contact frequency and duration. An extra dimension to the study was a comparison between the therapist's therapeutic approaches – for half the session, the therapist used an undirected, child-led approach, and in the other half incorporated gently structured activities involving turn taking and modelling. Video analysis of behaviours including joy (smiles and laughter), emotional synchronicity, and initiation of engagement, showed better outcomes for the music therapy experimental group. Within the music therapy group, the results were better still in the undirected half of the session (Kim, Wigram, & Gold, 2009). While the study did not include follow-up for maintenance, and the small numbers limit the generalisability of the findings, it is the first study to research children under 6 years of age with clinically relevant music therapy methods. The study showed that "improvisational music therapy has the potential to facilitate skills fundamental to social

[1] Social stories provide positive behavioural instructions to children to help them change their behaviour

interaction, especially non-verbal interaction in children with autism" (Kim et al., 2008, p. 1764). Further, improvisational music therapy fosters social learning and social motivation through facilitating "simultaneous coordination of listening, visual referencing and responding and engaging" (Kim et al., 2008, p. 1764).

Improvisational music therapy methods were also used in a single-case study design of 4 participants at an ASD specialist school (Carpente, 2009). Nordoff and Robbins Creative Music Therapy (NRMT) approach was used within a DIR®/Floortime™ framework. After 26 individual sessions held twice a week, the children made gains in social emotional development, specifically: self regulation; engagement; and two-way purposeful communication. Within the DIR®/Floortime™ framework, these skills are seen as developmentally vital for future social communication development in children with ASD. Therefore, it was concluded that NRMT "directly deal with autism's core deficits." (Carpente, 2009, p. 15).

Recent studies have focussed further on the value of music therapy as a motivator for emotional understanding (Katagiri, 2009), speech production (Wan et al., 2011), and socially responsive behaviours (Finnigan & Starr, 2010). While all of these studies have significant results in favour of music therapy, they were limited by: small numbers of participants – one of which was a single subject design (Finnigan & Starr, 2010); un-natural clinical settings (Katagiri, 2009; Wan et al., 2011); no control group (Wan et al., 2011); or non-randomised allocation to experimental groups (Katagiri, 2009).

The largest RCT in music therapy with children with ASD was recently undertaken in Brazil (Gattino, Riesgo, Longo, Leite, & Faccini, 2011). 24 children aged between 7 and 12 years of age were recruited to the study, including 12 children with PDD-NOS, 2 with Aspergers, and 10 with autistic disorder. The treatment consisted of "relational music therapy" (Gattino et al., 2011, p. 142), which is a non-directive approach that follows the child's lead. Singing, composing, improvising and musical games are employed to promote relationship and child-initiated interactions. Outcomes were measured through pre and post testing on the CARS Brazillian version in the areas of verbal, nonverbal and social communication skills. While there were no significant results between groups, analysis of the subgroup of participants with autistic disorder yielded a significant result in the area of non-verbal communication skills.

The literature presented in this section has focused on music therapy research with social communication outcomes. Further research literature will be presented in

the coming section highlighting the use of music therapy within natural settings, particularly with families.

Family Centred Practice

Since the 1980s, therapists and educators working in the field of early childhood intervention (ECI) were expected to be family, rather than child-focused, practitioners (Dunst, Trivette, & Deal, 1988). Informed by Bronfenbrenner's (1975) ecological systems model, American researchers in the field of ECI Dunst, Trivette & Deal (1988) wrote their ground-breaking book "Enabling and Empowering Families: Principles and Guidelines for Practice". They compelled ECI practitioners to turn away from an expert-model and toward an approach based on family participation and collaboration. This shift occurred due to the emerging understanding of ecological family systems theory which deems that events affecting the family will ultimately affect the child (Dunst et al., 1988). Rather than being concerned with 'what' the aim of the therapy is, family-centred practice is concerned with the 'manner' in which therapy is delivered (Moore, 2009).

Since then, ECI teams in Australian government and non-government organisations have implemented a broadly based family systems approach to support pre-school aged children with special needs. The national Australian Early Child Intervention Association's Code of Ethics directs ECI practitioners to: develop collaborative partnerships with families; work to engage in shared decision making with families in regards to the support given to their child; work to support and complement the skills of the family by recognizing their existing strengths; and respect the family's right to choose the way they wish to be involved in the services provided to their child (ECIA, 2011). Family-centred practice draws on ecological theory that acknowledges parents as the most important influence on a child's development (Mahoney & Wiggers, 2007). Young children are actively engaged and learn best when learning is part of their daily routine (Mahoney & Wiggers, 2007), emphasising the need to embed learning strategies into natural environments such as the home, childcare and preschool (Rantala, Uotinen, & McWilliam, 2009; Roper & Dunst, 2003).

A central tenet of family-centred practice is practitioners and families striving to work together in partnership (Davis, Day, & Bidmead, 2002) with an emphasis on building the capacity of the family (Dunst & Trivette, 2009). Respect, empathy and emotional responsiveness are required from practitioners as they attempt to support

parents in the highly private and personal responsibility of parenting their child. Practitioners therefore aim to enhance parents' self-esteem (in this context, their feelings of self worth as a parent) and their self-efficacy (their belief in their own ability to influence the care of their child). The way a parent thinks about themselves in general, including their skills in parenting, is believed to be influenced by the subtle ways that practitioners interact with them (Davis et al., 2002). The quality of the relationship between the parent and the practitioner is therefore of great importance, requiring the practitioner to consciously focus on recognising and supporting the strengths of the parent (Dunst & Trivette, 2009).

However, ECI practitioners also need to acknowledge and respect the challenging circumstances in which parents of young children with special needs find themselves. These circumstances may compromise their resources and the energy they have to engage fully in services for their children (Dunst et al., 1988). Practitioners may therefore need to balance promoting parent participation and independence with providing appropriate support, mindful that high levels of stress may ultimately be detrimental to their capacity to parent (Dempsey et al., 2009).

Recently, researchers have investigated whether positive family and child development outcomes are attributable to family-centred practices (Dempsey & Keen, 2008; Dunst, Trivette, & Hamby, 2007). In a meta analysis of 47 family-centred studies, Dunst, Trivette and Hamby (2007) found that the use of family-centred practices was associated with improved parent self-efficacy beliefs which in turn impacted positively on the child's development. Specifically, family-centred approaches that strived to establish strong relationships between families and practitioners, as well as promoted the active participation of parents in the helping process, had better self-efficacy outcomes for parents (Dunst et al., 2007). Parents with higher levels of self-efficacy are more likely to engage with their children in developmentally focused activities (Dunst et al., 2007).

Supporting interpersonal engagement and relationship.

The active participation of parents in their child's therapy has the potential to support the development of interpersonal engagement between parent and child. Thriving interpersonal engagement in children is considered an essential precursor to successful communication development (Moore, 2009; Stern, 1985; Stern et al., 1985). Interpersonal engagement incorporates skills such as: the child focusing on the face of

their parent; turn-taking as part of dyadic play (Schertz & Odom, 2007); the child responding to joint attention bids of the parent; and the child initiating joint attention (Mundy & Stella, 2000). The social communication impairments of children with ASD often significantly interrupt the acquisition of some or all of these skills (Mundy & Stella, 2000). As these early skills are non-verbal and rely on reciprocal interactions, they are difficult to promote through interventions involving targeted skill training (Schertz & Odom, 2007). Any intervention aiming to improve interpersonal engagement with children with ASD needs to be based in relationship-oriented approaches so that skills can be generalized and maintained (Schertz & Odom, 2007). Therapies which have the best positive outcomes for young children are those that help parents interact "more responsively with their children" (Mahoney & Wiggers, 2007, p. 10), irrespective of the type or intensity of the therapy provided.

Benefits of collaborating with families.

Interventions that are individualised, intensive and support the continuation of strategies in the home environment attain positive outcomes for young children with ASD (Rogers et al., 2006; Sussman, 1999) and their parents (Brookman-Frazee & Koegel, 2004). Collaborative approaches have been shown to benefit families by lowering parental stress and increasing confidence with parenting (Brookman-Frazee & Koegel, 2004). This is an important focus for interventions, given that high levels of parent stress are linked to poorer developmental outcomes for children (Osborne, McHugh, Saunders, & Reed, 2008).

Siller and Sigman (2002) investigated the relationship between the quality of parents' ability to synchronise with their child and positive child communication outcomes. The study compared the communication development of 25 children with ASD with 18 children with developmental delay and 18 typically developing children; assessed the children's development at ages 1, 10 and 16 years. The intervention aimed to help parents increase their sensitivity "to the focus of attention of the child and try to maintain his or her ongoing activity" (Siller & Sigman, 2002, p. 87) and decrease the parents' own "demanding verbalisations" (Siller & Sigman, 2002, p. 86) towards the child. The study showed a clear relationship between the amount of parent synchronisation and the child's future communication skills. Parents "who showed higher levels of synchronisation during initial play interactions had children who developed superior joint attention and language" (Siller & Sigman, 2002, p. 77).

Parent mediated interventions recognise that nonverbal social communication is something that can be promoted in children with ASD when addressed through developing and supporting parent-child interactions (Rocha et al., 2007). Social communication development can be effectively supported through a "planned but open ended format within the context of the relationship rather than through a skill-based approach that reinforces specific skills in isolation or as ends in themselves." (Schertz & Odom, 2007, p. 1565)

In response to the frustration experienced by parents as they waited for therapy services to begin following a diagnosis of ASD, Vismara et al. (2009) investigated the effectiveness of a purely parent administered intervention. 8 families with a child with ASD aged between 10 – 36 months took received training in The Early Start Denver Model. Parents learnt to deliver the teaching procedures over 12 weeks, which included 10 specific therapy strategies taught one at a time. The Early Start Denver Model "fuses developmental and relationship based approaches with applied behaviour analysis into the ongoing family routines and parent-child play activities." (Vismara et al., 2009, p. 93). Changes in the child's social communication and social engagement were measured from observational data. Results showed that parents did achieve mastery of the therapy techniques. At baseline, the children demonstrated almost no social communicative behaviours, initiation, imitation or speech. Over the 12 weeks of intervention, there was a gradual increase for all children across all behaviours, with all of the gains sustained at follow-up 5 months later. These findings show that parent administered interventions can lead to benefits for young children with ASD when the intervention targets skills that can easily be incorporated into the family's natural routines (Vismara et al., 2009).

Green et al. (2010) conducted a large, multisite international study with 152 children with ASD. Children were randomly assigned to PACT (parent-mediated communication focused treatment) or treatment as usual. The primary measure for this study was the ADOS-G (social communication items), with video analysis of parent-child interactions as a secondary measure. Families in the PACT group received bi-weekly 2 hour sessions for 6 months, followed by 1 monthly session for a further 6 months. There were no significant results for the ADOS-G, despite positive outcomes from the research team's pilot study (Aldred et al., 2004). However, results from the video analysis were significant in the areas of increased parent interaction with the child, and almost reached significance for child interaction with the parent. Green et al.

(2010) concluded that the parent-mediated intervention had the most impact on the parent's interaction with their child, which is perhaps not surprising given that the intervention focussed on training parents in techniques to use with their child. The study failed to show an immediate "downstream effect on autistic symptoms" (Green et al., 2010, p. 2158) or on the interactions of the child outside of the family. However, given that longitudinal studies have shown that improving sensitivity in parents' interactions with their children has positive benefits for the child's future social communication development (Siller & Sigman, 2002), the outcomes reported by Green et al. (2010) contribute substantially to understanding the value of parent-mediated interventions.

Music Therapy with Families

Providing music therapy within a family-centred framework complements the relationship focused methods that are a widespread feature of music therapy practice. Within this framework, the music therapist is not only concerned with *outcomes* for children, but also the *ways* these outcomes are facilitated (Thompson, In Press).

Music therapists have acknowledged the value of working with the families of young children with ASD since the very first published research article in the late1960s (Stevens & Clark, 1969). Highlighting the age-old challenge of assessing children with ASD, Stevens and Clark (1969) commented on the importance of engaging parents in the child's assessment:

> The examiner was unable to command sufficient attention from the boys to obtain quantitative scores, even when testing periods were interspersed with playroom activities. Family interviews provided important information for continued clinical service to these families upon conclusion of the study. (p. 99)

In 1978, a short chapter of 7 pages titled "Parents" appeared in "Music Therapy for the Autistic Child" (Alvin, 1978). These 7 pages acknowledge the importance of the family environment on the child's behaviours in ways that I believe are still highly relevant and challenging to today's music therapists. Alvin noted that families needed help and support in managing their child with ASD. Her recommendations seem ahead of their time, and foreshadow contemporary collaborative practices:

> Parents of a handicapped child are in need of specific help, advice and encouragement from those working with the child; the family clinic, the psychiatrist, the social worker, the teachers and the therapists. They are all involved in the process. (Alvin, 1978, p. 113)

Alvin described that, even if the child with ASD struggled to gain skills, music could at least help the mother/father to form an "emotional link" (Alvin, 1978, p. 114) with their child. She observed that music "created a bond between parent and child, or a bridge between them" (Alvin, 1978, p. 113) and that this was more likely to occur when music "had a place in the home" (Alvin, 1978, p. 113).

Alvin described the range of participation levels parents would want in the therapy – from leaving therapy to the experts, to full participation with their child where they could "share the same pleasure" (Alvin, 1978, p. 113). The potential for changes to occur in the way parents saw their child as a result of participating in the session was noted by Alvin:

> The image a mother has of her autistic child can be altered when she attends a well conducted music therapy session, where she sees her child becoming more communicative and better controlled, perhaps behaving almost like a normal child: he seems to enjoy himself. (Alvin, 1978, p. 115)

Perhaps the aspect of Alvin's work that is most ahead of its time, are her descriptions of gently supporting mothers and fathers to take the lead in interacting with their child. In a later published case study, Alvin triumphantly reported that "the mother has taken over from me at last" (Alvin, 1981, p. 7) in her description of her work with an emotionally disturbed young child. Attention to supporting the parent-child dyad continues to be emphasised today, with music therapists describing the need to understand the notion of therapeutically "holding back" (Shoemark, 2011, p. 170) in order to encourage the parent to take the lead role. Alvin described her work with one family where she provided support and consultation to a mother who had excellent music skills. To my knowledge, this is the first description of a music therapist supporting a parent-mediated approach with a child with ASD:

> The family lived too far from London for the small boy to be brought to town often enough, and there was then no music therapist in the region. It was

> decided that the boy would visit the music therapist from time to time with his mother, but that she would come herself regularly, be taught what to do next and report on the boy's progress week after week. This approach could certainly not be called music therapy, but under expert guidance it was a satisfactory substitute. It helped a very deprived mother to build up a good musical and personal relationship with the child. (Alvin, 1978, p. 116)

Outcomes of music therapy sessions that include families.

There is a growing body of literature describing the use of music therapy with families of children with ASD as part of: centre based community group programs (Allgood, 2005; Warren & Nugent, 2010; Williams, 2010; Woodward, 2004); individual family work in centres (Horvat & O'Neill, 2008); and sessions conducted in the family home (Pasiali, 2004). However, most of the research with families of children with ASD is either single (Wimpory, Chadwick, & Nash, 1998) or multiple (Allgood, 2005; Pasiali, 2004; Woodward, 2004) case studies, or quasi experimental designs with less than 10 families (Müller & Warwick, 1993).

An important early research project was conducted by Müller and Warwick (1993). They studied 9 children with ASD aged 3 to 14 years in a crossover design, where one group had the mothers participating in 10 music therapy sessions, and the other did not. Sessions were held in the family home. The study had ambitious hypotheses, including improvements in: the child's interactional skills; mother-child interactions; generalisation of the child's skills; and the accuracy of the mother's perception of the child's skills. While increases in the children's turn-taking were reported, there were no significant differences found for including the mother in the sessions or not; which is perhaps not surprising given the small and heterogeneous sample, non standardised outcome measures and quasi experimental design. Despite these limitations in the design, Müller and Warwick (1993) reported that the mothers in general described their children as being more "active, positive and goal orientated" (p. 228). The study concluded that mothers were able to see their child more realistically following music therapy (Müller & Warwick, 1993).

A recent Australian study of 358 families, 95 of whom had a child with a disability (and some of these 95 children with ASD), reported positive outcomes from

parent involvement in a 10 week community based group music therapy program. These outcomes included: improved parent sensitivity, engagement and acceptance of the child as indicated through therapist rated measures; and high rates of parent reported use of strategies from the music therapy sessions at home (Nicholson, Berthelsen, Abad, Williams, & Bradley, 2008). However, while this study had an impressive number of participants, there was no control condition which limits the generalisability of the findings.

Warren and Nugent (2010) surveyed 12 parents who had participated in a 10 week group music therapy program for preschool aged children with developmental disabilities including ASD. Parents reported improvements in their child's developmental skills such as: non-verbal and verbal communication; interaction; motor skills; and cognitive skills. Parents also reported that the bond with their child had strengthened because they now understood their child's abilities better. Many parents reported that they were using more music based activities at home with their child, such as singing and playing with instruments, to provide developmental play opportunities.

Benefits of including parents in music therapy sessions.

The practical benefits of including the parents of children with a variety of disabilities in music therapy sessions have been described in the literature. These benefits include: better consistency of therapeutic approaches between home and educational settings (Thaut, 1984); improved relevance of goals for the child if the parent has contributed to their formulation (Pasiali, 2004); improved communication between therapists and parents (Procter, 2005); increased opportunities for parents to experience first-hand what motivates their child (Thompson, 2009); and opportunities for parents to develop skills to enhance their child's development (Chiang, 2008; Warren & Nugent, 2010).

Additionally, supporting parent participation in music therapy sessions benefits the child's social communication skills. A variety of increases in the child's skills have been reported, including: social responsiveness (Williams, 2010; Wimpory et al., 1998; Woodward, 2004); child initiated interactions (Wimpory et al., 1998); non-verbal and verbal skills (Warren & Nugent, 2010); and joint play with their siblings (Woodward, 2004).

Further literature primarily focuses on the benefits to the parent-child relationship that working collaboratively with parents affords (Allgood, 2005; Alvin,

1978; Horvat & O'Neill, 2008; Müller & Warwick, 1993; Oldfield, 2006a, 2008, 2011; Oldfield, Adams, & Bunce, 2003; Oldfield & Bunce, 2001; Warren & Nugent, 2010; Warwick, 1995; Wimpory et al., 1998). Parents who participated collaboratively in music therapy sessions have described positive changes in a variety areas. Parents have described their ability to see the child in a more realistic (Müller & Warwick, 1993; Pasiali, 2010), or positive (Allgood, 2005; Oldfield, 1993) way; or seeing an improvement in the child's skills (Warren & Nugent, 2010; Williams, 2010). Parents have also described feeling supported in music therapy sessions (Müller & Warwick, 1993) and experienced music therapy sessions as fun and enjoyable (Chiang, 2008; Nicholson et al., 2008). Further, families have described enjoying the fact that the whole family could participate together in music therapy sessions, which was a rare experience for them (Allgood, 2005). Following a 7 week group music therapy program for children with ASD and their families, parents felt that their child with ASD was viewed more positively by their siblings who also participated in the sessions (Allgood, 2005).

Many music therapists describe the growing ability of the parent to take more leadership in interactions with their child as a positive therapy outcome (Alvin, 1981; Horvat & O'Neill, 2008; Müller & Warwick, 1993; Oldfield, 2008; Warwick, 1995). However, while a respectful relationship between the parent and music therapist is essential in collaborative practices (Jonsdottir, 2002; Oldfield, 2008), it is important to recognise that there are challenges in collaborating with parents. At times, parents may feel their parenting skills are undermined by therapists who are more successful than they are at interacting with their child (Woodward, 2004), or feel disempowered by poor therapist communication (Procter, 2005). The way family participation is described in the literature also needs to be respectful to parents. Researchers need to be mindful that focussing exclusively on the behaviours of the parent may result in an implied blame for their child's behaviours, or criticism of their parenting skills (Thompson, 2012). Reflecting on her substantial experience in collaborating with families, Oldfield (2011) recently described the relationship between the therapist and parent as follows:

> Perhaps my role with parents is a little like the musical improvisations that draw us together. We have to be sensitive to each other's contributions while at the same time allowing the musical exchanges to flow, be unexpected and creative. (p. 71)

Music Therapy in Natural Settings

Music therapists have also started to describe their work with children with ASD in natural environments such as preschools (Kern & Aldridge, 2006; Kern, Wakeford, & Aldridge, 2007a; Kern, Wolery, & Aldridge, 2007b; Thompson, 2009), and the home environment (Müller & Warwick, 1993; Pasiali, 2004). In the preschool setting, music therapists have promoted the inclusion of the child in the general activities of the day (such as play time with their peers), by providing consultation and support to carers and peers in these settings (Kern & Aldridge, 2006; Kern et al., 2007a; Kern et al., 2007b; Thompson, 2009). Music therapy methods have been found to successfully provide opportunities for shared interactions between preschool children with ASD and their peers (Barnes, 2010).

Following on from research in the home setting by Müller & Warwick (1993), Pasiali (2004) described a prescriptive song intervention for 3 high functioning children with ASD aged between 7 and 9 years. The music therapist worked one-to-one with the child based on goals identified by the family, such as reducing: non functional vocalisations at family dinner time; excessive fast-forwarding and rewinding of a video player; and going to the kitchen for food without parent's permission. Pasiali (2004) created individualised song lyrics set to the children's favourite song melodies following the guidelines of 'Social Stories'. All of the targeted problem behaviours reduced dramatically, and 2 of the 3 parents continued to use the song to assist their child's behaviour management. However, it was unclear whether parents were involved in the music therapy session with their child, despite them being held at the family home. Pasiali later researched a more collaborative style of music therapy in the family home with typically developing children who were developmentally at risk due to home environmental factors and self-reported maternal depression (Pasiali, 2010). Following their participation in the home based music therapy sessions, parents identified positive changes in the parent-child relationship, as well as describing their interactions with their child as more patient, fun and warm (Pasiali, 2010).

Conclusion

Early social communication skills are those skills required for successful social interaction. Sensitive and secure relationships are the basis for, and an artefact of, social communication development (Prizant et al., 2000). Social communication skills are a complex set of skills that are typically established in the first 18 months of life.

However, for those with ASD, fostering these skills requires additional and ongoing supports. Social communication skills are defined here as involving 3 interrelated aspects (American Psychiatric Association, 2011):

1. Social-emotional reciprocity, which involves: shared attentiveness (Adamson & Bakeman, 1991); interpersonal engagement (Bakeman & Adamson, 1984; Prizant et al., 2000); and affect attunement (Stern, 1977, 1985; Stern et al., 1985).
2. Non-verbal communicative behaviours, including: use of gestures; initiation of joint attention; and response to the joint attention bids of others (Bruner, 1995; Tomasello, 1995).
3. Developing and maintaining appropriate relationships, as seen by: interest in others; sharing interests with others (American Psychiatric Association, 2011); and the emergency of symbolic communication as evidence of a consolidation of joint attention (Bruner, 1995; Tomasello, 1995).

Scientific research investigating the use of music therapy with young children with ASD has been based on studies with small sample sizes of less than 10 participants (Gold et al., 2006), with only one study using standardised measures of outcomes and focussing on preschool aged children (Kim, 2006; Kim et al., 2008, 2009). So far, the literature has anecdotally described the use music therapy with children with ASD in natural settings, such as pre-school centres and in the family home. While Müller & Warwick's (1993) quasi-experimental study included one child under the age of 5, to my knowledge there has been no further experimental research into home-based music therapy with preschool children with ASD where the parent was an active participant. In addition, the literature describing family-centred music therapy with Australian preschool aged children with ASD is limited to community group work rather than individual, home based programs (Nicholson et al., 2008). This literature does however provide a foundation for music therapists to further examine collaborative approaches to working with young children with ASD in natural settings.

Chapter 3
Research Design

Introduction

The aim of this study was to investigate whether family-centred music therapy positively influences the social communication development of preschool aged children with severe ASD. Social communication skills are a complex set of interrelated skills including: social-emotional reciprocity; non-verbal communicative behaviours; and relationship skills, such as interest in others and symbolic communication. The literature suggests that successful social communication development is dependent on a variety of influences, none more so than thriving interpersonal engagement between the child and parent (Moore, 2009; Stern, 1985; Stern et al., 1985). Consequently, the quality of the parent-child relationship and as the feasibility of incorporating music therapy methods into the families' daily routines, were important in addressing this aim.

It's one thing to be clear about what you want to learn; it is another thing to work out how to go about acquiring that knowledge. Research has been defined as a "process through which we generate knowledge" (Biesta, 2010, p. 101). In choosing to research young children who are non-verbal and intellectually impaired, a vital question looms: "How will we know what we know?"

Epistemologically, my position is that we gain knowledge about events through "careful observation of what follows from how we act on the world" (Biesta, 2010, p. 111). Interpretation is always imposed on data, whether it be quantitative or qualitative (Biesta, 2010), and enquiry and knowledge are value and theory laden (Creswell, 2009; Robson, 2002).

Researching music therapy has its own particular challenges due in part to the nature of 'what' happens in a music therapy session. Music therapy has been described as "a specific form of practice – with specific skills and linked to or fostering specific resources and social relationships" (DeNora, 2006, p. 87). Music therapists facilitate sessions "in real time, in response to emerging situations" (DeNora, 2006, p. 87), often incorporating ecological theories which emphasise the complex factors that impact growth and development.

However, the aim of this study poses a direct question: does music therapy make a positive difference to a child's social communication development? This question could be answered in many different ways, which would ultimately lead to a political discussion of hierarchies of evidence (DeNora, 2006). It is precisely this political

discourse that has motivated me to engage in research, and has compelled me to address my aim from an evidence based practice perspective. Therefore, I have responded to the aim of this study by posing the following hypotheses:

1. There will be greater positive changes in the early social communication skills of young children with severe ASD in response to 16 weeks of family-centred music therapy plus standard care compared to standard care alone.
2. There will be greater positive changes in parents' ratings of the quality of their relationship with their child following 16 weeks of family-centred music therapy plus standard care compared to standard care alone.
3. Any changes in the child's early social communication skills will be maintained for at least 8 weeks after the family-centred music therapy intervention ceases.
4. Within the music therapy sessions, there will be positive, observable changes in symptomatic behaviours of ASD in the child in response to 16 weeks of music therapy plus standard care.
5. Parents will be able to implement music therapy methods with their child (without the music therapist) during the course of their usual week.
6. Parents will be able to identify positive changes in the nature of their parent-child relationship following 16 weeks of family-centred music therapy plus standard care.

Most of these hypotheses could be addressed through the use of numeric data; however hypothesis 6 is best suited to the use of descriptive data. Therefore, this is a mixed-methods study with a dominant quantitative component.

Method

Given that the first 2 hypotheses were well suited to an empirical design utilising numeric data, a randomised controlled trial (RCT) design was selected. The trial was registered retrospectively with the Australian New Zealand Clinical Trials Registry (ANZCTR) – ACTRN: ACTRN12611000391976; URL: http://www.ANZCTR.org.au/ACTRN12611000391976.aspx

While RCTs remain the gold standard for addressing bias in research (Attia, 2005, p. 11), this design has challenges when applied to complex ecological interventions such as family-centred music therapy (Bradt, 2012; Campbell et al., 2000). Complex interventions contain much greater variation in delivery than a simple

intervention such as a drug treatment. They are often difficult to reproduce (Campbell et al., 2000) and are strongly reliant on contextual variables, such as the therapist and setting (DeNora, 2006; Wigram & Gold, 2006). Further, there is a risk of compromising the intervention to the point of losing real-world clinical relevance in the quest for rigorous evaluation (DeNora, 2006; Rolvsjord, Gold, & Stige, 2005). Despite the challenges in researching complex interventions such as music therapy scientifically, empirical evidence of interventions is required by policy makers to ensure effectiveness and feasibility (Campbell et al., 2000; Roberts & Prior, 2006).

As described in the Literature Review, Chapter 2, a Cochrane review titled "Music therapy for autistic spectrum disorder" was conducted in 2006 (Gold et al., 2006) and based on three small studies which included 24 participants in total. The Cochrane Review reported improved outcomes for non-verbal and verbal communication skills for children with ASD as a result of music therapy interventions. Gold et al. (2006) proposed that future research should: focus on whether the effects of music therapy are enduring; be indicative of typical clinical settings; and utilise standardised measures in order to improve the generalisablity of any outcomes.

A parallel, block randomised controlled trial design was selected in order to contribute to the growing empirical quantitative evidence for the use of music therapy with children with ASD. Experimental trials can be considered according to where they are placed along a continuum of efficacy to effectiveness, or as more recently described, explanatory to pragmatic (Thorpe et al., 2009). Describing where a trial sits on this continuum involves the consideration of 10 items, each of which has its own individual continuum. Thorpe et al. (2009) recommend displaying this design continuum graphically, with the 10 items arranged like the spokes of a wheel. The centre of the wheel represents the more explanatory end of the continuum, and the rim of the wheel the more pragmatic end. This wheel diagram is called a Pragmatic-Explanatory Continuum Indicator Summary (PRECIS), and was created to assist researchers to describe where their study fits along the pragmatic-explanatory continuum (Thorpe et al., 2009). Table 3.1 provides further details about each item, as well as a rationale for where this study was placed along each item's continuum. The PRECIS diagram for this trial is presented in Figure 3.1.

Figure 3.1 and Table 3.1 indicate that this study is more explanatory in nature, and therefore can overall be considered an efficacy study. However, some of the design elements included are more pragmatic in approach. This uneven profile is the result of

my intention to investigate whether family-centred music therapy can change the social communication skills of children with ASD in a way that has real-world clinical relevance.

Table 3.1

Explanation of the PRECIS Items and Study Rationale

PRECIS items[a]	Study rationale	Pragmatic-explanatory continuum
1. The eligibility criteria for trial participants.	Some exclusion/inclusion criteria were used, although these were devised to control variance and be representative of typical music therapy practice.	More explanatory, but not extreme.
2. The flexibility with which the experimental intervention is applied.	A semi-flexible treatment protocol was devised and well documented. Restrictions were placed on the number and length of sessions.	Tending towards pragmatic, but not extreme.
3. The degree of practitioner expertise in applying and monitoring the experimental intervention.	One experienced therapist was used for all treatment sessions.	Explanatory approach.
4. The flexibility with which the comparison intervention is applied.	Standard care control, with participants recruited from centres with similar philosophies.	Pragmatic approach.
5. The degree of practitioner expertise in applying and monitoring the comparison intervention.	Standard care control was only monitored to ensure that participants did not alter the original condition.	Pragmatic approach.
6. The intensity of follow-up of trial participants.	Data collection compliance was highly monitored which may have altered participant behaviour.	Explanatory approach.
7. The nature of the trial's primary outcome.	While a primary outcome was identified, the measures were participant report. This could be viewed as the outcomes being "patient-important" (p. 469)	More explanatory, but not extreme.
8. The intensity of measuring participants' compliance with the prescribed intervention, and whether compliance-improving strategies are used.	The use of weekly record sheets was a compliance improving strategy. It is not part of typical music therapy practice, and therefore may have altered participant behaviour.	Explanatory approach.
9. The intensity of measuring practitioners' adherence to the study protocol, and whether adherence improving strategies are used.	Only one practitioner was used, but did not measure adherence to treatment protocol. Treatment was able to be individualised to suit the participant.	More explanatory, but not extreme.
10. The specification and scope of the analysis of the primary outcome.	Intention-to-treat analysis to be carried out on participants who completed the post measures. Will not exclude participants who had infrequent sessions.	More pragmatic, but not extreme.

[a]Adapted from Thorpe et al. 2009.

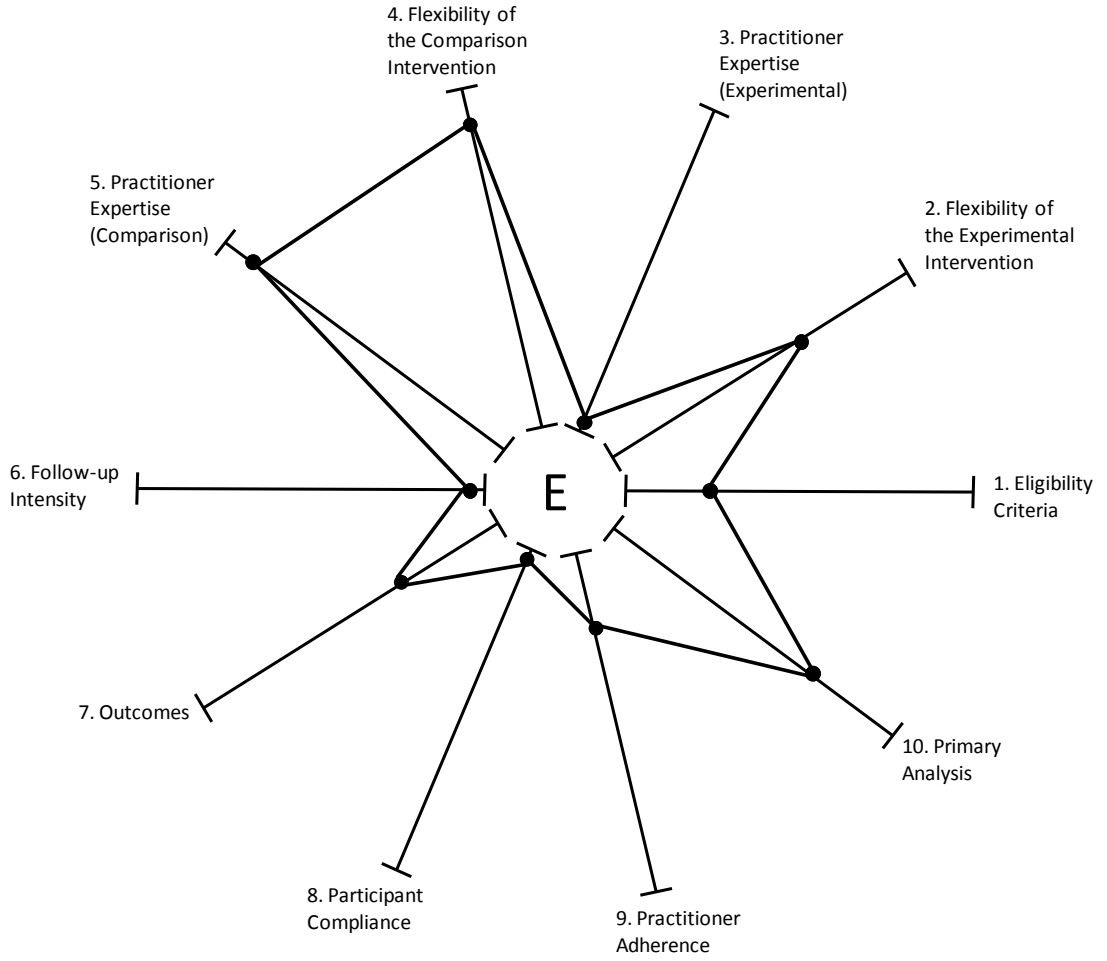

Figure 3.1. Pragmatic-Explanatory Continuum Indicator Summary (PRECIS) diagram for the study.

Sample Size and Power

Power calculations were challenging due to the limited number of existing empirical studies with similar participants and standardised measures. Unfortunately, the Cochrane review of music therapy with autism spectrum disorders (Gold et al., 2006) did not provide enough information to assist with power calculations, as the ages of the participants were too dissimilar (ranged from 2 to 9 years of age), and standardised measures were not used to assess communication outcomes.

Rather than try to estimate how much change was likely in the timeframe of the treatment – a difficult task given the severity of social communication impairments expected in the participants – two studies of family-centred interventions (but not music therapy) with preschool aged children with ASD (Drew et al., 2002; McConachie, Randle, Hammal, & Le Couteur, 2005) were used as a starting point for power calculations. While the participants in both these studies had higher social

communication skills at baseline than those I expected to recruit, the studies similarly investigated changes in communication skills using standardised measures.

Drew et al. (2002) used the MacArthur Bates Communication Development Inventories (MBCDI) as a measure (n=24). The best results were obtained for the "words understood" category of the MBCDI, with a mean difference of 75.8 words and a standard deviation of 121.9 (p=0.09). While this was not significant, a medium to high effect size was reported in favour of the treatment group (Cohen's d=0.73, 95% CI: -0.09, 1.56).

McConachie et al. (2005) also used the MBCDI as an outcome measure for their study of the 'Hanen Program' – a communication skill training course for parents of children with ASD (n=29). McConachie et al. (2005) reported a significant difference in the "words said" category (MD= -50.3, 95% CI: -92.0, -8.6, p=0.019). These results translated into a medium effect size (Cohen's d=0.40; 95% CI: -0.35, 1.14), although it should be noted that McConachie et al. (2005) was a non-randomised controlled study.

Knowing that this PhD study would have limitations on sample size due to restricted time for data collection, power calculations were carried out with small sample sizes in mind. From the "words understood" results in Drew et al. (2002) with a power of 80% and a significance level of 0.05, analysis showed that: a sample size of 20 would detect a mean difference of 140 "words understood"; a sample size of 24 would detect a mean difference of 125 "words understood"; and a sample size of 30 would detect a mean difference of 110 "words understood". From the "words said" results in McConachie et al. (2005) with a power of 80% and a significance level of 0.05, analysis showed that: a sample size of 20 would detect a mean difference of 110 "words said"; a sample size of 24 would detect a mean difference of 100 "words said"; and a sample size of 30 would detect a mean difference of 88 "words said".

There was still considerable uncertainty around how meaningful the power calculation would be. Firstly, the MBCDI is a secondary outcome measure in this study. Secondly, while the children's ages were similar to my selection criteria, I planned to recruit children with more severe communication impairments. Lastly, while the studies investigated family-centred interventions, they were not music therapy interventions.

Taking these issues into consideration, I aimed to recruit at least 24 participants over a period of 12 months. This sample size was feasible in the time frame possible for data collection, and was similar to the sample sizes of the studies used for power

calculations. With small sample sizes, a homogeneous sample is desirable in order to help control the variance. Controlling the variance through careful inclusion/exclusion criteria in small sample sizes is another way to improve statistical power.

Inclusion and Exclusion Criteria

While previous studies with young children with ASD have reported strict inclusion criteria around the age of the children, they have not restricted the inclusion according to the social communication functioning level of the child resulting in samples with large variations in social communication skills (Drew et al., 2002; McConachie et al., 2005). As individuals with ASD spectrum disorders have a high degree of variability in these skills, large sample sizes are likely required to counteract the variability in the sample. The following inclusion and exclusion criteria were set with the objective of recruiting a homogeneous sample in order to control the variance and therefore improve statistical power. However, care was taken to ensure that inclusion and exclusion criteria were broad enough so that participants typical of those referred to music therapy were not excluded, and therefore any findings would still be generalisable to music therapy practice (Campbell et al., 2000).

Inclusion criteria.

That the children:

- Have a confirmed diagnosis of ASD from experienced clinicians or diagnostic team.
- Are aged between 3.0 – 6.0 years. Age is likely to be a confounding variable when researching pre-school aged children, due to the widely accepted belief that children who begin therapy at a younger age will achieve better outcomes due to the plasticity of neural pathways (Ben Itzchak & Zachor, 2007). Children under the age of 36 months were excluded from this study to minimize the effects of the child's age on their potential to benefit from the intervention.
- Have limited or no functional verbal communication – the child has either no verbal language or uses limited single word utterances. Children with limited or no functional verbal communication skills are typically the most socially aloof. Severe impairments in this domain are

often characteristics of intellectual impairment, which is predictive of poorer progress in receptive language and play skills. Children with cognitive delays and social aloofness "are the most difficult to treat" (Ben Itzchak & Zachor, 2007, p. 298). This criterion was included not to lessen the likelihood of improvement, but so that the sample would represent characteristic referrals to music therapy.

- Are receiving additional services from an Early Intervention centre which typically provide a maximum of one treatment contact time per week with the child and have a family-centred model of care. Recruitment was restricted based on the characteristics of the child's standard care in order to control for any confounding variables related to treatment intensity (Mohr et al., 2009), without compromising ethical considerations such as withdrawal of participants from their typical therapies (Hauser-Cram et al., 2000).
- Live in the Northern or Western suburbs of Metropolitan Melbourne. Families living in these suburbs have average weekly earnings approximately 40% lower than average weekly incomes Australian wide (ABS, 2011a, 2011b, 2011c). This economic delineation was considered to reduce the likelihood that participants would be receiving an abundance of private therapy services, due to the limited financial resources they had to draw on. Therefore, the variation and complexity of the standard care control could be contained. More practically, as the treatment protocol involved home visiting, these suburbs are geographically adjacent to each other making it easier to visit multiple families in one day.

Exclusion criteria.

That the children:

- Have participated in individual music therapy sessions previously. This criterion diminished the possibility of any carry over effect from pervious intensive individual therapy (Wigram & Gold, 2006). Group music therapy sessions were considered to be less intense than individual sessions, and so were not included in the exclusion criteria. Music

therapy is not a commonly accessed service by preschool aged children in Australia (Williams, 2010), and this was evident in the recruitment of only one child who had attended group music therapy sessions briefly in the past 12 months.

- Have additional impairments including vision impairments, hearing impairments, ADHD or Cerebral Palsy. This criterion helped to control for possible confounding variables associated with sensory, motor and behavioural impairments.
- Participate in intensive behavioural interventions (IBI) provided by a therapist for more than 5 hours a week. Behavioural interventions, such as Applied Behavioural Analysis (ABA), have research to support positive outcomes for children with ASD when provided by trained therapists for at least 30 hours per week (Roberts & Prior, 2006). IBI programs have an underlying assumption that the symptoms of ASD can be reduced by deliberately managing environmental factors through a system of contingent rewards. Behavioural interventions delivered in this intensive way were considered to be at odds with the relationship based approach of music therapy (Wigram & Gold, 2006). IBI programs involve hefty financial expenses and time commitment from families (Roberts & Prior, 2006), and because of this were not expected to be commonly accessed by families in the target geographical locations. This was evident by the recruitment of only 2 families incorporating limited therapist-lead ABA interventions ranging from 1 to 5 hours per week.
- The primary participating parent cannot read or speak English. Assessment measures were provided in English only due to a lack of funds for translation. Parents needed to read English well enough to be able to complete the assessment measures with independence – all measures had a reading level of approximately fourth grade American standards (Constantino & Gruber, 2005; Gerard, 2005).

Participants

Participants were recruited from the Northern and Western suburbs of Metropolitan Melbourne between November 2009 and April 2010. This geographic location was selected for specific reasons outlined in the selection criteria, namely that families living in these suburbs have a relative socio-economic disadvantage resulting in lower incomes compared to the average household in Australia. At the time of this study, families from the Northern Suburbs earned on average $773 per week (ABS, 2011c), and families in the Western Suburbs earned on average $762 per week (ABS, 2011b) – significantly lower than the National Australian average of $1,306 per week (ABS, 2011a). The likelihood of these participants having the financial resources necessary to fund an abundance of private therapy services was low, thereby helping to control the complexity of their standard care. Additionally, the geographical positioning of these suburbs would assist with the practicalities of home visiting. As I had previously been employed by various Early Intervention centres in this geographical location, I was also familiar with the typical services in the area and had a network of professionals to assist with recruitment.

Recruitment Procedure

Early Childhood Intervention (ECI) centres in the Northern and Western suburbs of Metropolitan Melbourne known to have a family-centred model of care were approached to assist with recruitment. The networks and connections in the local area I had established through working in the sector for 12 years prior to the study informed the selection of 5 of these ECI centres (numbers 1, 2, 3, 6, & 7 from Table 3.2). I met with each manager to discuss the study and the assistance required for recruitment. All 5 centre Managers signed the consent form and agreed to assist with recruitment (see Appendix A).

Each centre was provided with a recruitment pack, which included a poster to display in the centre (see Appendix B), copies of the plain language statement (see Appendix C), copies of the consent form (see Appendix D), copies of the information sheet (see Appendix E), and stamped, addressed envelopes so that families could submit their consent form and information sheets by mail. The plain language statement and consent forms included my phone number in case families wanted to ask further questions about the study.

Table 3.2

ECI Centre Characteristics

ECI Centre	Number of participants recruited	Program		Family-centred practice philosophy*
		Centre-based group sessions	Home visiting	
1	6	Weekly[1]	Infrequent[2]	Respects the right of parents to work collaboratively with staff in developing best practice early childhood intervention, educating and nurturing the development of each child. The use of play and experiential learning are regarded as the most natural and vital tools to encourage this development.
2	6	Weekly	Infrequent	All services are tailored to meet the individual needs of the child and are focussed on supporting the child within their own environment with everyday experiences and activities. Goals, objectives and strategies for the child and family are driven by the family's priorities, and are determined by the team, ie the parents and professionals working with the child.
3	6	By arrangement[3]	Fortnightly[4]	To promote community understanding and acceptance of children with diverse abilities and backgrounds. The organisation works together with families and communities to help children reach their potential and participate meaningfully in society... help for young children with delays or disabilities works best when parents and professionals work together as partners. We also acknowledge the importance of learning through play.
4	2	None	Fortnightly	All children should be able to participate in their family and in the community activities of their choice. We recognise that: some children and families may need extra support to do this; and parents and carers are the experts about their children
5	1	Weekly	Infrequent	We provide early childhood intervention services with a particular focus on language and communication, social interaction, sensory skills and motor skills. These programs are designed for the full participation of the parent with the child.
6	1	Weekly	Infrequent	The aim of these services is to provide parents and families with the knowledge, skills and support to meet the needs of their child and to optimise the child's development and ability to participate in family and community life. All services are provided using a family-centred approach, recognising the importance of working in partnership with the family.
7	1	Weekly	Infrequent	To make a difference to the lives of children and their families by maximising their potential, laying the foundation for them to participate as valued members of the community throughout their lives. The program provides a comprehensive developmental curriculum for children from birth to six years. Information, education, and support are offered to families, who together with staff are strongly encouraged at all levels of EPIC operations.

* Information taken from the websites of the ECI centres. Indentifying information has been removed for the purposes of the participants' anonymity.

[1]weekly during government school terms; approximately 40 sessions per year.

[2]roughly twice per school term; approximately 8 sessions per year

[3]centre-based programs are offered flexibly according to need, however none of the participants in this study were accessing these programs at the time

[4]fortnightly during government school term; approximately 20 sessions per year.

Participants from the remaining two ECI centres (numbers 4 & 5 from Table 3.2) approached me after hearing about the study through word of mouth. Their suitability for inclusion in the study was determined through discussion with the participants, my prior knowledge of the ECI centres they were associated with, and after confirming the philosophy and treatment approach of the ECI centre in on-line searches.

The recruiters directed families to contact me by telephone, or to simply post their consent form. When I received the families' consent forms in the mail, they were contacted by telephone to confirm the inclusion/exclusion criteria and an appointment was made to visit them at their home.

Ethics and Informed Consent

Ethics approval was received for this project by Humanities and Applied Sciences Human Ethics Sub-Committee at The University of Melbourne (HREC ID 0932487) and the Early Childhood Research Committee of the Department of Education and Early Childhood Development Victoria (2nd November, 2009). The plain language statement (see Appendix C) explained the risks and benefits of the study, and emphasised that participants could withdraw from the study at any time without consequence. If parents wished to continue with music therapy sessions at the completion of the project, assistance would be provided to contact the Australian Music Therapy Association.

Incentives

A wait-listed design was chosen so that all participants would eventually receive the treatment protocol, thereby providing an incentive to those participants allocated to the control group to stay in the study. At the start of the treatment protocol, the experimental group received a small resource kit valued at approximately 50 AUD. The same kit was given to the control group when they started their treatment protocol. The kit was provided to ensure that each family had appropriate resources available to participate in the family-centred approach of the sessions and continue the music therapy methods without the music therapist. Each kit contained: a pair of egg shakers; a set of 3 bells on a handle; a 24cm diameter floor tom; a pair of 10cm diameter hand cymbals; a CD containing 3 songs I specially composed (see Appendix F); and a social communication skills information booklet (see an example of the content in Appendix

G). Participants were informed they would be gifted these resource kits at the end of their participation whether they completed the treatment protocol or not.

Random Allocation Procedure

An independent statistician prepared opaque, numbered allocation envelopes in order to conceal the allocation and prevent any selection bias (Attia, 2005; Schulz, Altman, & Moher, 2010). Allocation to the study groups was achieved using a computer generated sequence. Block randomisation (block size 12) was chosen to ensure an equal number of participants in each experimental group.

Participants filled in a "Personal Information Sheet" (see Appendix E) with their consent form which asked them to disclose how many hours of private therapy (additional to their service from the EI centre) their child was receiving. While participants receiving more than 5 hours per week of private therapy were excluded from the study, I was concerned that participants receiving between 4-5 hours per week of private therapy could confound the results (Attia, 2005; Roberts & Prior, 2006). Therefore, two sets of envelopes were prepared: set "A" were given to participants who reported less than 4 hours per week of private therapy, and set "B" were given to participants receiving between 4-5 hours per week of private therapy. This stratification at the allocation stage safeguarded against participants with higher levels of private therapies falling into the same group. These envelopes were opened by the participants during their first meeting with me, and were given out in the order these first meetings occurred.

Assessment Measures

The complex nature of social communication skills is reflected in the lack of a single measure to assess these skills. During the design phase of this study, the diagnostic features of ASD identified by the DSM-IV-TR informed the search for outcome measures. Impairment in social interaction is evident in impaired relationship skills, while impairment in communication is evident in a lack of speech and language skills and/or the social use of communication (American Psychiatric Association, 2000). Four assessment measures were selected: 3 that addressed impairments in social interactions within relationships; and 1 assessing the child's and speech and language skills.

As described earlier, parents were viewed as collaborators in this study and therefore played a vital role in the implementation and evaluation of the music therapy treatment. Assessing young children with severe disabilities is complex and fraught, especially within an empirical research design. Given the ecological underpinnings of the music therapy treatment, the parents' views of their child's functioning and change in development was considered the most appropriate (Warren & Nugent, 2010) and the most accurate (Hauser-Cram et al., 2000). The value of parent report has a long history in ASD literature, dating back to the pioneering work of Leo Kanner (1943) and is still recommended in the recent changes proposed in DSM-5 (American Psychiatric Association, 2011).

Standardised measures are obvious tools for empirical studies due to their reliability and validity (Erkkilä et al., 2011; Gold, Erkkilä, & Wampold, 2011). As the participants in this study were anticipated to have severe social communication impairments, finding measures that would be age appropriate and sensitive to change was paramount. In addition, as the recruitment targeted young children, choosing standardised measures that minimized the burden to families in this typically busy life-stage was also important.

Difficulties in accurately assessing young children with severe ASD are well recognised, and were in fact described in the first scientific research in music therapy with children with ASD (Stevens & Clark, 1969). Stevens and Clark described the difficult behaviours of the child participants in response to formal testing with a stranger, which resulted in unsuccessful psychological testing. "Family interviews" (Stevens & Clark, 1969, p. 99) were considered essential in understanding the behaviours of the children.

Standardised parent-report measures were therefore selected where possible, as they adequately addressed the various difficulties in collecting accurate information on the abilities of young children. Formal testing procedures that require young children to respond to specific stimuli or demonstrate a particular skill are questionable in their ability to accurately measure children's abilities (Fenson et al., 2007). It can be difficult to determine whether the child's lack of ability was due to their level of functioning, or their dislike of the testing situation, or even their mood on the day of testing (Fenson et al., 2007; Sparrow, Balla, & Cicchetti, 1998). Parents on the other hand, generally know their child better than anyone and have the advantage of seeing their child's

behaviour and skills in multiple circumstances and over long periods of time (Fenson et al., 2007).

Primary Outcome: Relationship – social interaction in the home and community.

The treatment method – described fully in sections to follow – was informed by relationship models of music therapy practice (Ansdell, 1995; Carpente, 2009; Wigram & Elefant, 2009). The primary outcome was selected because it was considered to be closely related to the focus of the music therapy approach.

The Vineland Social-Emotional Early Childhood Scales (Vineland SEEC) assesses the social and emotional functioning of typically developing children from birth through 5 years 11 months. Skills such as "paying attention, entering into intentional social interactions, understanding expressions of emotion, constructing and observing relationships, and developing self-regulatory behaviours" (Sparrow et al., 1998, p. 1) are assessed, and a standard score is calculated indicating the quality of the child's interactions in the home and community. The Vineland SEEC was developed from the socialisation domain of the Vineland Adaptive Behaviour Scales Expanded Form (Sparrow, Balla, & Cicchetti, 1984), which was standardised for children from 18 months to 18 years 11 months. The advantage of using the Vineland SEEC is that it provides a "comprehensive estimate of the child's level of personal and social sufficiency" (Sparrow et al., 1998, p. 2) specifically tailored to the preschool years. Due to the Vineland SEECs ability to capture small changes in early social interaction skills it was selected as the primary outcome measure.

The Vineland SEEC is administered by a semi-structured interview with an adult who is knowledgeable about the child's usual level of ability, which for this study was the child's participating parent. The parent is asked a series of open-ended questions laid out in the interview protocol about the child's functioning in various community settings such as the home, preschool and childcare. The interviewer then fills in the ratings based on the parent's responses. The Vineland SEEC manual reports high test-retest reliability, with the majority of coefficients in the 0.70s, and any differences between testings being negligible (Sparrow et al., 1998, p. 86).

I conducted the interview with the parent and filled in the ratings according to the published protocol, and a research assistant later independently calculated the total score for each participant. Two factors guided this method of data collection. Firstly,

the interview protocol allowed families to start building rapport with me immediately, supporting the family-centred philosophy underpinning the treatment. Family-centred literature further suggests that families dislike having to re-tell information to different professionals (Davis et al., 2002), and so conducting the interview myself reduced the burden of participating in a research project. As the interviewer fills in the ratings based on the parents' responses, the risk of bias was considered minimal. Secondly, the home-based treatment worked in with each family's schedule and therefore reduced the burden of data collection. It was not feasible in this project to employ a research assistant who could reliably fit in with each family's schedule and complete the Vineland SEEC in a timely way.

There are 3 subscales that make up the Vineland SEEC, two of which were selected for this study:

1. The Interpersonal Relationships Scale, which contains 44 items to assess the child's usual level of ability in interactions with others. Skills such as: responding to others; expressing and recognising emotions; imitating; communicating in social contexts; and developing friendships, are assessed.
2. The Play and Leisure Time Scale, which contains 44 items to assess how the child plays and uses leisure time. Skills such as: playing with toys; playing with others; sharing and cooperating with others; and participating in make-believe activities, are assessed.

The third subscale, the Coping Skills Scale, assesses how responsible and sensitive to others the child is usually. The Coping Skills Scale is only recommended for use with typically developing children over the age of 2. As it was anticipated that the participants in this study would have significantly delayed socially functioning, a meaningful score on the Coping Skills Scale was considered unlikely. The Vineland SEEC manual recommends that the Coping Skills subscale be omitted for children with significant social functioning delays (Sparrow et al., 1998).

Each item was rated according to the following criteria:

- A score of 2 – the child performs the activity satisfactorily and habitually whenever the opportunity occurs.

- A score of 1 – the child is just beginning to perform the activity, or performs the activity inconsistently, or only performs part of the activity with success.
- A score of 0 – the child never or very seldom performs the activity.
- A score of N (no opportunity) – is given when there is no opportunity in the child's environment to perform the activity. For example, N can be scored for the item "listens to the radio for entertainment" if there is no radio or similar object available to the child. A score of 1 is assigned to each N.
- A score of DK (Don't Know) – is given when the parent does not know if the child performs the activity or not. A score of 1 is assigned to each DK.

Secondary Outcome: Relationship – social responsiveness.

The Social Responsiveness Scale Preschool Version for 3-Year-Olds (SRS-PS) is a diagnostic assessment tool completed by an adult who is knowledgeable about the child's usual functioning in natural social settings, in this case the participating parent. This measure assesses impairments in "interpersonal behaviour, communication, and repetitive/stereotypic behaviour" (Constantino & Gruber, 2005, p. 3) in children, with an emphasis on social deficits involving reciprocal social behaviour. The 65 items on the questionnaire are rated using a 4 point Likert scale with the categories: 1 = not true; 2 = sometimes true; 3 = often true; and 4 = almost always true. The use of the Likert scale allows the severity of ASD to be measured, rather than simply indicating if the child does or does not have ASD. The SRS-PS measures social impairment independent of the child's IQ (Gotham, Pickles, & Lord, 2009) and therefore assesses the core impairments of ASD. The SRS-PS was written to be easily understood by most adults, and was rated 55 on the Flesch Reading Ease scale indicating an average level of readability suitable for most adults (Constantino & Gruber, 2005). An advantage of the SRS-PS is the brief amount of time it takes to complete the questionnaire – approximately 15 minutes.

Extensive work has been done in the development of the SRS-PS to establish its reliability as a parent-rated measure. The 1 month test/retest reliability of the parent was high, as suggested by Pearson's correlation value (r) of 0.70 ($p = 0.01$). When

compared to existing "gold standard" ASD assessment measures including: the Autism Diagnostic Interview-Revised (ADI-R); the Autism Diagnostic Observation Schedule (ADOS); and the Vineland Adaptive Behaviour Scales (VABS), the parent-rated SRS-PS was highly correlated. Correlations with the SRS-PS were as follows: ADI–R (Pearson's $r = 0.634$, $p = 0.002$); ADOS ($r = 0.489$, $p = 0.034$); and VABS ($r = –0.862$, $p = 0.001$). Further, the parent-rated SRS-PS was also highly correlated with the teacher-rated SRS-PS ($r = 0.785$, $p = 0.0001$). Therefore, a reliable measurement of social impairment can be obtained from the parent-rated SRS-PS (Pine, Luby, Abbacchi, & Constantino, 2006).

The SRS-PS gives a total score, which indicates the overall severity of reciprocal social behaviour, and has 5 subscales designed to assist in planning treatment programs for children with ASD. The 5 subscales include:

1. Social Awareness – the ability to notice social cues.
2. Social Cognition – the ability to interpret social cues.
3. Social Communication – expressive and social communication.
4. Social Motivation – the motivation to engage in social interactions.
5. Autistic Mannerisms – stereotypic behaviours or narrow range of interests.

Parents were given the SRS-PS and asked to fill it in independently based on their observations of their child over the past week. Parents who had English as a second language were encouraged to look up any words they did not understand in their language dictionary. If necessary, I would provide a verbal definition of any words/phrases that the parent requested assistance with. This approach to assisting parents is accepted according to the SRS-PS Manual (Constantino & Gruber, 2005). At the completion of the questionnaire, I checked over the form to ensure that it had been filled in correctly, as it cannot be scored if 16 or more items are missing or double-marked. If there were missing answers, I gave the form back to the parent and asked them to attempt to answer all the questions to the best of their ability.

Secondary Outcome: Speech and language.

The MacArthur-Bates Communicative Development Inventories – Words and Gestures (MBCDI-W&G) is a parent-report measure that assesses the early language skills of typically developing young children in the areas of vocabulary comprehension and production, and their use of communicative and symbolic gestures (Fenson et al.,

2007). The MBCDI-W&G was selected as a measure due to its potential sensitivity in detecting emerging communication skills. In typically developing children, these skills begin to emerge before their first birthday, which is reflected by the fact that the MBCDI-W&G is standardised for typically developing children aged from birth to 18 months. The MBCDI-W&G is suitable to use with children older than 18 months if they have a severe language delay (Fenson et al., 2007).

The MBCDI-W&G has recently been used in studies concerning preschool aged children with ASD, including: assessing parent training intervention outcomes (Drew et al., 2002; McConachie et al., 2005); predicting language development trajectories (Luyster, Qiu, Lopez, & Lord, 2007); and indentifying preschoolers at risk of ASD (Mitchell et al., 2006). The studies by Drew et al. (2002) and McConachie et al. (2005) were also used in the power calculations for this study due to the similarities in treatment approach and recruitment criteria.

There are various advantages and disadvantages to using a parent-report measure for language assessments. When considering the advantages, firstly the parent has the opportunity to observe the child in a wide range of situations. The data may therefore be more representative of the child's actual language than data collected through a structured test or analysis of a language sample. Secondly, young children's performance in a formal testing situation may be compromised by their mood on the day and their personality. Parent report is less vulnerable to these factors. When considering the disadvantages, parents may either over or under-rate their child's performance. In order to address this, the MBCDI-W&G uses a recognition format rather than relying on the memory of the adult, meaning that a list of prescribed words and gestures are provided to the parent. Using prescribed lists helps improve the reliability of the measure, which is indicated by the high test/retest reliability with Pearson's correlation values (*r*) in the 0.80 range. The MBCDI-W&G also instructs parents to limit their report to the context of current or emergent behaviours, making the measure more objective in terms of what the child can do at a specific point in time (Fenson et al., 2007).

The MBCDI-W&G measure takes approximately 20-40 minutes to complete. Parents were given the assessment form and asked to fill it in independently based on their observations of their child over the past week. There are written instructions on the assessment form, ensuring a uniform understanding of how to fill in the various sections. The measure is divided into the following sections:

Part 1: early words

A – First signs of understanding. (3 items)

B – Phrases; assessing the child's comprehension of everyday phrases and routines. (28 items)

C – Starting to talk. (2 items)

D – Vocabulary checklist. Parent reports on the comprehension and production of language. (396 items)

Part 2: actions and gestures – the sections below are combined to create a total score based on 63 items.

A – First communicative gestures. (12 items)

B – Games and routines. (6 items)

C – Actions with objects. (17 items)

D – Pretending to be a parent. (13 items)

E – Imitating other adult actions. (15 items)

Secondary Outcome: Relationship – parent-child.

The Parent-Child Relationship Inventory (PCRI) is a numeric, self-report questionnaire. While a numeric measure has limitations in assessing the quality of a relationship, it does make it possible to compare participants with a normative sample (Gerard, 2005). This is particularly useful in studies with more than just a few participants, where qualitative approaches would require time intensive analysis.

This measure attempts to assess "parents' attitudes towards parenting and toward their children" (Gerard, 2005, p. 1) in a quantitative way. Parents respond to 73 items using a Likert scale, where 1 = strongly agree, 2 = agree, 3 = disagree and 4 = strongly disagree. The parents' responses are tallied and converted to a standard score, thereby bringing the perspective of normative comparisons to an area that is often only qualitatively evaluated. The PCRI has a fourth-grade reading level and takes around 15 minutes to complete.

The PCRI is arranged in scales that represent core features of parenting and the parent-child relationship (Gerard, 2005). The PCRI scales include:

- The Parental Support Scale (SUP): assesses the level of emotional and social support the parent receives (9 items).

- The Satisfaction with Parenting Scale (SAT): assesses the amount of pleasure and fulfilment a parent receives from their parenting role (10 items).
- The Involvement Scale (INV): assesses the parents' level of interaction with and knowledge of his or her child (14 items).
- The Communication Scale (COM): assesses the parent's perception of how effectively they communicate with his or her child (9 items).
- The Limit Setting Scale (LIM): assesses the parents' experience disciplining their child (12 items).
- The Autonomy Scale (AUT): assesses the ability of parents to encourage their child's independence (10 items).
- The Role Orientation Scale (ROL): examines parents' attitudes toward gender roles in parenting (9 items).

The items on this assessment are highly personal (see Appendix H), and so care was taken with preparing parents to fill in the questionnaire. Parents were reminded about confidentiality and the procedures taken to ensure anonymity. In particular, I assured parents that I would not be scoring the assessment and so would not know how they responded to any specific item. They were also reminded that if they did not feel comfortable answering the questionnaire, they could leave it incomplete without consequence and could still participate in the study.

Secondary Outcome: Child's engagement in the music therapy sessions.

The Music Therapy Diagnostic Assessment (MTDA) is a non-standardised, numeric assessment protocol. It was originally used to support the process of diagnosis for children (aged 6 and over) who present with pervasive developmental delays consistent with difficulties associated with autism spectrum disorder, attention deficit disorder or Gilles De la Tourette's syndrome (Oldfield, 2006a). To my knowledge, the MTDA had not been used as an outcome measure before the commencement of this study.

The MTDA assesses a wide range of behaviours, and was designed to be able to be compared with other non-music therapy diagnostic tools, such as the Autism Diagnostic Observation Schedule (Oldfield, 2006a). Primarily, the MTDA assesses various aspects of the child's social communication ability and/or motivation to engage

in music therapy sessions. There are 12 items on the MTDA scoring protocol, which are scored with the following criteria: 0 = none of this behaviour was noticed, 1 = some of this behaviour was noticed, 2 = a lot of this behaviour was noticed (see Table 3.3).

Table 3.3

Music Therapy Diagnostic Assessment (MTDA)

MTDA scoring categories:
1. Child's playing seems to be independent of therapist's playing. Therapist has to work hard to "remain" with child, and child often seems to be doing his/her own thing.
2. Child is not facially or physically engaged in playing process, or unusual eye-contact (too little or too much).
3. Child does not make any spontaneous suggestions (musical or verbal) with communicative intent; or story is excessively simple, showing inability to be creative or imaginative (this should not be caused by a general learning disability, but appear untypical of child's overall ability).
4. Child is unusually interested in structure of instruments; lines instruments or beaters up; "twiddles" with beaters of shakers; uses beaters in unexpected ways e.g. puts them in holes, sticks them on head...
5. Child becomes self-absorbed and difficult to distract from certain instruments such as wind chimes or the ocean drum (not boredom or distractibility but a more isolated, engrossed type of playing, with possible repetitive playing).
6. Child's tone of voice/intonation has an unusual or repetitive quality.
7. Child is unable or unwilling to make up a story where we both contribute to the storyline. Child may be unwilling to make up a new story rather than telling a well-known story, or child may refuse to allow the therapist to contribute in any way.
8. Child develops obsessive/repetitive types of playing or obsessive repetitive patterns in a story.
9. Child is unable to have more than one immediate copying response. The exchanges do not develop into a dialogue.
10. Child is unable to have any playful or humorous exchange with the therapist.
11. Child wants entire session to be on his/her terms and cannot accept any ideas or suggestions from the therapist (not in a calculated or manipulative way but rather in an "own world" way).
12. Child does not show a response to therapist's singing. No embarrassment or smile or communicative response. Do not score if child is choosing to reject or ignore the therapist and showing a negative response.

Note: Reproduced from Oldfield, 2006a.

Items were scored according to the following protocol - 0 = none of this behaviour was noticed, 1 = some of this behaviour was noticed, 2 = a lot of this behaviour was noticed.

Item 7 was left out of the scoring as it was considered inappropriate for skill level of the participants in this study. Therefore, maximum score possible = 22

The second and second last music therapy sessions were facilitated according to the MTDA guidelines (see Appendix I) and were video recorded. I watched the video with the parent immediately after the session; giving the parent an opportunity to

comment on their child's behaviours, and me the opportunity to explain the music therapy techniques. This process of knowledge sharing between the parent and myself supported the collaborative manner of the family-centred approach. I then later watched the video a second time without the parents, and rated the session according to the MTDA scoring protocol (see Table 3.3). Despite the subjective nature of this non-standardised measure, inter-rater reliability was sought with an independent research assistant (RA) who was also a registered music therapist experienced in working with children with ASD.

Secondary outcome: Parents' use of music in the home.

Parents in the Treatment group were asked to keep a record of how much, and what type, of music activities they did with their child without the music therapist. Each week, parents filled in a record sheet (see Appendix J) estimating how much time they spent in minutes participating in each of four specified variables: singing; singing with instruments; improvisation; and listening to music with their child. There was provision on the sheet to record in minutes how much estimated time they spent daily participating in each category. However, the record sheet was not presented to the parents as a prescriptive list of activities, but rather was explained to them as an exercise in data collection. The family did not have to adhere to a set of "homework" tasks, and parents were free to interpret this as they wished. This was an important consideration in fostering a sense of partnership between the therapist and parent (Turnbull, Turbiville, & Turnbull, 2000). Rather than tell the parent to do this or that, the therapist would support the parent's efforts. For example, if a parent showed interest in doing an activity throughout the week, the therapist would assist them to be able to do this by writing out the lyrics or providing a simple recording of the song.

At the end of each music therapy session, I collected the previous week's record sheet from the parent. If the parent had forgotten to fill it in they were encouraged to do so retrospectively so long as they felt they could reliably estimate the time spent in the activities. A note was made at the bottom of the sheet if it was filled in retrospectively. Parents were then given a new record sheet for the coming week, with a maximum of 14 record sheets completed due to the fact that the record sheets were given out beginning with session 2 and ending with week 15.

After the 8 week follow-up period, parents were sent a summary sheet to fill in (see Appendix T). They were asked to estimate how much time they had spent

participating in each category of activity with their child since the music therapy sessions had finished.

Secondary outcome: Parents' descriptions of the parent-child relationship.

Parents in the treatment group were asked to participate in a structured interview at the end of the 16 week treatment period. The interview format gave parents more flexibility in how they portrayed their parent-child relationship compared to the survey-style format of the PCRI (Robson, 2002). While the PCRI usefully evaluates the quality of the parent-child relationship compared with a normative sample (Gerard, 2005), the rigidity of having to answer questions about relationship with a 4 point Likert scale limits the depth of the data. An interview allows the nuance of the parents' responses to be captured; resulting in data that potentially has greater depth than a survey, and is capable of being sensitive to the parents' context, personality and experiences (Hauser-Cram et al., 2000). It was anticipated that this data may offer clarity and/or validation for the PCRI data (Robson, 2002).

Parents were given the interview questions the week before it was due to take place. This procedure gave them time to consider their answers to the direct questions being asked and prepare their answers if they wished too. This preparation time was desirable, as the interview was conducted in their home environment which was likely to contain distractions and interruptions. The interview was conducted by myself, as it was considered a natural extension of the collaborative approach to the family-centred music therapy sessions. Permission was sought for the interview to be audio recorded so that it could be transcribed with accuracy.

The interview questions are presented in Table 3.4 and can be thought of as falling into three topics, including questions about: the child, the parent, and the therapist. By including questions on these 3 aspects, parents were able to give emphasis to the aspects they judged to be important. This was preferable to having a battery of questions only about the parent-child relationship, which may result in the interview being leading.

The schedule for the interview was as follows:

1. The interview questions were given to parents a week before to allow them time to think about their responses.

2. A brief introduction to the interview which: assured parents about confidentiality; explained that their views are valid and important to the research; and acknowledged that being interviewed can feel odd initially.
3. A warm up question designed to be easy and build the engagement of the parent.
4. Questions about the child's responses to music therapy.
5. Questions about change in the parent-child relationship following music therapy.
6. Questions about the role of the therapist in the sessions.
7. Open questions to bring the interview to a close.

Table 3.4

Structured Interview Questions

Focus	**Question**
Warm up	1. What did you think of the music therapy sessions?
Change in Child's responses	2. How did you think xxx responded in the music therapy sessions? 3. How did you think xxx joined in socially in the music therapy sessions? 4. When you think over the 4 months of therapy, is there anything about xxx's participation that particularly stands out?
Change in Parent-child relationship	5. What was it like for you taking part in music therapy with xxx? 6. How would you describe your relationship with xxx during music therapy and now afterwards?
Role of the therapist	7. Is there anything about the way I worked with xxx that particularly stands out for you? 8. Did seeing me working with xxx influence the way you are with yyy?
Open questions	9. Sometimes people say that music therapy changes the way they see their child, did anything change for you? 10. How do you think you will use music with xxx in the future?
Note: xxx was replaced with the child's name. yyy was replaced with him/her	

Outcome measures related to hypotheses.

In summary, there were 7 different assessment tools used in this design: 4 standardised measures (Vineland SEEC, SRS-PS, MBCDI-W&G, and PCRI); one music therapy specific, unstandardised measure (MTDA); one survey specifically written for this study; and a structured interview. A guide to the measures selected to

address each hypotheses is provided in Table 3.5, while Table 3.6 outlines when the measures where to be completed.

Blinding

Due to the use of a wait listed design with a standard care control, it was not possible to blind the participants to the treatment condition. This is a typical limitation when researching a complex intervention which requires the active involvement of the participants, and where a standard care control is selected (Bradt, 2012; Campbell et al., 2000). As is common in research with access to limited financial resources (Bradt, 2012), I was both the researcher and clinician which meant that I could not be blinded to the participants' treatment allocation. In order to overcome some of the bias introduced in clinician-led research, I developed a clear treatment protocol (Bradt, 2012) which will be described in the coming sections.

Three of the four standardised measures were able to be completed by the parent independently. On their completion, I quickly scanned the measures ensuring that all of the items had been filled in. If some were found to be missing, this was pointed out to the parent and they were asked to complete the items to the best of their ability. As described earlier, one of the standardised parent-report measures (Vineland SEEC) was completed based on parents' responses to a published semi-structured interview protocol. While I was not blind to the treatment allocation, bias was minimised by adhering to the detailed interview protocol.

Once completed, all measures were placed in an opaque envelope and given to a research assistant who scored the measures and entered the data into an Excel Worksheet. The data was therefore managed by an independent person, and not inspected until the end of the treatment phase. This is desirable in all studies, and especially in this situation where I was involved in many aspects of the design and implementation (Bradt, 2012).

Table 3.5

Assessment measures related to each hypothesis

	Relationship			Speech / language	Child's engagement in sessions	Parents' use of music in the home	Parents' descriptions of the parent-child relationship
Hypothesis	Vineland SEEC	SRS-PS	PCRI	MBCDI-W&G	MTDA	Weekly Record Sheet	Structured Interview
1. There will be greater positive changes in the early social communication skills of young children with severe autism in response to 16 weeks of family-centred music therapy plus standard care compared to standard care alone.	✓	✓		✓			
2. There will be greater positive changes in parents' ratings of the quality of their relationship with their child following 16 weeks of family-centred music therapy plus standard care compared to standard care alone.			✓				
3. Any changes in the child's early social communication skills will be maintained for at least 8 weeks after the family-centred music therapy intervention ceases.		✓		✓			
4. Within the music therapy sessions, there will be positive, observable changes in symptomatic behaviours of autism in the child in response to 16 weeks of music therapy plus standard care.					✓		
5. Parents will be able to implement music therapy methods with their child (without the music therapist) during the course of their usual week.						✓	
6. Parents will be able to identify positive changes in the nature of their parent-child relationship following 16 weeks of family-centred music therapy plus standard care.							✓

Table 3.6

Outline of when each measure was completed.

Measure	Session 1	Session 2	Sessions 3-14	Session 15 (second last)	Session 16 (last)	Follow-up
Relationship – social interaction in home and community (Vineland SEEC)	✓				✓	
Relationship – social responsiveness (SRS-PS)	✓				✓	✓
Relationship – Parent-child (PCRI)	✓				✓	✓
Speech & Language (MBCDI-W&G)	✓				✓	
Child's engagement in sessions (MTDA)		✓		✓		
Parents' use of music in the home (Weekly Record Sheet)		✓	✓	✓		✓
Parents' descriptions of the parent-child relationship (Structured Interview)					✓	

Data Preparation

A variety of data – both numeric and descriptive – was collected to address each of the 6 hypotheses.

Numeric data.

A research assistant, who was blind to the treatment allocation, was responsible for scoring the numeric measures and entering the data into a Microsoft Excel Worksheet. The research assistant programmed formulae into the Excel Worksheet to calculate total raw scores, convert raw scores to standard scores, and to calculate subscale scores as appropriate. At the end of the data collection phase, I checked the data for accuracy. The accuracy check was carried out by calculating the raw score and standard scores by hand in order to ensure that the data in the Excel Worksheet were accurate.

Video data.

The MTDA sessions were video recorded and prepared for inter-rater reliability. In preparation, I edited the beginning and end of each videoed session to remove any

clues as to whether it was the pre or post session. I then tossed a coin to determine the order that the pair of sessions for each child appeared – either pre-post or post-pre. The video data was then given to the research assistant on an external hard drive with all identifying information about the client removed. The research assistant was well trained in the scoring protocol.

Descriptive data.

The interviews were recorded on an iPod Touch and later downloaded and converted to an mp3 file. The file was imported into a free software program called Audiotranskription f4, downloaded from http://www.audiotranskription.de/f4.htm. The f4 program allows the audio file to be slowed down, speed up and paused. The transcription is typed directly into the program, which allows easy time stamping.

I listened to the interview firstly in its entirety with no transcribing. On the second listening, data related broadly to any aspect of the parent-child relationship were transcribed word for word in preparation for a content analysis. A word document for each participant's transcription was created using the participants' de-identified descriptor in the document name. A detailed description of the qualitative data analysis will be presented in Chapter 5.

The Control Condition

The control condition was the standard care being provided to the child. In Australia, most young children with ASD receive treatment services of some kind in their preschool years. The early intervention and treatment of ASD is understood by parents and government funding bodies as being vital to the child's development (Roberts & Prior, 2006). It would therefore have significantly affected recruitment opportunities to restrict participants to preschool aged children receiving no treatment of any kind. Due to the importance of early intervention and treatment, it would have been unethical to request that families alter or cease the current treatment their child was receiving. These ethical issues have ramifications on the design of experimental studies with young children (Hauser-Cram et al., 2000). Therefore, the control condition was defined as standard care, with recruitment criteria formulated to ensure that participants were recruited from programs with similar philosophies of family-centred practice and levels of treatment contact time per week per child.

In pragmatic trials, standard care is a popular control (Campbell et al., 2000). Researchers using this control are interested in exploring whether adding a treatment to participants' standard care significantly improves outcomes (Mohr et al., 2009). Provided that the standard care control is monitored and well documented (Campbell et al., 2000), and other measures are taken to address bias (Attia, 2005), it can provide an effective control. However, the difficulties around this type of control also need to be acknowledged. A standard care control will contain many intervention strategies that are also used in music therapy, albeit without music, which may make the results difficult to interpret (Gold et al., 2006). Compared to studies that use a placebo, or control for the attention of the therapist, a study with a standard care control investigates the effects of the therapy as a whole, rather than specific effects. Further, as it would be expected that the standard care is helpful to the participants, it is likely to affect power calculations in ways difficult to pre-empt (Mohr et al., 2009) and the results "are likely to underestimate the true effects of music therapy" (Gold et al., 2006, p. 9). These issues need to be kept in mind when interpreting the results.

The characteristics of the ECI Centres assisting with recruitment were presented in Table 3.2. ECI Centres 1, 2 and 3 provided the bulk of participants (18/23) with the remaining 5 participants being recruited from 4 different centres. The ECI centres had a mixture of program types, including: (i) weekly centre-based sessions during school terms combined with approximately 2 home visits – 5 centres, and (ii) fortnightly home visits – 2 centres. The 2 centres providing home visits only do occasionally have centre-based programs offered flexibly according to need, however none of the participants in this study were accessing group sessions at these centres.

Despite these differences, the ECI centres shared similar approaches in the way their programs were delivered. All the ECI centres described themselves as being either: inclusive of parents; working with parents; partnering with parents; or acknowledging the expertise of parents. The philosophy guiding intervention practices and the intensity of the program are the most important defining characteristics of ECI programs (Dunst & Trivette, 2009; Dunst et al., 1988).

The Treatment Condition

The treatment condition was family-centred music therapy plus standard care, and will be described in detail in the Treatment Procedure section below. Treatment

sessions began in February, 2010 with the final participant completing their last session in early January, 2011.

Participants received 16 weeks of family-centred music therapy sessions in their own home, with a session scheduled once per week. The length of treatment varies considerably in research projects with young children with ASD. While some research has measured treatment effect after 12 months (Aldred et al., 2004; Drew et al., 2002; McConachie et al., 2005), treatments lasting for a few months (Carpente, 2009; Kim, 2006) or even just a few sessions (Brownell, 2002; Pasiali, 2004) are also reported. The 16 week treatment timeframe was expected to allow enough time for an effect to take place, while also being practical within the 12 month data collection period. Each session lasted for as long as the child could maintain interest in the activities, typically ranging from 15 to 40 minutes, with intervention time being capped at 50 minutes in order to set some parameters around dosage. Participants continued to receive standard care at their ECI centre or private therapies as applicable. A flow chart detailing the tasks completed in each session is seen in Figure 3.2.

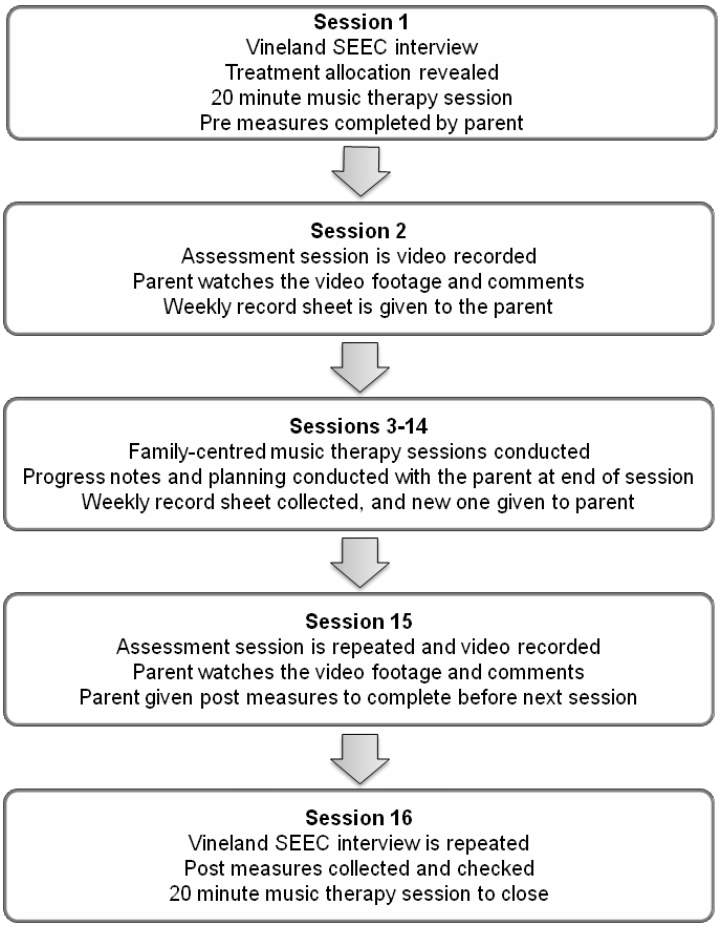

Figure 3.2. Flow chart for tasks completed in treatment sessions.

Setting.

The family-centred music therapy sessions occurred in the participants' homes in order to promote a collaborative, participatory style of the treatment. Conducting the sessions in the participants' homes shifted the power balance of the therapeutic relationship, by casting the therapist in the role of the visitor, and the parent in the role of leader. While many aspects of working in the home could be viewed as obstacles, family-centred practice acknowledges that young children are actively engaged and learn best when their learning is part of their usual routine and environment (Mahoney & Wiggers, 2007; Rantala et al., 2009; Roper & Dunst, 2003). The challenges of the home environment, such as: children leaving the therapy space; being distracted by toys and the television; and the session being interrupted by visitors, can be seen as valuable natural learning opportunities. Working in the home environment provided me with the opportunity to work directly with issues that impact the child and family on a daily basis, and model for the parent how to embed therapeutic interactions in usual home situations.

Family-centred therapies are typically conducted in the natural environments of the child. Choosing this setting for the treatment sessions better enables any findings to be generalised due to the naturalistic, clinically relevant treatment protocol (Campbell et al., 2000; Geretsegger, Holck, & Gold, 2012).

Internal and External Validity

Internal validity was strengthened through documenting the treatment protocol and by using one music therapist (the researcher) to conduct all of the treatment sessions (Mohr et al., 2009). The family-centred music therapy model of work was documented (see Treatment Procedure below), as well as the specific activities and music therapy methods relevant to communication stages (see Music Therapy Methods below). A flow chart outlining contingencies according to the mood and behaviour of the child (see Treatment Procedure below) was also documented. Participants in the control group were monitored (Campbell et al., 2000) to ensure they did not add additional interventions to their standard care program or engage in music therapy sessions during the control period.

While the treatment protocol was developed to strengthen validity and replicability, this was not at the expense of flexibility within the sessions. The treatment protocol allowed me to flexibly adapt and respond within the established

guidelines according to the needs of each child. Flexibility to tailor the sessions to the child is necessary when working with children with ASD who have diverse needs and for whom a one-size-fits-all approach is not appropriate (Kim et al., 2009; Roberts & Prior, 2006; Wigram & Elefant, 2009).

Threats to external validity include the use of only one music therapist, the small sample size and the selection criteria which targeted children within a narrow age and ability range. However, external validity was strengthened by the use of 7 different EI Centres for recruitment, thus increasing the generalisability of results despite the fact that participants were all living in the North-West suburbs of Melbourne.

The trade off between internal and external validity is ever present in experimental studies. A recent consideration is also the ecological validity – namely, whether the study resembles "real-world" conditions (Robson, 2002). This study was undertaken mindful of real-world music therapy conditions, through the incorporation of typical clinical settings and typical outcome reporting approaches – such as parent and therapist report.

Equipment

At the start of the treatment protocol, each family was given a small resource kit to assist them to continue the music therapy methods in between sessions. This resource kit contained (see Appendix K for a photo of the kit):

- pair of egg shakers
- set 3 bells on a handle
- 24cm diameter floor tom
- a pair of 10cm diameter hand cymbals
- a CD containing 3 songs specially composed by me
- a social communication skills information booklet

Each session, I also brought additional resources to the participants' homes in a large duffle bag and a guitar case. The equipment brought to each session is listed in Table 3.7 (see Appendix L for photos of the items), and included:

- Instruments – the collection available in every session
- Non-instruments – props for use with songs or activities available in every session

- Special additions – items only brought when required for a specific activity

Table 3.7

Equipment Brought to Each Session by the Researcher

Instruments	Non-instruments	Special additions
Steel string guitar with strap (Fender)	Picture cards for songs and instruments	3 kazoos
4 egg shakers	Picture props for songs	1 35cm bell tree
3 box shaped shakers	3 Scarves	3 tuned tone bars (C D E) with mallet
3 egg shakers with handles	1 Lycra rope	Toys props for songs, including: (ducks, banana, teddy bears, frog, monster, stars)
4 jingle bells	1 small parachute with butterfly pattern	
1 tone block with inbuilt mallet	Bubble mixture	
2 castanets		
1 large red ball-bearing shaker		
1 tambourine		
2 triangles – small and medium sized		
3 slide whistles		
1 25cm floor tom (Remo)		
1 set of bongos (14cm and 11cm heads) (Remo)		
1 20cm lollipop drum (Remo)		
1 small 11 note multicoloured xylophone (tuned)		
1 small set of chimes on a stand		
1 25cm splash medium brilliant cymbal on stand (Stagg)		

Treatment Procedure

Broad concepts such as: family-centred practice; working in natural settings; and relationship oriented approaches, could be incorporated into music therapy practice in a wide variety of ways. Early intervention therapists, no matter what their qualification, are encouraged by the literature to work collaboratively with families and openly share with them their knowledge and skills (Dunst & Trivette, 2009; Dunst et al., 2007). A description of the general approach in the sessions is summarised in Figure 3.3, emphasising both the contextual and ecological nature of the music therapy encounter. The descriptions to follow explain how I attempted to worked collaboratively with families in sessions and provide a rationale for the model.

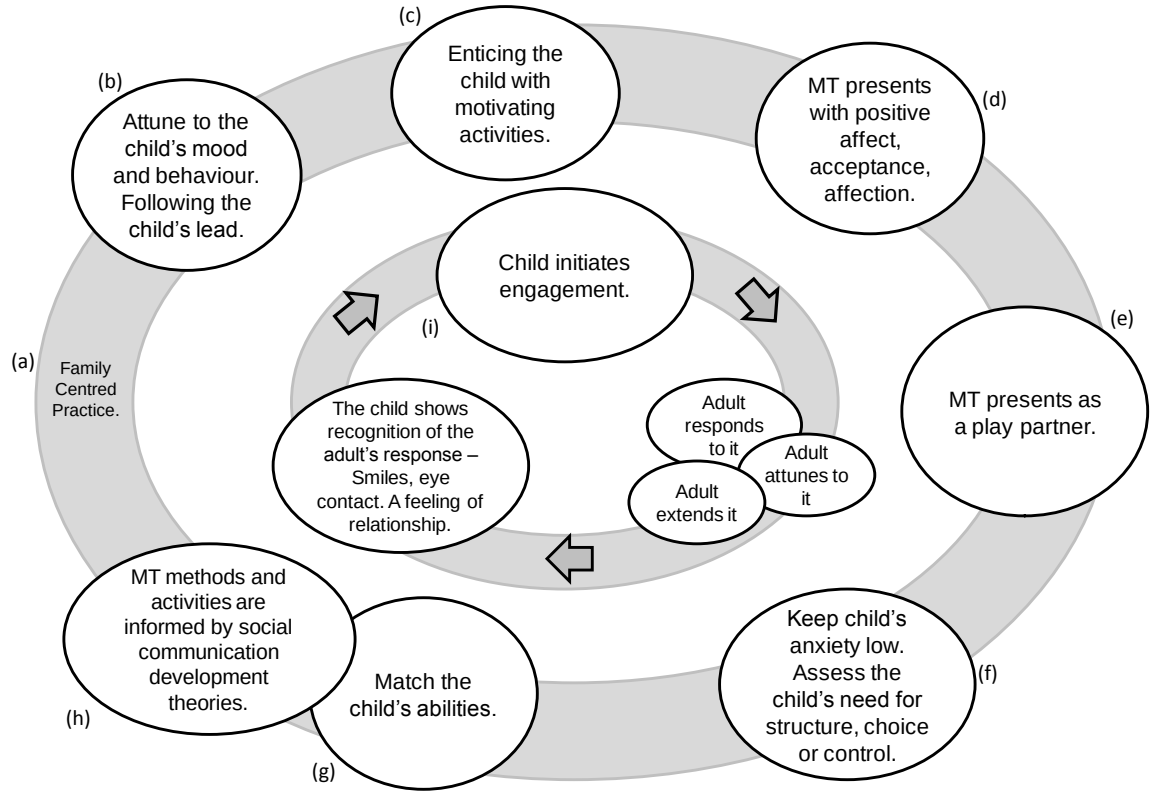

Figure 3.3. Model of work: family-centred music therapy sessions.

It is necessary first to distinguish between collaborative approaches with parents and training approaches. This model is broadly a collaborative one which aims to focus the parent on attuning to their child. The therapist provides support to the parents through modelling methods and techniques in a facilitated rather than direct way. As well as being a gentle and respectful way to work alongside parents, collaborative approaches help parents come to their own understanding of what is and isn't helpful in interacting with their child (Aldred et al., 2004; Green et al., 2010). In contrast, training approaches are characterised by therapists teaching parents a prescribed set of skills and helping the parent develop competence in applying them. Training approaches are more closely aligned with contemporary behavioural interventions (Baker-Ericzen et al., 2007; Rogers et al., 2006; Vismara et al., 2009). While at times direct instruction can be needed when working with parents, in general a training approach is at odds with this study's family-centred practice ethos.

(a) Family-centred practice.

The outer circle in Figure 3.3 represents the knowledge that I brought to the sessions, and illustrates a readiness to work in partnership with the family. My knowledge of: musical conventions; social conventions; social communication development; and my past experience of working with children with ASD, are all pertinent. Rather than imposing this knowledge upon the family, I endeavoured to share my professional skills. Through a process of gentle negotiation, I work to promote a relationship between myself, the parent, and the child based on equality and collaboration. The different yet complementary expertise of the parent and myself is openly acknowledged, and the parent is enabled to be an active participant in the sessions to the extent they feel comfortable (Davis et al., 2002; Dunst & Trivette, 2009; Dunst et al., 2007). This approach has similarities with the resource-oriented theoretical framework which has been incorporated into music therapy practice in recent times, most notably in the area of mental health. Similar to family-centred practice, collaboration and equality in the therapeutic relationship between the therapist and client are paramount in a resource-oriented framework, with the focus being on working with the client's strengths (Rolvsjord, 2004).

(b) Attune to the child's mood and behaviour/following the child's lead.

I strived to establish musical and emotional synchronicity (Kim et al., 2009) through following the child's lead and meeting them where they were musically and/or emotionally (Wigram, 2004; Wigram & Elefant, 2009). This approach underpinned all elements of the sessions. I worked to build rapport with the child, and promoted engagement in the session by incorporating the child's interests and skills in the session (Carpente, 2009). In keeping with the focus on relationship, I tried to musically attune to the child, similar to what Gattino et al. (2011) recently described as "Relational music therapy".

(c) Enticing the child with motivating activities.

Children with severe ASD, demonstrated through considerable communication delays and repetitive behaviours, may have limited play repertoires and interests (Rogers, Hepburn, Stackhouse, & Wehner, 2003). When working with a child who has limited interests, it can be valuable for therapists to sensitively lead some activities with the intention of introducing new ideas to the child that expand their experiences. Some

young children with ASD, especially those with severe social communication impairments, may be musically naive to the possibilities within the music therapy session. In the context of a therapeutic relationship, the music therapist shares her history of music with the child, and invites the child to join in with her. The child is free to respond in his own unique way - which is in turn responded to by the music therapist or the parent - developing together a shared history of musical experiences (Holck, 2004a).

(d) Music Therapist presents with positive affect, acceptance and affection.

Children with ASD may be difficult to read affectively, even by those who know them well. They can appear aloof, disinterested and non-reactive (Wing, 1988), which makes it difficult to tell by observation whether the child is interested in an activity or object. Alternatively, they may be highly reactive to stimuli that would hardly be noticed by others (Prior & Ozonoff, 1998; Volkmar, Lord, Bailey, Schultz, & Klin, 2004).

As social beings, people respond to the affective behaviours of others (Stern, 1985). Families may experience a sense of being rejected or disliked by their child with ASD if the child is aloof and does not give many social signals to their family. Conversely, when a child is being highly reactive and having difficulty tolerating various stimuli, families may fear that any demands they make of their child might result in the child becoming more upset or reacting unexpectedly. Research suggests that in these situations adults reduce communication attempts towards the child with ASD without realising it (Dawson et al., 1990; Rocha et al., 2007). By modelling positive affect, acceptance and affection in the music therapy sessions, I aimed to reframe the meaning of the child's behaviours towards a more positive interpretation.

(e) The music therapist presents as a play partner.

This idea builds on the previous section, *(d)* presenting with positive affective behaviours. In addition to the affective aspect of the encounter, I strived to convey an active message to the child – "I want to play with you...let's play together" – through affirming behaviour. The intention of my behaviour is to promote engagement between the child and parent/myself, and so a mixture of approaches may be required including: following the child's lead; presenting with positive affect; and being playful and present

in the actions of the child. Throughout the sessions, I made every effort to promote any form of interaction.

This is not to imply that parents of children with ASD don't play successfully with their children. However, through my clinical work, I have heard many parents describe the pressure they feel to teach their child something rather than play with them. Perhaps this "teaching" approach is due in part to the fact that as the child grows in age, parents may feel that play is no longer age appropriate. In the context of family-centred practice, I aimed to share my knowledge of how to build an interaction through working with the child's interests or presenting behaviours (Aud Sonders, 2003), and also to promote the participation of the parents in these interactions.

(f) Keep the child's anxiety low. Assess the need for structure, choice or control.

If a child is stressed and pressured, their ability to concentrate, learn and participate will be compromised (Sussman, 1999). I believe that the type of structure provided in music therapy sessions is an important factor in moderating anxiety for children with ASD. Some children are only able to use their social communication skills in highly structured activities that allow them to predict what is coming next. Other children are only able to participate socially when the session is free flowing and determined by their interests. As interactions in natural environments typically require children to be flexible in their need for structure, the social inclusion of children with ASD can be compromised by either of these extremes.

Music therapy can promote flexibility in children with ASD in a variety of ways, most notably through the use of improvisational methods. For children who participate best when others follow their lead, improvisation enables the music therapist to promote interactions with the child through mirroring and matching the child's music, vocalizations or behaviour. Importantly, improvisation can also support structured interactions by incorporating predictable musical patterns and encouraging musical dialogue (Wigram, 2004). The dynamic, multifaceted applications of improvisational methods make it a versatile tool to encourage children's flexibility. I also supported parents to be aware of their child's level of anxiety. Parents were first encouraged to meet their child's need for structure and then gently to introduce some balance or variety (Aud Sonders, 2003; Sussman, 1999).

(g) Matching the child's abilities, and (h) understanding social communication development theories.

Assessment of the child's abilities was ongoing, and care was taken to introduce or extend activities in ways appropriate to the child's presenting social communication abilities. This assessment was based on a sound understanding of social communication development theories. When I followed the child's lead in activities, this knowledge guided the way activities were extended so that the child's abilities were gently challenged to promote development. While typically developing children move through a predictable sequence of stages in social communication development, children with ASD often do not follow the usual sequence of skills (Carpenter et al., 2002; Clifford & Dissanayake, 2008). Early skills, such as sharing attention, may be underdeveloped, while later skills, such as object manipulation, may be strengths.

Therefore, for children with severe ASD, it may be useful to conceptualise these skills as building blocks of social communication development. This analogy acknowledges the importance of all these skills for continued social communication development, but reasons that the order in which they occur is less relevant. These building block skill areas include: shared attention; focus on faces; turn taking; object play and manipulation (Adamson & McArthur, 1995; Bakeman & Adamson, 1984); affect attunement (Hughes, 2009; Stern et al., 1985); response to joint attention; and initiation of joint attention (Prizant et al., 2000; Schertz & Odom, 2007).

(i) Child initiates engagement.

While the outer circle in Figure 3.3 describes the various theories, approaches and knowledge the music therapist calls on in family-centred practice, the inner circle depicts my main social communication aim for the child with ASD. I believe that when trying to promote interpersonal engagement between children with ASD and their families, the pivotal aim is for the child to initiate engagement with others; meaning that the child attempts to interest someone in something, or keep an interaction going. This aim speaks to an understanding of social communication development as being more than a cued response to another person. The child, having been immersed in the norms (or culture) of the music therapy sessions as discussed above, has a lived experience of those norms that hopefully provide him with useful tools for engaging. Supporting the active, independent participation of the child is vital for successful social skill development (Campbell et al., 2008; Poulsen et al., 2006).

The challenge for parents and therapists is to create an environment that is conducive to child initiated engagement. According to self-determination theory, a child who is intrinsically motivated will have higher levels of unprompted participation and persistence in activities (Poulsen et al., 2006). There are three categories of intrinsic motivators, namely: the acquisition of knowledge; mastery of skill; and sensory pleasure. Of these, sensory pleasure is an intrinsic motivator particularly relevant to music therapy sessions with children with severe ASD. The inner circle in Figure 3.3 therefore describes mine or the parents' endeavours if/when a child initiated engagement occurs: respond to the child in an attuned way; and try to extend the duration or content of their initiation. Hopefully the child will show awareness of the adult's responses and be motivated to engage further.

Traditionally, attunement is a dyadic encounter (Ansdell et al., 2010; Malloch, 2000; Pavlicevic & Ansdell, 2009) which could seem to be at odds with the collaborative style of family-centred practice. Attuning to children with severe ASD can be challenging, and so in the spirit of collaboration, the parent may chose to: initially watch me attempt to attune to their child, or; take an active role in attuning to their child, or; anything in between. In this sense, both the child and the parent need to be supported and the therapist needs to have developed a mature awareness of their role in supporting the parent through understanding the notion of therapeutically "holding back" (Shoemark, 2011, p. 170). Open negotiation diminishes the possibility of the therapist assuming, or being assigned, an expert-therapist role which could be a threat to a parent's self-efficacy beliefs.

Treatment contingency plan.

While Figure 3.3 describes and defines the over arching approach within the family-centred music therapy sessions, the protocol for moment-to-moment therapeutic decisions is out lined in Figure 3.4 – the treatment contingency plan. The contingency plan describes my responses in relation to the behaviours observed in the child.

At the top of the diagram, my general approach to the sessions is described as *working to musically and emotionally attune to the child*. The glowing arrows on either side indicate that this orientation continued throughout the session. At the start of the session, I would greet the child and assess their readiness for engaging with me or their parent based on the child's response. If the child displayed positive behaviours,

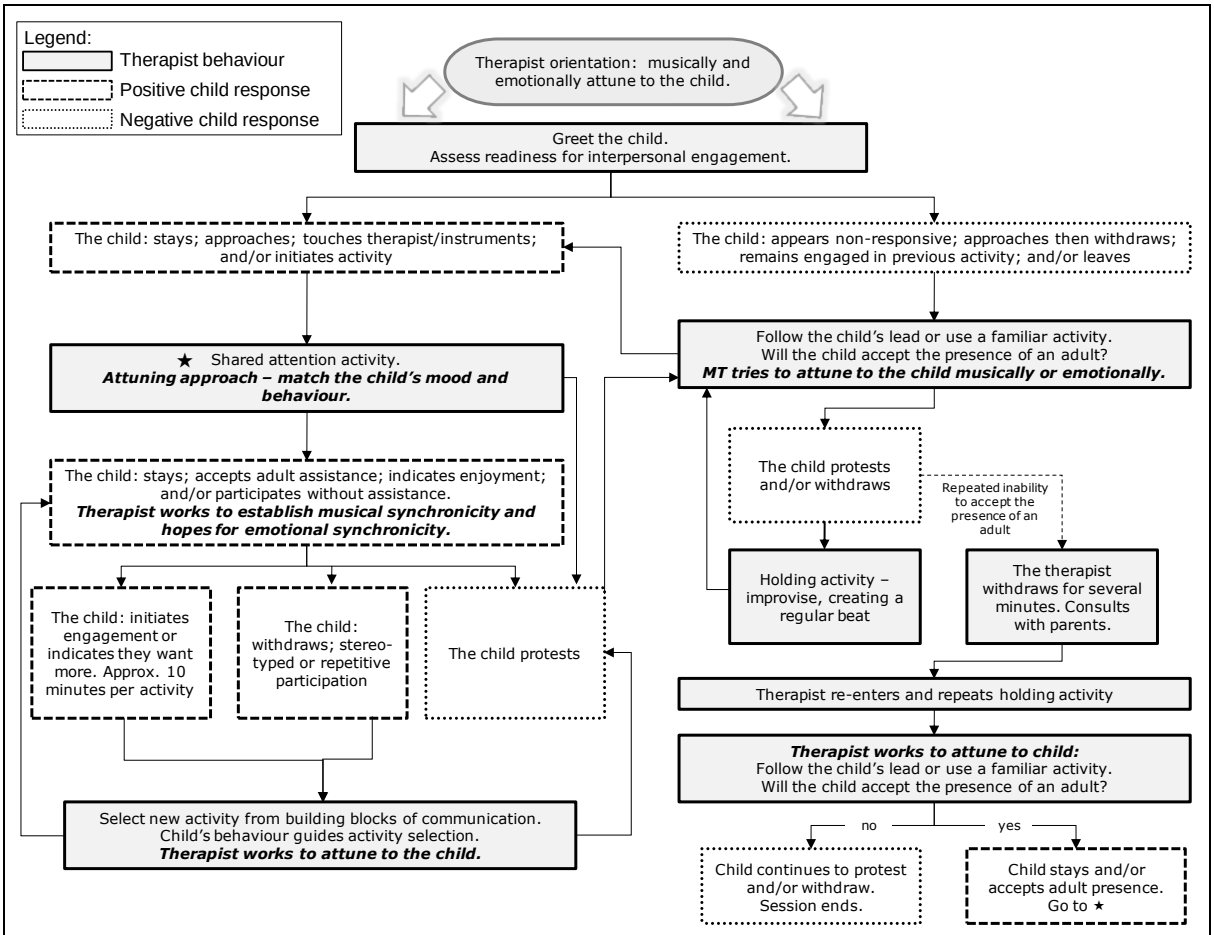

Figure 3.4. Treatment contingency plan.

such as approaching the musical instruments or the therapist, this was taken as confirmation that the child was open to engage. Following down the left hand side of Figure 3.4, I would choose a shared attention activity that matched the child's facial expression or the rhythmic quality of their movements. If the child showed a favourable response to the activity such as staying in the room, accepting assistance from the adults, independent participation or an indication of enjoyment, the activity would be repeated. The number of repetitions was dependent on the child, however after approximately 10 minutes, I would attempt to transition to a new activity. If the child's behaviour became withdrawn, stereotyped or repetitive, I would facilitate a transition to a new activity. If the child began to protest, as seen through behaviours such as aggression, crying, or leaving the room, I would attempt to follow the child's lead, or introduce a familiar activity and continue to try to musically and emotionally attune to the child.

The right hand side of Figure 3.4 illustrates the approach I took if the child appeared non-responsive, withdrawn or left the therapy space after being greeted. Rather than introduce a specific activity, I would follow the child's lead or introduce a familiar activity based on information from the family. If the child began to display positive behaviours, such as approaching me or the musical instruments, then the session would continue as illustrated on the left hand side of Figure 3.4.

However, if the child continued to withdraw or protest, I would withdraw from directly interacting with the child, and improvise a holding activity to create a musically predictable environment. This would typically involve playing the guitar gently with a steady, moderate tempo and a predictable, simple harmonic progression. If the child continued to withdraw or protest, I would withdraw my social and musical involvement completely from the child for several minutes and consult with the child's parents.

Depending on the parent's advice, I would either: try again to engage the child by following their lead or providing a familiar activity; or the session would end if the child continued to withdraw or protest. If the child began to display positive engagement behaviours when the parent or myself attempted to engage with them, the session would proceed gently according to the left hand side of Figure 3.4.

Music therapy methods.

The treatment protocol comprised three music therapy methods; songs, improvisation and structured instrument games. All three of these methods involved the use of live music making. Table 3.8 lists the specific music activities and categorises them according to the social communication skills they relate to. An activity that was relevant to more than one category was listed in each. For example, the song "Bounce and Sway" appears in both the *shared attention* and *focus on faces* categories.

Songs.

Songs are widely used to engage young children with ASD (Kern & Aldridge, 2006; Kern et al., 2007a; Kern et al., 2007b; Oldfield et al., 2003; Williams, 2010) and were used in a variety of ways in this study. Traditional children's songs contain simple lyrics and repetitive musical elements. When presented live (rather than recorded) they can be sung in an infinite variety of ways to match or reflect the child's mood and behaviour. I presented songs with the intention of attuning to the child's facial

Table 3.8

Music Activities Categorised According to Social Communication Stages

Social Communication Stage	Music Therapy Method	Specific activities	
Shared attention	Action songs	Bounce and sway* Row your boat I had a little row boat Jelly on a plate Walk around the room Wiggly Woo Scarf song*	Bee hives Twinkle Twinkle Little Star Bee Hives The child's favourite songs (Come on and Party, Hi5 Theme song, Hot Potato, Rock-a-bye Your Bear, Great Day)
	Improvisation	Mirroring Matching	
Focus on faces/ Eye contact	Action songs	Hello song* Bee hives Put your finger on your nose Heads and shoulders Where's your nose Row your boat	Pat-a-cake Bounce and sway* Play with me* I hear the drum 1-2-3 I had a little row boat We're finished*
	Songs with props	Peek-a-boo Spot song Scarf song* Star song*	Giddy up horsey Jelly on the plate I am hiding*
	Improvisation	Matching Frameworking Extemporising	
Turn taking	Songs with props	5 fat sausages 3 green bottles Old MacDonald	3 teddy bears/jelly fish The wheels on the bus The monster song
	Structured instrument games	I hear the drum 1-2-3 I'm in the mood Shaker Land It's Mummy/Daddy's turn*	
	Improvisation	Play with me* (improvised song structure) Dialoguing Frameworking Extemporising	
Response to joint attention	Songs with props	3 jelly fish Old MacDonald 5 Fat Sausages 3 Green bottles	
	Structured instrument games	Let's play some music The mystery instrument game Shaker land	
	Improvisation	Play with me* (improvised song structure) Dialoguing Frameworking Extemporising	
Initiation of joint attention	Improvisation	Dialoguing Frameworking Extemporising	
	Space for the child to initiate	Provide repetition and build repertoire of activities so that child has opportunities to initiate and request	

**Researcher's original songs*

expressions, body movement, gestures and vocalisations. The attunement of my performance of the song to the child's mood or behaviour was vital – exploiting the non-verbal components of communication possible through music (Malloch, 2000).

Stephen Malloch (2000) labelled this musical "coordinated companionship" (p. 32) as "communicative musicality" (p. 32). Three musical elements in particular – pulse, quality and narrative – make possible a non-verbal dialogue between communication partners (Ansdell et al., 2010). In this way, songs can be used as a form of non-verbal communication (Wigram & Elefant, 2009). Action songs were used to promote *shared attention* and *focus on faces*. For example, "Bounce and Sway" (see Appendix M) is an action song where the child bounces while I attempted to musically attune to the child by matching the rhythm of their bouncing. The child would either sit face-to-face with their parent or myself, encouraging the child to focus on the face of the adult and therefore develop their social awareness. During the song, I would playfully and abruptly stop the music (and therefore the bouncing) and provide space for the child to indicate in some way that they would like the activity to continue. For example, the child might try to bounce, look towards the parent or myself, touch the parent or myself, or say "go". Another action song, "Bee Hives" (see Appendix N), was sung with finger actions which combined auditory and visual information. At the end of the song, there is an anticipatory count from 1 – 5, after which the child is tickled, cuddled or chased around.

Simple props were added to various songs to boost the visual presentation of the song and encourage the child to actively participate. For example, the song "3 Green Bottles" was presented with pictures of bottles stuck to a laminated board. As the words "and if one green bottle should accidently fall" were sung, a bottle was taken off the board and dropped on the floor. The children were encouraged to actively participate in taking the pictures off the board.

Additionally, songs from children's television shows and songs traditionally used in preschool and childcare centres were included into the sessions for familiarity and to motivate choice making. If a child had a particular favourite song, it would be incorporated it into the session.

Improvisation.

Improvisation in the context of music therapy methods is the use of any combination of sounds, within a framework of beginning and ending, established to meet the needs of the client (Wigram, 2004). In child-led approaches, improvisation techniques enable the therapist to meet the child where they are and follow their lead. Improvisation techniques can also be used to encourage interaction between the

improvisers through the use of musical dialogue. The dynamic, multifaceted applications of improvisation techniques make it a versatile tool to promote therapeutic change. The following improvisation techniques were most commonly incorporated into the sessions:

1. Mirroring – "doing exactly what the client is doing musically, expressively and through body language at the same time as the client is doing it. The client will then see his or her own behaviour in the therapist's behaviour." (Wigram, 2004, p. 82)
2. Matching – "improvising music that is compatible, matches or fits in with the client's style of playing while maintaining the same tempo, dynamic, texture, quality and complexity of other musical element." (Wigram, 2004, p. 84)
3. Extemporising – "Improvising on some given music material, or as a pastiche of a style of composition, maintaining the musical and dynamic characteristics of the style." (Wigram, 2004, p. 114). Traditional children's songs were often used as a starting point for improvisations by maintaining the harmonic progression and character of the original song.
4. Frameworking – "Providing a clear musical framework for the improvised material of a client...in order to create or develop a specific type of musical structure." (Wigram, 2004, p. 118). Frames were typically short musical motives that developed from matching the child's playing. The motif (a harmonic progression, melodic phrase, rhythmic phrase or a combination) are repeated and cycled by the therapist creating a dynamic accompaniment for the child's playing.
5. Redirection – the therapist chooses to alter the direction of the improvisation by introducing a change in tempo, dynamics, tonality, rhythm or style (Bruscia, 1987). Redirection allows the therapist to input new ideas and expose the child to a variety of musical elements that they may not be able to initiate themselves, which is particularly relevant for young children and children with ASD.

Structured instrument games.

The family-centred music therapy model described in the Treatment Procedure section above emphasised the child's initiation of engagement as the underlying aim of

the sessions. While it is not possible to make a child initiate an interaction, there are music therapy techniques that promote turn-taking skills which require an initiation of response from the participants. Turn-taking in music therapy can be promoted through the use of musical dialoguing (Wigram & Elefant, 2009). Dialoguing can be understood as a musical conversation that may involve structured, controlled turn-taking or free-flowing musical improvisation (Wigram, 2004). Techniques such as *interjecting* (the therapist waits for a gap in the child's playing and then has a turn) and *making spaces* (the therapist leaves gaps deliberately and waits expectantly for the child to fill the gap) promote turn-taking and develop dialoguing in the interaction (Bruscia, 1987). Due to the children's ages and impaired social communication skills, turn-taking and dialoguing were often encouraged through the use of structured instrument games.

Structured instrument games encourage the child to initiate by providing strong musical and gestural cues to promote turn-taking and dialoguing (Wigram, 2004). For example, the song "I hear the drum" provides musical cues to the child through the use of an interrupted perfect cadence (which pauses expectantly on the dominant chord when it is the child's turn to play), and melody (which rises just before pausing when it is the child's turn to play). Gestural cues reinforce these musical cues, and include: passing the instrument to the child just before it is their turn; the adult looking toward the child and the instrument; and (if needed) physically touching the child to encourage them to start playing. Gestural cues were flexibly applied according to the needs of the child, with the aim being to provide as little support as possible to prompt the child to play. When "I hear the drum" is first introduced, the child's participation is supported through the use of exaggerated musical and gestural cues. As the child's familiarity with the activity develops, these musical and gestural cues are toned down to allow the child opportunities to initiate their turn.

These structured games were employed flexibly; often as an introduction to, or a framework for, an improvised dialogue with the child when appropriate. For example, the song "I hear the drum" ends with the words "all day long" where everyone is encouraged to play together. This section of the song can continue for as long as the child is interested, and can develop into an improvisation which incorporates the techniques of mirroring, matching, extemporising, frameworking and redirection as described in the improvisation section.

Conclusion

Challenges abound when empirically researching complex therapies such as family-centred music therapy and diverse client groups. Never-the-less, empirical evidence into the effectiveness of music therapy is demanded by service providers and policy makers in the Australian context (Roberts & Prior, 2006). In order to investigate whether there were any positive changes in the social communication skills of children with ASD participating in family-centred music therapy, a parallel RCT design was employed.

The design was strengthened by: the use of a block randomised, concealed allocation to the treatment group; the use of strict inclusion and exclusion criteria hoping to control variance and improve statistical power; the use of one person to implement the treatment protocol to support internal validity; and stratifying participants at allocation for the possible confounder of high amounts of private therapy. Standardised, published measures were used for data collection which, when combined with treatment delivered in a natural and clinically relevant manner, will better enable any findings to be generalised.

Conversely, the wait list design and use of a standard care control resulted in an inability to blind the participants or myself to the treatment allocation. All of the standardised measures were based on parent report which may introduce biased responses in favour of the treatment group. Notwithstanding, these measures are specially designed for parent rating and therefore contain internal safe-guards to address bias as evidenced by high correlations with non-parent rated measures (in the case of the SRS) or high test/retest correlations (in the case of the Vineland SEEC, PCRI and MBCDI-W&G).

In order to gain a broader outcome perspective, a variety of measures were used including video analysis and a structured interview with the parent at the end of the treatment phase. Congruence in the results between these different measures may indicate that bias was not a strong feature.

Lastly, while power calculations were difficult to carry out, this study aimed to recruit at least 24 participants. If achieved, this would make it the largest RCT in music therapy with preschool aged children with ASD, one of the largest RCTs in music therapy and ASD, and the only Australian RCT in music therapy with ASD. The outcomes of the study are presented in the following chapter.

Chapter 4
Quantitative Results

Introduction

This chapter presents the results of the quantitative data, which relates to Hypotheses 1 – 5. Hypotheses 1 and 2 were addressed through the controlled research design comparing the Treatment Group to the Control Group; while Hypotheses 3 – 5 were addressed by the Treatment Group's data only. The descriptive data relating to Hypothesis 6 are subsequently presented in Chapter 5.

From November 2009 to April 2010, 27 participants were assessed for eligibility to the study. Figure 4.1 shows the flow of participants through the phases of the trial from enrolment through to data analysis. Of the 27 participants, 4 were excluded from the study because they either did not meet the assessment criteria (n = 2) or had a sibling with ASD who was already participating (n = 2). It was decided that only one child per family would be enrolled in the study to assist the parent to focus their observations and evaluations. The non-enrolled sibling with ASD could still participate in the treatment sessions as part of the family-centred approach.

In the treatment group, one participant was lost to the study due to the child and parent contracting a severe respiratory illness. The parent decided to cease involvement in the study after missing 7 consecutive weeks of sessions and still not feeling well enough to participate. I did not pursue the parent to complete the post treatment measures, as the parent made it clear that she was not well enough to contribute any further. In the control group, one participant was also lost to the study. When I tried to contact the family for their post measures, there was no response. Therefore, 11 participants completed the pre and post measures and the 16 week treatment protocol in the treatment group (see Figure 4.1), with the mean number of sessions being 14.1 with a standard deviation of 1.2 and a range of 12.0 to 16.0 (see raw data in Appendix O). Ten participants completed the pre and post measures in the control group.

Follow-up data was collected for the treatment group 8 weeks after the completion of the treatment phase; which occurred 24 weeks after randomisation (see Figure 4.1). The 11 participants were telephoned to confirm their postal address, willingness to complete the follow-up measures, and their compliance with the requirement to not participate in music therapy. The follow-up measures were then sent

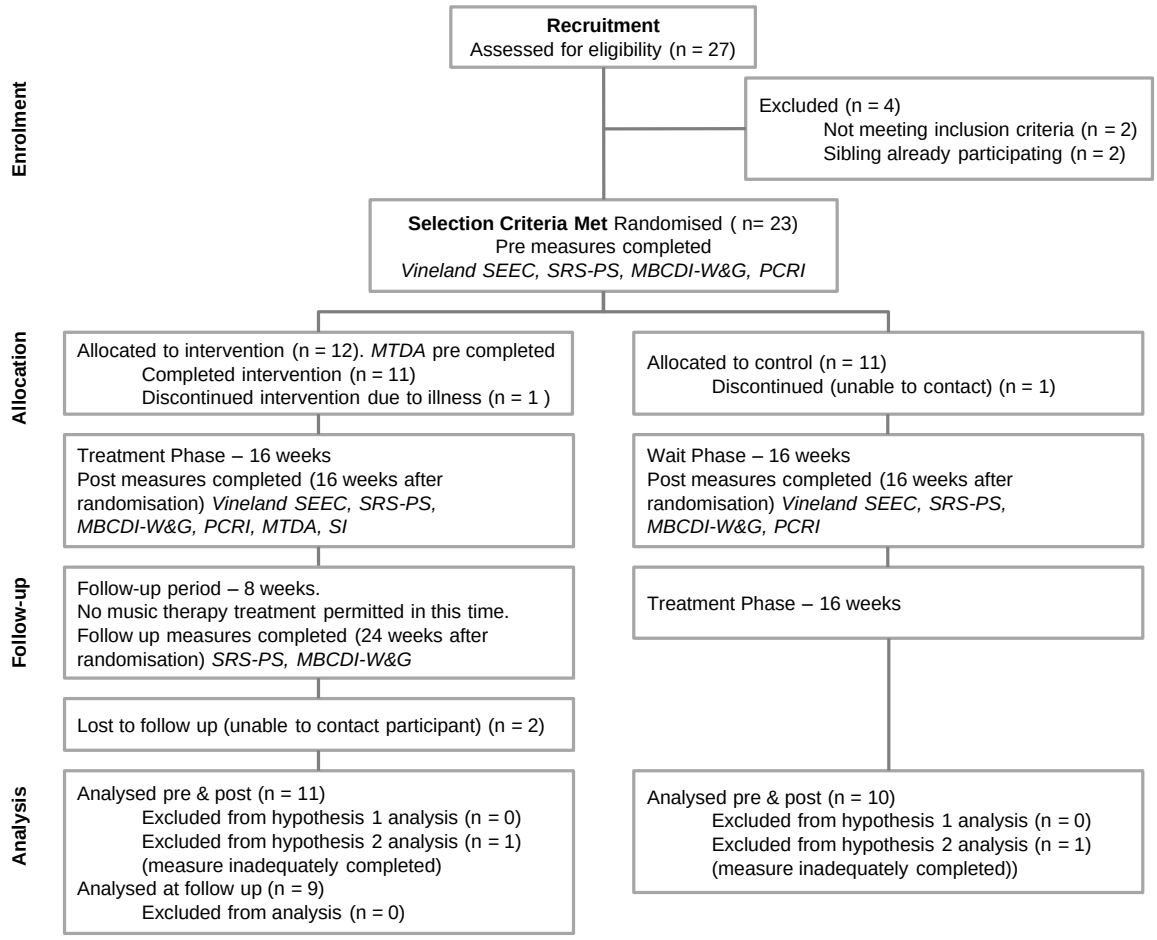

Figure 4.1. Flow diagram of participants' progress through the phases of the trial.
Vineland SEEC = Vineland Social Emotional Early Childhood Scales; SRS-PS = Social Responsiveness Scale Preschool Version; MBCDI-W&G = MacArthur Bates Communicative Development Inventories Words and Gestures; PCRI = Parent Child Relationship Inventory; MTDA = Music Therapy Diagnostic Assessment; SI = semi structured interview.

to the participants in the mail. While all 11 participants confirmed their willingness to complete the follow-up measures and had not continued with music therapy treatment in the follow-up period, only 9 sets of data were returned. I tried to contact the participants lost to follow-up and left messages for them, but no further contact with the participants occurred.

The participant's individual characteristics are presented in Table 4.1. All but one participant was accompanied by their mother in the sessions. The main participating parent in the sessions were generally well educated, with the minimum education level reported being 12 years of schooling (n = 8). 7 parents had completed tertiary training which involved completing a post Year 12 vocational study qualification that is not a University Degree, such as hairdressing, and 8 parents

Table 4.1

Overview of all Participants

Participant[1]	Experimental group	Age[2] (months)	Gender	SRS[3]	Parent[4]	Average hours/week		Therapy	Parent		SES[6]
						EI Program	Additional Therapies		ESL	Education[5]	
A01	Treatment	52	F	83	Mother	2.0	<1	SLT	Yes	Year 11-12	Stability
A02	Control	37	M	71	Mother	1.0	1	SLT	Yes	University degree	Stability
A03	Control	56	M	104	Mother	<1.0	<1	SLT	No	Year 11-12	Hardship
A04	Treatment	49	F	133	Mother	2.0	<1	SLT	No	Year 11-12	Stability
A05	Control	49	M	89	Mother	3.5	1	SLT	No	University degree	Stability
A06	Control	39	M	94	Mother	2.0	<1	SLT	Yes	University degree	Stress
A07	Treatment	37	M	74	Mother	2.0	1	SLT	No	Year 11-12	Stability
A08	Treatment	47	F	92	Mother	2.0	<1	OT	No	Tertiary training	Stress
A09	Control	45	M	67	Mother	1.0	0		No	University degree	Hardship
A10	Treatment	55	M	90	Mother	2.0	1	SLT	No	Year 11-12	Stability
A11	Control	50	M	93	Mother	1.0	0		No	Year 11-12	Stress
A12	Control	49	M	96	Mother	1.0	1	SLT, OT	No	University degree	Stress
A13*	Treatment	36	F	75	Mother	<1.0	1	SLT	No	Tertiary training	Stress
A14	Treatment	46	M	86	Mother	2.0	<1	SLT	Yes	University degree	Stress
A15	Control	50	M	83	Mother	1.0	0		Yes	Year 11-12	Stress
A16	Treatment	41	M	85	Mother	2.0	1	ABA	No	Tertiary training	Stability
A17	Control	41	M	86	Mother	2.0	2	SLT, OT	No	University degree	Stability
A18	Treatment	36	M	72	Mother	1.0	0		No	Tertiary training	Stability
A19	Control	41	M	84	Mother	2.0	0		No	University degree	Stress
A20*	Control	60	M	65	Father	2.0	1	SLT	No	Tertiary training	Stability
A21	Treatment	41	M	87	Mother	2.0	0		Yes	Year 11-12	Stability
A22	Treatment	39	M	91	Mother	2.0	1	SLT, OT	No	Tertiary training	Stability
B01	Treatment	48	M	81	Mother	1.0	5	SLT, ABA	No	Tertiary training	Stress

Note. Abbreviations: EI = early intervention; ESL = English as a second language; SLT = speech & language therapy; OT = occupational therapy; ABA = applied behavioural analysis intervention which is based on discrete trial training of the child;

[1]A = regular allocation; B = stratified allocation for ≥5 hours additional therapies – see explanation of stratification in text.

[2]Age at first contact

[3]SRS = Social Responsiveness Scale T scores where >76 indicate autism in the severe range.

[4]Main participating parent in the sessions

[5]Highest level of education reached by the participating parent. Tertiary training is post year 12 vocational study that is not a University Degree, e.g. hairdressing.

[6]SES = socioeconomic status (financial) of the family as observed by the researcher (hardship < stress < stability);

*Withdrew from the study

had completed a bachelor's degree.

While parents were not asked to indicate their level of income, families living in the suburbs targeted for recruitment have lower incomes on average compared to the National average household in Australia according to the Australian Bureau of Statistics (ABS, 2011a). Gauging by the living conditions of the families and the casual

comments made by parents, I broadly categorised families into 3 levels of financial status being (in order from most disadvantaged to least) hardship, stress and stability. Two families were judged to be living in financial hardship, one of whom was a single mother living in temporary accommodation, and one family where both parents were unemployed. 9 families were judged to be financially stressed, indicated by the parents making frequent comments about the struggle they experienced in making the family budget stretch to cover expenses. 12 families were judged to be financially stable, indicated by the absence of comments about finances made by the parents and their home environment.

Three different additional therapies were accessed by the families: Speech and Language Therapy (which in Australia is commonly referred to as Speech Pathology); Occupational Therapy; and Applied Behavioural Analysis therapy, which is a contemporary discrete trial training approach. Speech and Language Therapy was by far the most common of the additional therapies, with 15 families accessing this therapy privately (separate to their Early Intervention program). 4 families were accessing Occupational Therapy, and 2 families were accessing Applied Behavioural Analysis. However, 6 families were not accessing any additional therapies, and 5 families were accessing the additional therapies only once every fortnight (as indicated by the weekly average of <1 hour per week).

Table 4.2 summarises the baseline characteristics of the participants according to allocation; the categorical variables were considered comparable between groups at the start of the study. On average, participants in the treatment group received 1.71 hours per week (sd = 0.54) of contact time from their early intervention service and 1.00 hours per week (sd = 1.31) of additional therapies. In order to calculate the mean for additional therapies, a value of 0.5 hours per week was given where parents had reported <1 hour per week. Participants in the control group received an average 1.55 hours per week (sd = 0.85) of contact time from their early intervention service, and 0.64 hours per week (sd = 0.64) of additional therapies. The mean differences were 0.16 (p = 0.59), and 0.42 (p = 0.42) respectively. Participants ranged in age from 36 to 60 months at baseline. The treatment group averaged 43.92 months (sd = 6.46) and the control group averaged 47.00 months (sd = 7.18); mean difference of -3.08 (p = 0.29).

The participant's ASD diagnosis was confirmed through a specialist paediatrician's report. These reports used either the CARS or ADOS to confirm the

Table 4.2

Baseline Characteristics of Children Randomised to Treatment or Control

Characteristic	Treatment Group (n=12)	Control Group (n=11)	Mean Difference (95% CI)	p[1]
Age: months, mean (s.d.)	43.92 (6.46)	47.00 (7.18)	-3.08 (-8.99, 2.83)	0.291
Sibling participated, n (%)	4 (33)	6 (54)		0.327
English Second Language, n (%)	3 (25)	3 (27)		0.907
Diagnosis severity, mean (s.d.)	87.42 (15.84)	84.73 (12.52)	2.69 (-9.77, 15.15)	0.658
Severe[2], n (%)	9 (75)	8 (73)		0.907
Moderate, n (%)	3 (25)	3 (27)		0.907
Average hours per week of additional interventions				
Early intervention program	1.71 (0.54)	1.55 (0.85)	0.16 (-0.45, 0.78)	0.586
Private therapies	1.00 (1.31)	0.64 (0.64)	0.36 (-0.55, 1.27)	0.415
Test scores[3], mean (s.d.)				
Vineland SEEC	49.10 (12.40)	45.09 (8.13)	3.99 (-5.19, 13.17)	0.376
MBCDI	180 (108)	170 (109)	10.20 (-84.20,104.70)	0.824
SRS-PS	105.40 (27.10)	106.20 (26.10)	-0.80 (-23.90, 22.40)	0.946
PCRI[4]	194.30 (23.10)	191.60 (19.40)	2.67 (-16.95, 22.29)	0.779

[1]*t*-test assumed equal variance
[2]Based on SRS-PS T-scores $\geq$76 indicate autism in the severe range.
[3]Total raw scores.
[4]Treatment group n=11, and control group n=10 due to inadequately filled in questionnaires.

diagnosis of ASD. In the public health system in Melbourne at the time of this study, paediatricians' emphasis was on confirming the diagnosis of ASD so that the child and family would have access to relevant government funding. For preschool aged children, there is typically no attempt to indicate the severity of the diagnosis in this report (Dr. Francis, Royal Children's Hospital, personal communication, June, 2010). This is a customary procedure, with full IQ testing usually occurring just before the child goes to school.

In order to independently confirm the ASD diagnosis and provide some information about symptom severity, the SRS-PS T-scores from baseline are offered. Nine participants in the treatment group were considered "severe" on the autism spectrum as indicated by T-scores $\geq$76 on the SRS-PS; while 8 participants in the control group were considered "severe" (p = 0.907).

4 siblings participated regularly in the music therapy sessions in the treatment group, and in the control group 6 siblings were young enough to be at home during the day ($p = 0.327$). Three parents in each group had English as a Second Language ($p = 907$). T tests for the categorical values "siblings", "English as a second language", and "diagnosis severity", were carried out.

The two groups' baseline test scores were also considered comparable. A mean difference of 3.99 ($p = 0.376$) was calculated for the Primary Outcome; the Vineland SEEC. P-values for the mean difference on the three secondary measures ranged from 0.779 – 0.946.

Controlled Design Quantitative Results

Four standardised measures were used to compare results between experimental groups. As each participant completed the same measures pre-post, the raw change score was used for analysis. Change scores were considered more sensitive than post scores, as they helped to eliminate some of the variability in the data. Raw scores were selected as they measured the actual magnitude of change rather than the standardised change.

For each dependent variable, a null hypothesis was formulated and tested. While testing the null hypothesis allowed the statistical significance of the outcomes to be quantified, the practical significance of any outcome was also of interest. Therefore, descriptive statistics were combined with inferential (Gold, in press), meaning that the effect size and confidence intervals for the estimate (mean difference) were also calculated. A summary of the results from the 4 standardised measures are presented in Table 4.3.

Table 4.3

Changes in Primary and Secondary Outcomes in the Treatment Group and Control Group from Baseline to 16 Weeks (End Of Treatment)

Outcome	*n*	Change Score Mean (s.d.)	Change Score Mean Difference (95% CI)	*t*-test[1]	*p*	*d*[2]
Primary Outcome: Relationship – social interaction (Vineland SEEC)						
Treatment Group	11	22.40 (10.10)	21.46 (11.42, 31.50)	4.48	<0.001	1.96
Control Group	10	0.90 (11.90)				
Secondary Outcome: Relationship – social responsiveness (SRS-PS)[3]						
Treatment Group	11	-7.70 (17.30)	6.33 (-7.22, 19.88)	0.98	0.341	0.42
Control Group	10	-1.40 (11.50)				
Secondary Outcome: Speech & Language (MBCDI)						
Treatment Group	11	78.90 (73.40)	20.20 (-49.80, 90.20)	0.60	0.553	0.26
Control Group	10	58.70 (79.80)				
Secondary Outcome: Relationship – parent-child (PCRI)[4]						
Treatment Group	10	8.00 (9.19)	7.78 (-1.64, 17.19)	1.74	0.099	0.80
Control Group	9	0.20 (10.30)				

Note. Outcomes based on total raw change scores.
[1]assumed equal variance
[2]effect size: 0 - 0.3 = small effect; 0.3 - 0.6 = moderate effect; >0.6 = large effect size.
[3]Negative scores indicate a reduction in symptom severity
[4]Lower n due to inadequately filled in questionnaires.

Hypothesis 1: There will be greater positive changes in the early social communication skills of young children with severe ASD in response to 16 weeks of family-centred music therapy plus standard care compared to standard care alone.

Three measures were chosen to test Hypothesis 1 due to the complex nature of social communication skills. The Vineland SEEC was the Primary Outcome, as it measured social communication development in an integrated way by considering the interaction skills of the child from the perspective of interpersonal relationship and play skills. The SRS-PS assesses the core deficits of ASD in terms of the DSM-IV-TR, and is used as a parent-report diagnostic tool. The MBCDI-W&G measures the more specific variables of comprehension and use of words and gestures.

Hypothesis 1 results: a) Relationship – social interaction in the home and community.

The Vineland SEEC is a semi-structured, quantitatively scored interview that was completed by the parent participating in the family-centred music therapy sessions. Parent's responses to open-ended questions about their child's skills in categories such as: social interaction; communicating in social contexts; developing friendships; and playing with others, were scored according to the published protocol (Sparrow et al., 1998).

Analysis of the total score for the Vineland SEEC.

Figure 4.2 presents the Vineland SEEC total raw pre and post scores for each participant in each group. A two-sample *t*-test was used for statistical analysis (using Minitab 16 software) of the data as the distribution could be assumed to be normal. The null hypothesis for the data was as follows:

There will be no difference in mean total change scores on the Vineland SEEC for family-centred music therapy plus standard care compared to standard care alone.

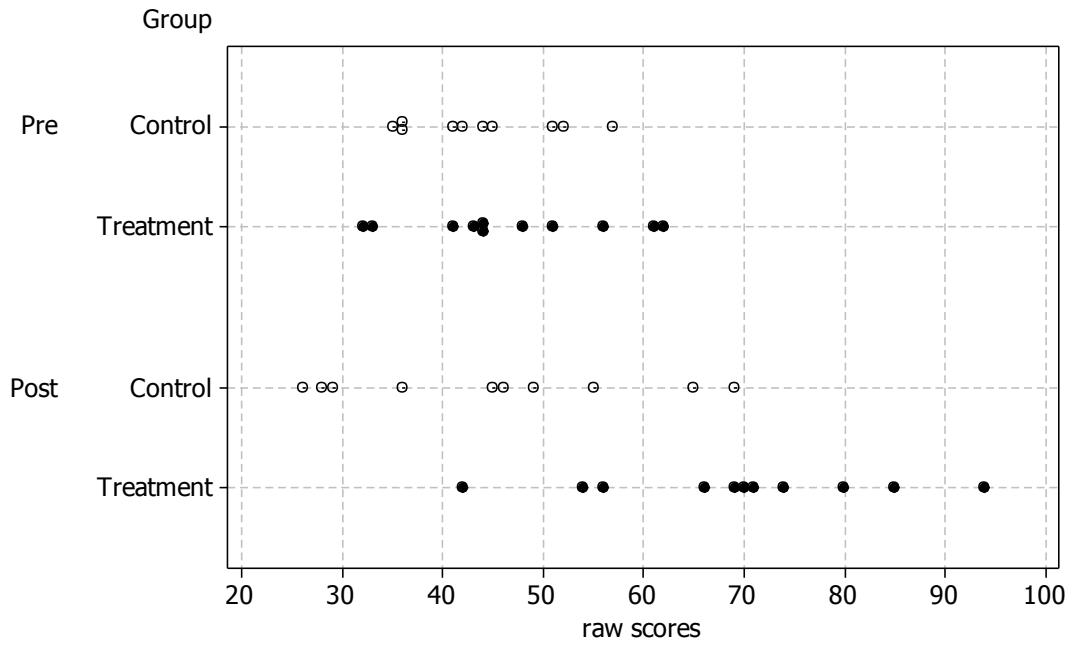

Figure 4.2. Vineland SEEC total raw scores.

At the completion of the treatment protocol, the treatment group had a mean change score of a 22.40 (95% CI 15.61, 29.12) while the control group had a mean change score of 0.90 (95% CI -7.63, 9.43) illustrated in Figure 4.3. The treatment group

gained 21.46 (95% CI: 11.42, 31.50) more points than the control group on average (see Table 4.3). This result was statistically significant in favour of the treatment group ($p < 0.001$) with a large effect size of $d = 1.96$ (95% CI 0.92, 3.00). The effect size was calculated using an online effect size calculator created by The Campbell Collaboration (http://www.campbellcollaboration.org/resources/effect_size_input.php).

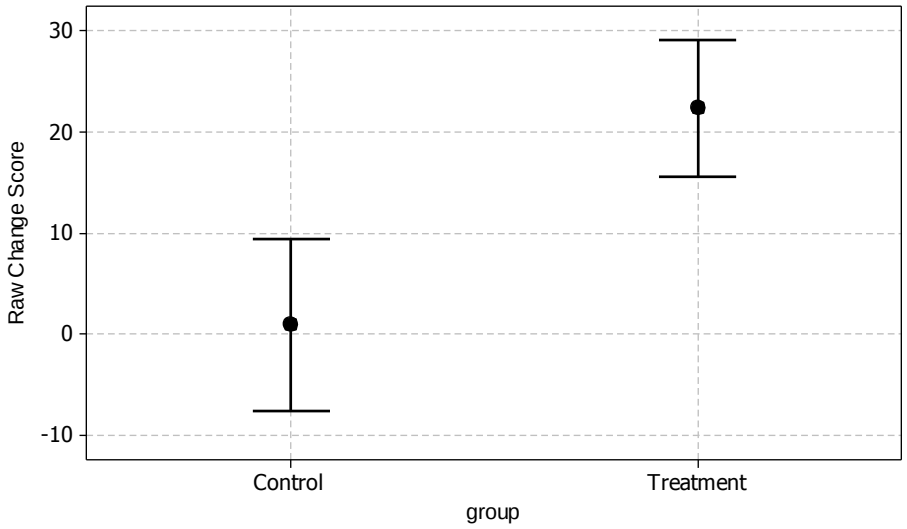

Figure 4.3. Vineland SEEC mean total raw change score with 95% CI for the mean.

The inferential results are strong, with the *p* value significant at the 0.001 level. Descriptively, the results are also strong, with zero not included in the confidence interval for the mean difference and Cohen's *d*. These results indicate that parents were able to identify changes in their child's social communication functioning following family-centred music therapy. The family-centred approach to the sessions gave parents the opportunity to not only observe their child but also to interact with them. When completing the Vineland SEEC, parents were therefore able to take into consideration the behaviours they observed and experienced with their child in the music therapy sessions as well as throughout the week.

Analysis of the Vineland SEEC subscales.

In order to take a deeper look at the data, further analysis was carried out on each of the two subscales. The Interpersonal Relationships subscale assesses the child's usual level of ability in interactions with others, including skills such as: responding to others; expressing and recognising emotions; imitating others; and communicating in

social contexts. A two-sample *t*-test was used to analyse the raw change scores of the Interpersonal Relationships subscale (see Table 4.4 and Figure 4.4). Analysis revealed a significant result in favour of the treatment group, with a mean difference of 10.93 (95% CI 4.41, 17.44; $p = 0.002$). There was a large effect size of $d = 1.53$ (95% CI 0.56, 2.51).

Table 4.4

Vineland SEEC Subscale Analysis

Outcome	*n*	Change Score Mean (s.d.)	Change Score Mean Difference (95% CI)	*t*-test	*p*	*d*[1]
Interpersonal Relationships subscale						
Treatment Group	11	9.73 (6.62)	10.93 (4.41, 17.44)	3.51	0.002	1.53
Control Group	10	-1.20 (7.64)				
Play & Leisure Time subscale						
Treatment Group	11	12.64 (5.46)	10.54 (5.16, 15.92)	4.10	0.001	1.79
Control Group	10	2.10 (6.31)				

Note. Total raw change scores used for outcomes.
[1]Large effect size

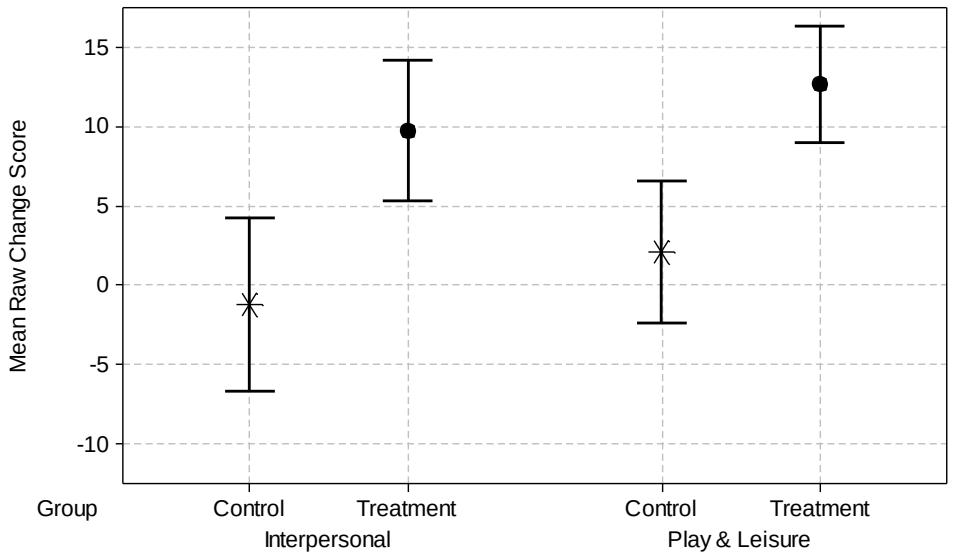

Figure 4.4. Vineland SEEC subscale analysis of the mean raw change scores with 95% CI for the mean.

Similarly, analysis was carried out on the raw change scores of the Play and Leisure Time subscale (see Table 4.4 and Figure 4.4). The Play and Leisure Time subscale assesses the child's skills in areas such as: playing with toys; playing with others; and sharing and cooperating with others. Analysis revealed a significant result in favour of the treatment group, with a mean difference of 10.54 (95% CI 5.16, 15.92; $p = 0.001$). There was a large effect size of d = 1.79 (95% CI 0.78, 2.81).

The results for both subscales remain significant using the Bonferroni corrected alpha of 0.025 instead of 0.05 to mitigate the effects of multiple testing. Music therapy sessions positively impacted both aspects of social communication development, with both subscales yielding similar *p* values and large effect sizes. It is interesting to note that the control group had change scores very close to zero, with a mean of 2.10 (sd = 6.13) for the Play and Leisure Time subscale and a loss of skills recorded for the Interpersonal Relationships subscale with a mean of -1.20 (sd = 7.64).

Hypothesis 1 results: b) Relationship – social responsiveness.

The SRS-PS assesses the three core impairments of ASD according to the DSM-IV-TR: social interactions; communication; and restricted repetitive behaviours. Parents completed the 65 item questionnaire using a 4 point Likert scale.

Analysis of the total score for the SRS-PS.

Figure 4.5 presents the SRS-PS total raw pre and post scores for each participant in each group. A two-sample *t*-test was used for statistical analysis (using Minitab 16 software) of the data as the distribution could be assumed to be normal. The null hypothesis for the data was as follows:

There will be no difference in mean total change scores on the SRS-PS for family-centred music therapy plus standard care compared to standard care alone.
At the completion of the treatment protocol, the treatment group had a mean change score of -7.70 (95% CI -19.32, 3.87), while the control group had a mean change score of -1.40 (95% CI -9.63, 6.83) as seen in Figure 4.6 and Table 4.3. A negative change score is desirable, as this indicates that the impairments associated with ASD measured by the SRS-PS have reduced. The treatment group's symptoms reduced by 6.33 (MD) more points than the control (95% CI -7.22, 19.88), yet was not significant ($p = 0.341$). This result equated to a medium effect size of $d = 0.42$ (95% CI -0.44, 1.29).

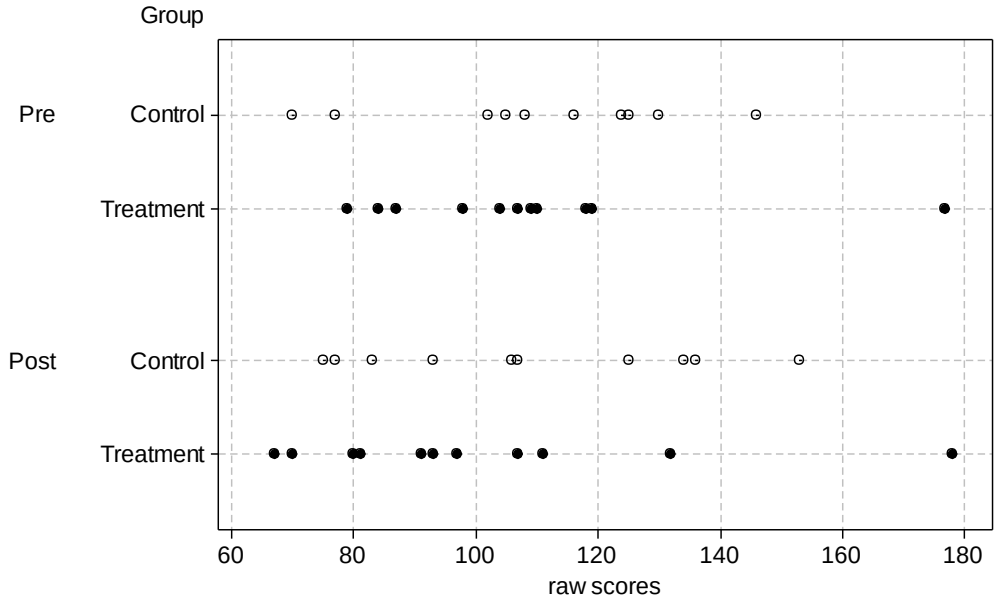

Figure 4.5. SRS-PS total raw scores.

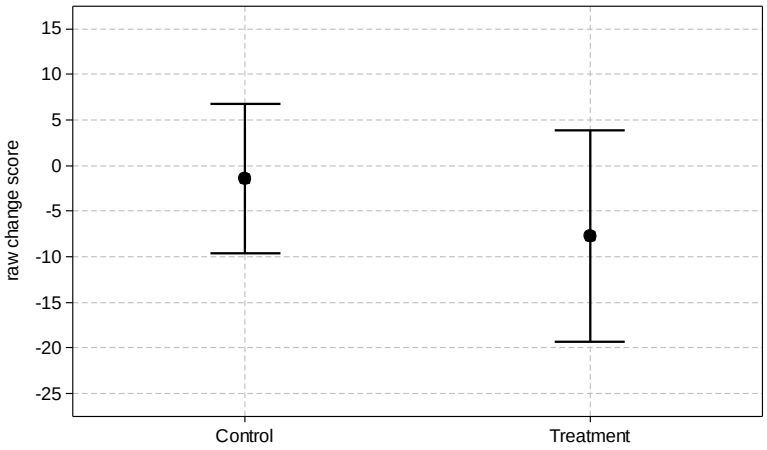

Figure 4.6. SRS-PS mean total raw change score with 95% CI for the mean.

The core impairments of ASD are pervasive, especially in children with moderate to severe symptoms as in this study. To achieve a medium effect size from a 16 week intervention is encouraging, however the wide confidence interval that includes zero limits the way this data can be interpreted.

Analysis of the SRS-PS subscales.

While the total score mean difference was not statistically significant, further analysis was carried out to see if there were any differences between the subscales. If

so, the results may help to explain how music therapy might have impacted the participants. Two-sample *t*-tests were used to analyse the raw change scores of the 5 subscales, with the results summarised in Table 4.5 and Figure 4.7.

The 5 subscales assess different aspects of the child's social skills, communication skills and behaviour, namely:

- Social Awareness – the ability to notice social cues.
- Social Cognition – the ability to interpret social cues.
- Social Communication – expressive and social communication.
- Social Motivation – the motivation to engage in social interactions.
- Autistic Mannerisms – stereotypic behaviours or narrow range of interests.

Table 4.5

SRS-PS Subscale Analysis

Outcome	*n*	Change Score Mean (s.d.)	Change Score Mean Difference (95% CI)	*t*-test	*p*	*d*
Social Awareness						
Treatment Group	11	0.36 (2.58)	-0.56 (-2.92, 1.79)	-0.50	0.622	0.22[1]
Control Group	10	-0.20 (2.57)				
Social Cognition						
Treatment Group	11	-2.27 (4.47)	1.17 (-2.62, 4.97)	0.65	0.525	0.28
Control Group	10	-1.10 (3.75)				
Social Communication						
Treatment Group	11	-3.64 (7.19)	3.24 (-2.66, 9.13)	1.15	0.265	0.50
Control Group	10	-0.40 (5.50)				
Social Motivation						
Treatment Group	11	-1.00 (5.20)	1.10 (-3.06, 5.26)	0.55	0.586	0.24
Control Group	10	0.10 (3.70)				
Autistic Mannerisms						
Treatment Group	11	-1.18 (4.31)	1.38(-2.39, 5.15)	0.77	0.453	0.33
Control Group	10	0.20 (3.91)				

Note. Total raw change scores used in analysis. Negative scores indicate a reduction in symptom severity

[1]effect in favour of the control group

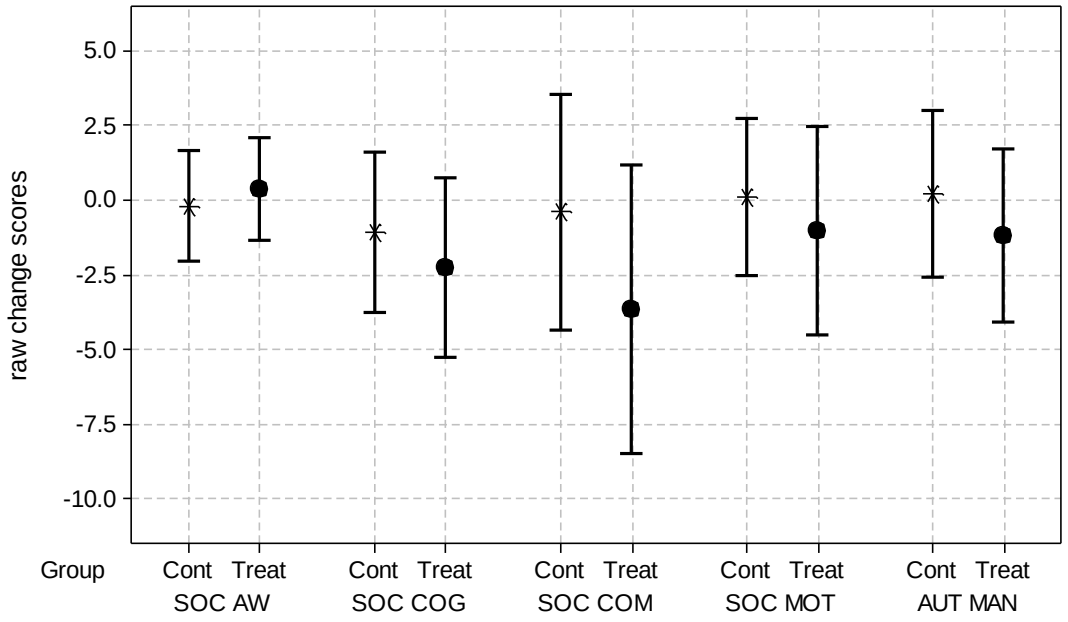

Figure 4.7. SRS – PS subscale analysis of the mean raw change scores with 95% CI for the mean.

Subscale abbreviations: SOC AW = social awareness; SOC COG = social cognition; SOC COM = social communication; SOC MOT = social motivation; AUT MAN = autistic mannerisms.

Analysis revealed that the children in the treatment group recorded the largest change score for the Social Communication subscale (mean difference = 3.24, 95% CI -2.66, 9.13; $p = 0.265$) with a medium (but non-significant) effect size of $d = 0.50$ (95% CI -0.37, 1.37). This subscale assesses the expressive and social communication abilities of the child through 22 items, such as: "avoids eye contact or has unusual eye contact"; "is able to imitate others' actions"; "plays appropriately with children his or her age"; and "wanders aimlessly from one activity to another" (Constantino & Gruber, 2005, p. 18) (see Appendix P for full list of items).

Small (but non-significant) effect sizes in favour of music therapy were found for the Social Cognition ($d = 0.28$, 95% CI -0.58, 1.14), Social Motivation ($d = 0.24$, 95% CI -0.62, 1.10), and Autistic Mannerisms ($d = 0.33$, 95% CI -0.53, 1.20) subscales. The Social Awareness subscale however, had a small (but non-significant) effect size of $d = 0.22$ (95% CI -0.64, 1.08) in favour of the control group.

There are some inconsistency in the subscale results of the SRS-PS, with the small effect size in favour of the control group for the Social Awareness subscale being out of step with the small to medium effect sizes in favour of music therapy in the 4 other subscales. A closer look at the specific items making up the Social Awareness subscale (see Appendix Q) reveal that: 4/8 items ask the parent to rate the meaning of

their child's behaviour (e.g. Is aware of what others are thinking or feeling); 2/8 items refer polite social behaviours (e.g. Walks in between two people who are talking); 1 item refers to successful toilet training; and 1 item refers to the congruence of the child's social behaviour (e.g. Expressions on his or her face don't match what he or she is saying). It seems that music therapy is not an appropriate intervention for effecting change in the items in this subscale.

Hypothesis 1 results: c) Speech and language.

The MBCDI-W&G assesses the early language skills of typically developing young children in the areas of vocabulary comprehension and production, and the use of communicative and symbolic gestures (Fenson et al., 2007). The MBCDI-W&G was selected as a measure due to its sensitivity in detecting emerging early communication skills. In typically developing children, these skills begin to emerge before their first birthday, which is reflected by the fact that the MBCDI-W&G is standardised for typically developing children aged from birth to 18 months. However, this measure can be used successfully with children older than 18 months with severe language delay.

Analysis of the total score for the MBCDI-W&G.

A total raw score was calculated for each child pre and post by adding together sections 1B (phrases understood), 1D (words understood and words produced) and 2 (actions and gestures used). Sections 1A (first signs of understanding) and 1C (starting to talk) were not included in the total raw score. These sections contained only 2 and 3 items respectively, and were designed to be screening questions rather than measure skills.

While the children were allocated to the study based on a strict inclusion criterion for limited functional communication, the pre scores for this measure revealed a surprising amount of variability in the sample reflected in the large standard deviations. The treatment group mean raw pre score was 180 (sd = 108), while the control group scored 170 (sd = 109) (see Table 4.2).

Figure 4.8 presents the MBCDI-W&G total raw pre and post scores for each participant in each group. A two-sample *t*-test was used for statistical analysis of the data (using Minitab 16 software) as the distribution could be assumed to be normal.

The null hypothesis for the data was as follows:

There will be no difference in mean total change scores on the MBCDI-W&G for family-centred music therapy plus standard care compared to standard care alone.

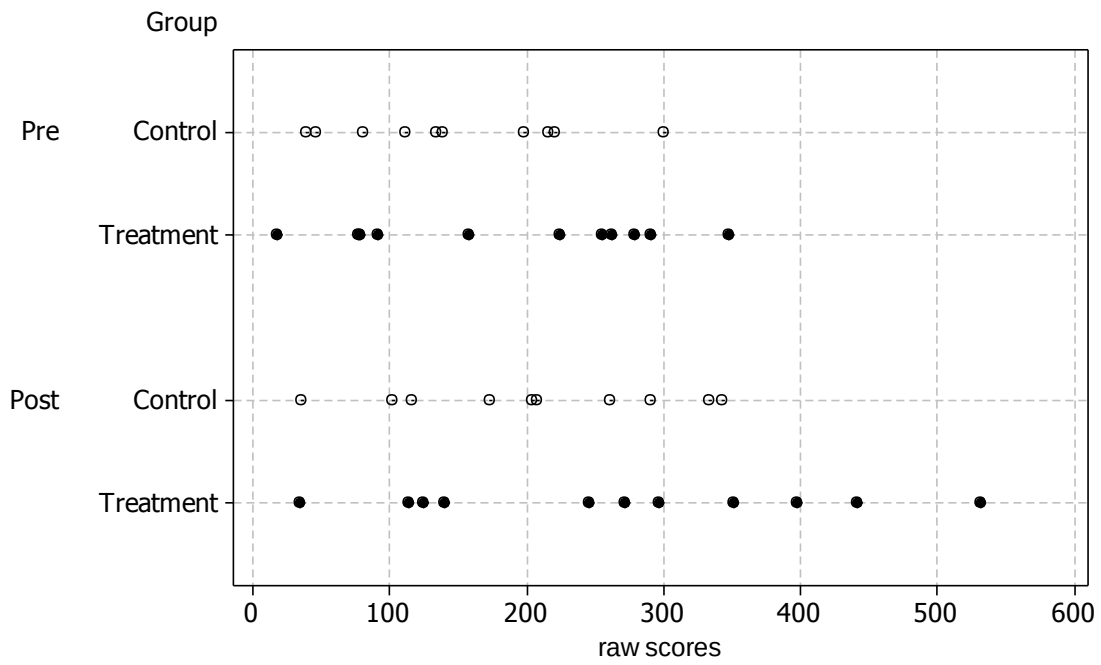

Figure 4.8. MBCDI-W&G total raw scores.

At the completion of the treatment protocol, the treatment group had a mean change score of a 78.90 (95% CI 29.58, 128.24) while the control group had a mean change score of 58.70 (95% CI 1.63, 115.77) illustrated in Figure 4.9. The treatment group gained 20.20 (95% CI: -49.80, 90.20) more points than the control group on average (see Table 4.3). This result was not statistically significant, $p = 0.553$, and equated to a small effect size of $d = 0.26$ (95% CI -0.60, 1.12).

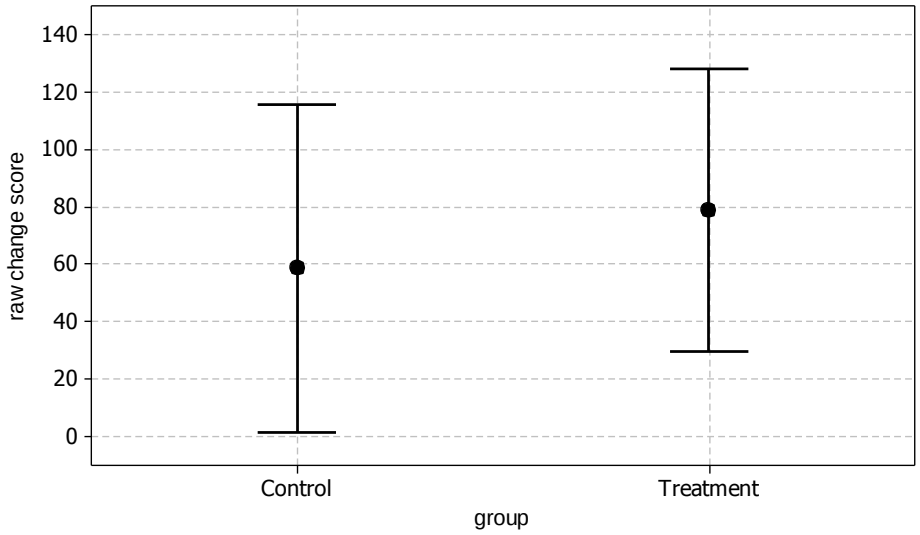

Figure 4.9. MBCDI-W&G mean total raw change score with 95% CI for the mean.

These results cannot rule out the null hypothesis. Further, the wide confidence intervals for the mean difference and Cohen's *d* indicate that the study was likely underpowered for this measure. The large standard deviations for the mean change scores indicate that there was a large amount of variability in the sample which reduces power considerably in studies with small sample sizes.

Analysis of the MBCDI-W&G subscales.

While the total score mean difference was not statistically significant, further analysis was carried out to see if there were any differences between the subscales. If so, the results may help to explain how music therapy might have impacted the participants. Two-sample *t*-tests were used to analyse the raw change scores of the 4 subscales, with the results summarised in Table 4.6 and Figures 4.10 and 4.11 (each Figure depicts 2 subscales, grouped together because the scale ranges were compatible).

The subscales assess different aspects of the child's communication skills, including:

- 1B: everyday phrases the child understands (28 items)
- 1D: words the child understands - vocabulary checklist (396 items)
- 1D: words the child says - vocabulary checklist (396 items)
- 2: actions and gestures used by the child (63 items)

Table 4.6

MBCDI-W&G Subscale Analysis

Outcome	*n*	Change Score Mean (s.d.)	Change Score Mean Difference (95% CI)	*t*-test	*p*	*d*
1B: phrases understood						
Treatment Group	11	2.36 (2.80)	1.86, (-0.83, 4.56)	1.45	0.164	0.63
Control Group	10	0.50 (3.10)				
1D: words understood						
Treatment Group	11	42.5 (44.8)	16.4 (-22.8, 55.5)	0.87	0.393	0.38
Control Group	10	26.1 (40.5)				
1D: words produced						
Treatment Group	11	29.0 (34.2)	0.6 (-37.40, 38.60)	0.03	0.974	0.01
Control Group	10	28.4 (48.5)				
2: actions & gestures used						
Treatment Group	11	5.09 (4.68)	1.39 (-4.06, 6.84)	0.53	0.599	0.23
Control Group	10	3.70 (7.10)				

Note. Total raw change scores used in analysis.

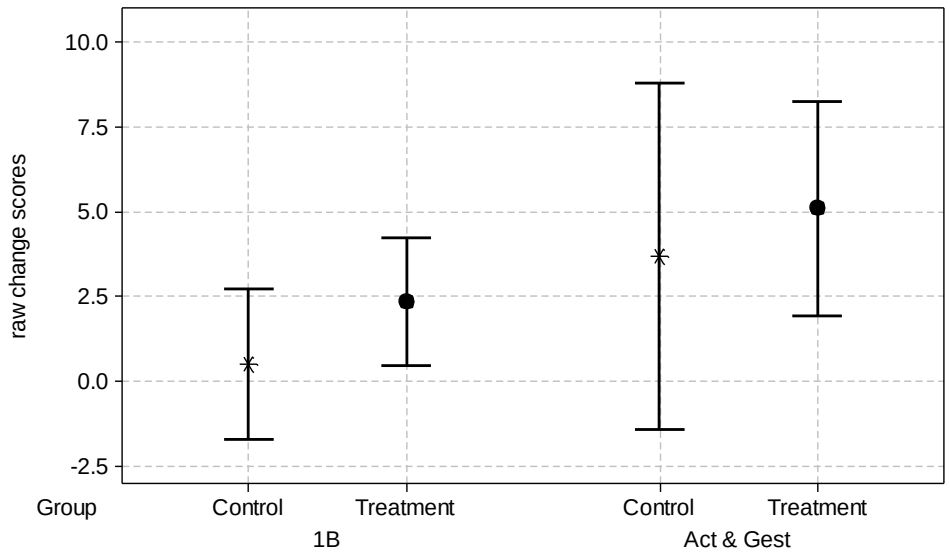

Figure 4.10. MBCDI-W&G subscale analysis of the mean raw change scores with 95% CI for the mean.

Subscale abbreviations: 1B = phrases understood; Act & Gest = actions and gestures used.

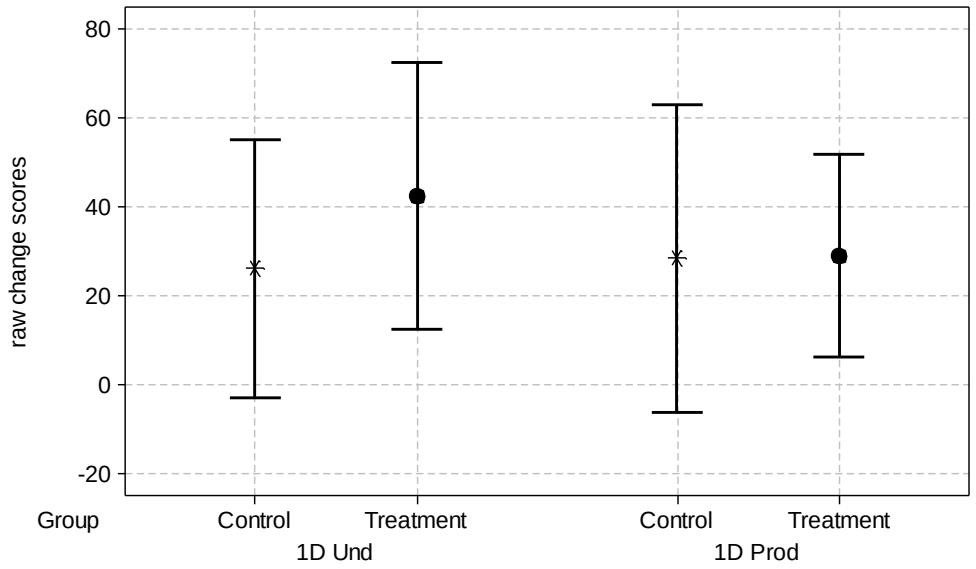

Figure 4.11. MBCDI-W&G subscale analysis of the mean raw change scores with 95% CI for the mean.

Subscale abbreviations: 1D Und = words understood; 1D Prod = words produced.

There were no significant results for any of the subscales, however analysis revealed that the children in the treatment group performed best in subscale 1B: Phrases Understood subscale (p = 0.164), with a medium effect size of d = 0.63 (95% CI -0.25, 1.51). This subscale assesses the child's understanding of everyday phrases such as: "are you hungry?"; "be quiet"; "don't touch"; and "sit down".

Small effect sizes were found for subscales 1D: Words Understood (d = 0.38, 95% CI -0.48, 1.25) and 2: Actions and Gestures Used (d = 0.23, 95% CI -0.63, 1.09). A negligible effect size of d = 0.01 (95% CI -0.84, 0.87) was found for subscale 1D: Words Produced.

Analyses of the subscales suggest that music therapy may be more likely to impact the child's comprehension of phrases rather than the child's acquisition of new words or gestures. However, given the wide confidence intervals for the mean differences and effect sizes, the effectiveness of music therapy in supporting communication development is unclear in this study.

Summary for Hypothesis 1.

Hypothesis 1 states that there will be greater positive changes in the early social communication skills of young children with severe ASD in response to family-centred music therapy. The results for Hypothesis 1 offer some evidence for a positive

treatment effect, with a statistically significant result and a large effect size for the primary measure, the Vineland SEEC. While there were no statistically significant results in either the SRS-PS or the MBCDI-W&G total change scores, there was a medium effect size for the SRS-PS and a small effect size for the MBCDI-W&G in favour of music therapy.

Given that this study has a small sample size, it is difficult to interpret the magnitude of the treatment effect from the *p*-value alone. Cohen's *d* effect size estimates offer an interpretation of the magnitude of the effect from a practical point of view relative to the two experimental groups (Valentine & Cooper, 2003). The statistically significant results of the Vineland SEEC are supported by the large effect size. The effect sizes for the non-significant results are encouraging, however all recorded wide confidence intervals that included zero (most likely reflecting the small sample size) which limit the interpretation of the results.

Hypothesis 2: There will be greater positive changes in parents' ratings of the quality of their relationship with their child following 16 weeks of family-centred music therapy plus standard care compared to standard care alone.

Similar to Hypothesis 1, as each participant completed the PCRI pre to post, the raw change score of this standardised measure was used for analysis. The PCRI is arranged into 7 subscales that each represent a feature of parenting and parent-child relationships. A total raw score was calculated to address Hypothesis 2 by tallying the 7 subscale raw scores.

Results for Hypothesis 2: Relationship – Parent-child.

The PCRI is a quantitatively scored parent-report questionnaire that assesses the parent child relationship though investigating parents' attitudes towards parenting and their children. The participating parent responded to the 73 items of the PCRI using a 4 point Likert scale.

Analysis of the total score for the PCRI.

Figure 4.12 presents the PCRI total raw pre and post scores for each participant in each group. A two-sample *t*-test was used for statistical analysis of the data (using Minitab 16 software) as the distribution could be assumed to be normal. The null hypothesis for the data was as follows:

There will be no difference in mean total change scores on the PCRI for family-centred music therapy plus standard care compared to standard care alone.

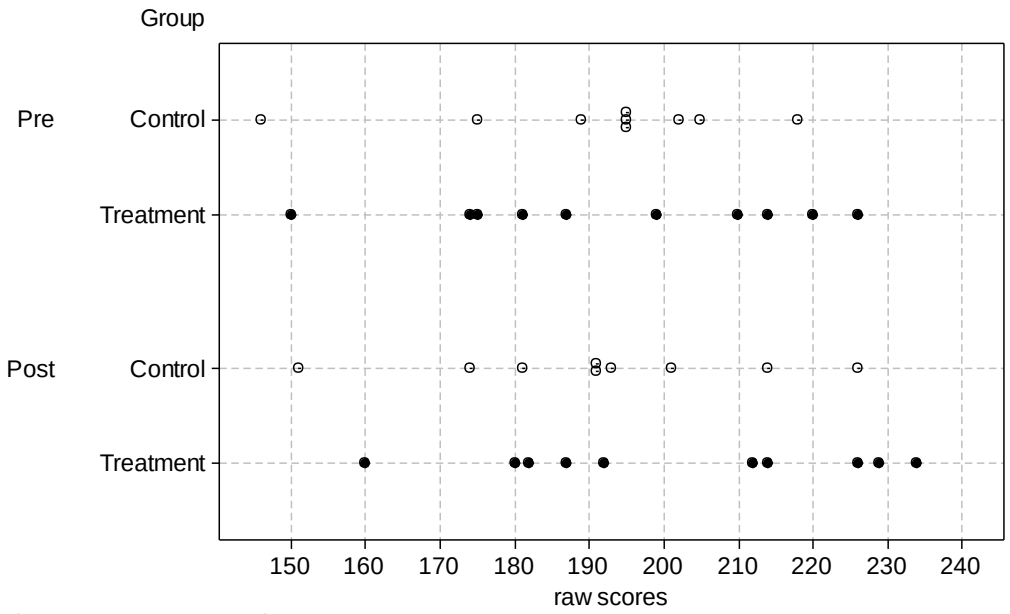

Figure 4.12. PCRI total raw scores.

At the completion of the treatment protocol, the treatment group had a mean change score of 8.00 (95% CI 1.43, 14.57), while the control group had a mean change score of 0.22 (95% CI -7.67, 8.11) as seen in Figure 4.13. For the PCRI, higher scores indicate that the parent has a positive view of the parent-child relationship. The treatment group's parent-child relationship rating increased by an average of 7.78 more points than the control (95% CI -1.64, 17.19) (see Table 4.3). This result was not statistically significant ($p = 0.099$), however it equated to a large effect size of $d = 0.80$ (95% CI -0.13, 1.74).

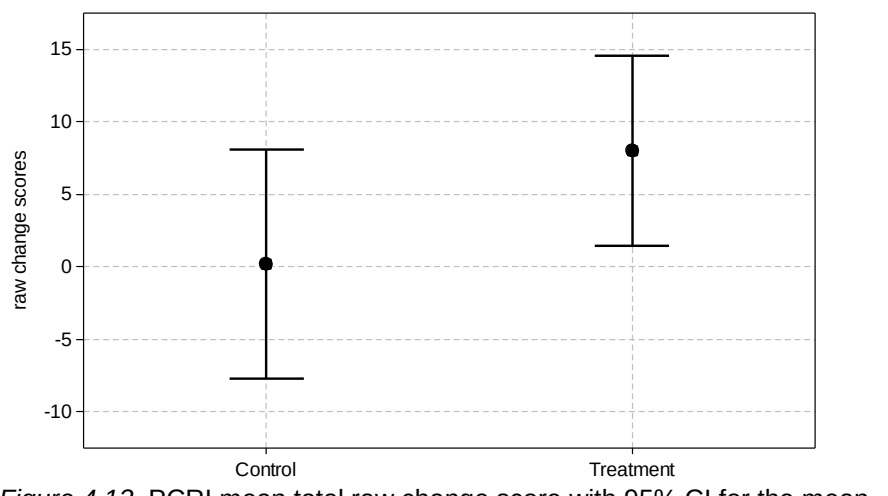

Figure 4.13. PCRI mean total raw change score with 95% CI for the mean.

The large effect size in favour of music therapy and the low (but not statistically significant) p-value are encouraging results from a 16 week intervention, and suggest that further investigation into the effectiveness of music therapy on the parent-child relationship is needed with a larger sample. However, zero is included in the wide confidence intervals for the mean difference and effect size, which is indicative of the small sample size, and thus the quantitative data offers only provisional support for the music therapy intervention.

Analysis of the PCRI subscales.

While the total score mean difference missed statistical significance, the subscales were analysed to see if there were any differences between the subscales. If so, the results may help to explain how music therapy might have impacted the participants. Two-sample *t*-tests were used to analyse the raw change scores of the 7 subscales, with the results summarised in Table 4.7 and Figure 4.14.

Table 4.7

PCRI Subscale Analysis

Outcome	*n*	Change Score Mean (s.d.)	Change Score Mean Difference (95% CI)	*t*-test	*p*	*d*
Support						
Treatment Group	10	1.30 (2.75)	-0.03 (-2.63, 2.56)	-0.03	0.979	0.01
Control Group	9	1.33 (2.60)				
Satisfaction						
Treatment Group	10	0.60 (2.37)	-0.73 (-3.78, 2.32)	-0.51	0.619	0.23
Control Group	9	1.33 (3.84)				
Involvement						
Treatment Group	10	2.50 (2.84)	3.06 (-0.23, 6.34)	1.96	0.066	0.90
Control Group	9	-0.56 (3.91)				
Communication						
Treatment Group	10	0.40 (3.31)	0.07 (-2.82, 2.95)	0.05	0.962	0.02
Control Group	9	0.33 (2.55)				
Limit Setting						
Treatment Group	10	1.30 (4.52)	2.97 (-0.94, 6.87)	1.60	0.128	0.74
Control Group	9	-1.67 (3.39)				
Autonomy						
Treatment Group	10	1.40 (2.27)	1.29 (-0.70, 3.27)	1.37	0.189	0.63
Control Group	9	0.11 (1.76)				
Role Orientation						
Treatment Group	10	0.50 (2.07)	1.17 (-0.54, 2.87)	1.44	0.167	0.67
Control Group	9	-0.67 (1.32)				

Note.Total raw change scores used in analysis.

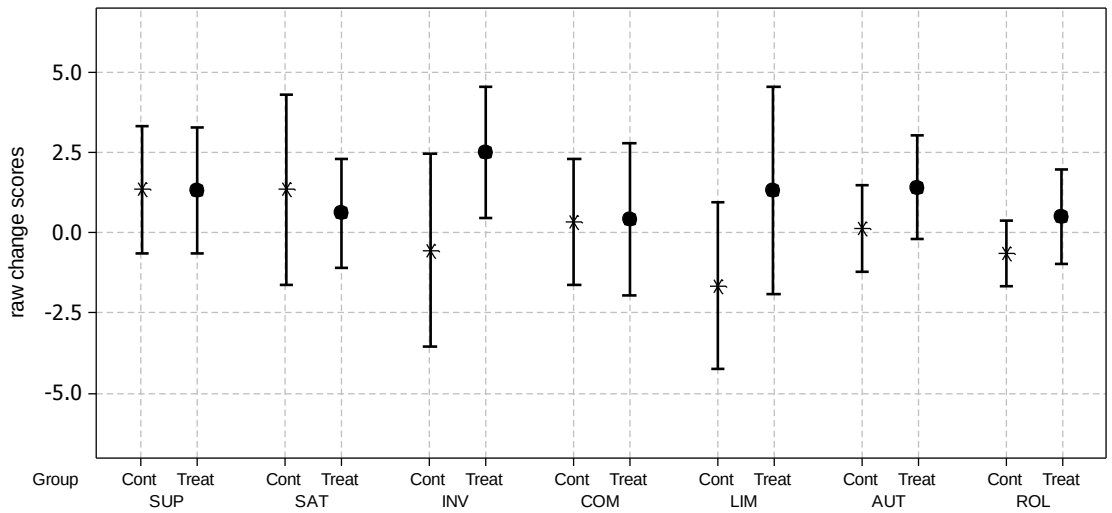

Figure 4.14. PCRI subscale analysis of the mean raw change scores with 95% CI for the mean.

Subscale abbreviations: SUP = parental support; SAT = satisfaction with parenting; INV = involvement; COM = communication; LIM = limit setting; AUT = autonomy; ROL = role orientation; Cont = control; Treat = Treatment.

The 7 subscales assess different features of parenting and parent-child relationships, namely:

- Parental Support – the level of emotional and social support the parent receives.
- Satisfaction with Parenting – the amount of pleasure and fulfilment a parent receives from their parenting role.
- Involvement – parents' level of interaction with and knowledge of his or her child.
- Communication – parents' perception of how effectively they communicate with his or her child.
- Limit Setting – parents' experience of effectively disciplining their child.
- Autonomy – parents' ability to encourage their child's independence.
- Role Orientation – parents' attitudes toward gender roles in parenting.

The analysis of each of the 7 subscales revealed some interesting information. While the results are not statistically significant, especially considering that the Bonferroni corrected alpha would be 0.007 due to the number of subscales, the effect size calculations offer some perspective on how music therapy might have impacted the participants.

A large effect size (d = 0.90; 95% CI -0.04, 1.85) and low (but not statistically significant) p-value of 0.066 in favour of music therapy was found for the Involvement subscale. The Involvement subscale contains 14 items that assess the parents' level of interaction with and knowledge of his or her child. This result offers some support for the potential of family-centred music therapy approaches to promote the active participation of the parent within the session.

Medium (but not significant) effect sizes in favour of music therapy were found for the Limit Setting (d = 0.74, 95% CI -0.19, 1.67), Autonomy (d = 0.63, 95% CI -0.29, 1.55), and Role Orientation (d = 0.67, 95% CI -0.26, 1.59) subscales. All three of these subscales could be thought of as representing a level of confidence with the parenting role. Higher scores on the Limit Setting subscale indicate that the parent feels in control and is comfortable establishing guidelines for the child. Higher scores on the Autonomy subscale indicate that the parent comfortable with the child seeking age appropriate independence. Higher scores on the Role Orientation subscale indicate that the parent has attitudes about parenting gender roles consistent with an egalitarian model of shared responsibilities between males and females.

Negligible (but not significant) effect sizes were found for the Parental Support subscale (d = 0.01, 95% CI -0.89, 0.91) and the Communication subscale (d = 0.02, 95% CI -0.88, 0.92). Higher scores on the Parenting Support subscale indicate that parents' positively view the amount of practical and emotional support they receive from others. It appears from this study that music therapy is unlikely to impact these aspects of the parenting role. Higher scores on the Communication subscale indicate that the parent perceives that they can communicate effectively with their child. Both groups recorded only very small increases for this subscale. However, the PCRI was not written with children with communication impairments in mind. For example, the items within this subscale include: "my child generally tells me when something is bothering him or her"; "If I have to say no to my child, I try to explain why"; and "When my child has a problem, he or she usually comes to me to talk things over" (Gerard, 2005, p. 37). The items in this subscale are not within the developmental skill level of the children in this study. It is perhaps a good indication that parents had a realistic and unbiased view of their child's skill development in this area.

Finally, there was a small (but not significant) effect size in favour of the control group for the Satisfaction with Parenting subscale (d = 0.23, 95% CI -0.67, 1.14).

Higher scores on the Satisfaction with Parenting subscale indicate parents' enjoyment and fulfilment in their parenting role.

Summary for Hypothesis 2.

Hypothesis 2 states that there will be greater positive changes in parents' ratings of the quality of their relationship with their child in response to family-centred music therapy. The results for Hypothesis 2 indicate that further investigation into the effectiveness of music therapy is warranted. While there was a large effect size in favour of music therapy for the total raw change score, this missed statistically significance. Further, the wide confidence intervals for the mean difference and effect size, which included zero, reflect the small sample size and therefore offer only limited support for the music therapy intervention in this study.

Results for the Experimental Group Quantitative Data

Hypothesis 3: Any changes in the child's early social communication skills will be maintained for at least 8 weeks after the family-centred music therapy intervention ceases.

At the completion of the treatment phase, participants in the treatment group were asked to delay any further involvement in music therapy treatment for 8 weeks. At the end of 8 weeks, participants were contacted to confirm that they had not continued music therapy treatment with another clinician and invite them to complete the follow-up measures. 9/11 participants completed the follow-up measures, which included the SRS-PS and the MBCDI-W&G. These measures were selected for follow-up as they were appropriate for re-testing in the 8 week follow-up period, and did not require further face-to-face contact (no interview or instruction was required, thereby reducing burden on the participants).

As illustrated in Figure 4.1, the control group was wait listed and began their treatment phase at the start of the follow-up period of the treatment group, resulting in no comparison for the follow-up data being possible between the two groups. In hindsight, it would have been useful to delay the control group's treatment phase until after the follow-up period so that a comparison could be made. The results for this hypothesis therefore need to be viewed conservatively, acknowledging the limitations of

any inferences due to the lack of a control and the shorter time period of the follow-up phase (8 weeks compared to 16 weeks).

In order to see if scores were maintained after the follow-up period of 8 weeks, means of the total raw scores were compared. The data is dependent, as the same data for each participant was collected at three different time points. Two participants (A08 and A21) did not return their follow-up data, making n=9 for the follow up data.

The Linear Mixed Model was used to compare the change in mean for the period pre to post and post to follow-up, as it is suitable for use with longitudinal data where the data are dependent. Genstat software was used for the analysis as this software can deal with missing data (due to the two families who did not complete the follow-up measures).

Hypothesis 3 results: a) Relationship – Social responsiveness.

The means for the Total Raw Scores at each time-point (pre, post and follow-up) are presented in Table 4.8. Figure 4.15 illustrates the change in the mean across the three time points. Initially there is a drop in the mean from pre to post, indicating a reduction in the severity of symptoms. From post to follow-up the mean remained at this lower level.

Table 4.8

SRS-PS: Total Raw Score Means for each Time Point (Treatment Group).

Time point	Mean	SD
Pre treatment	108.36	26.38
Post treatment	100.64	31.88
Follow up*	100.60	33.40

* Follow-up n=9 due to 2 participants who did not complete follow-up data. n=11 for mean and SD of pre and post scores.

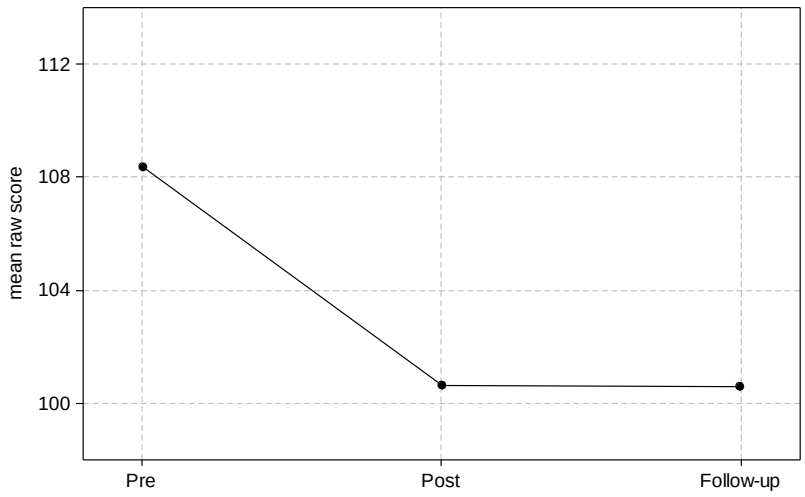

Figure 4.15. SRS-PS: total raw score means for each time point (treatment group).

The null hypothesis for the change in mean for the period's pre to post and post to follow-up was:

There will be no difference in the location of the change in mean from pre to post and post to follow-up for the SRS-PS total raw score.

The results of the mixed linear model analysis are presented in Table 4.9. Without a control it is not possible to separate the effect of the treatment from the effect of time (or any developmental factors); however the total mean follow-up score for the SRS-PS was sustained at a lower level from post to follow-up, indicating maintenance in the reduction of symptoms ($F_{(2,18)} = 1.67$; $p = 0.215$).

Table 4.9

SRS-PS Mixed Linear Model Analysis

	Post-Pre Mean Difference		Follow-up to Post Mean Difference			
SRS-PS	Estimate	95% CI	Estimate	95% CI	$F_{(2, 18)}$	*p*
Total Raw Score	-7.73	-17.85, 2.40	-0.18	-11.1, 10.73	1.67	0.215

Note: Follow-up to post n=9 due to 2 participants who did not complete follow-up data. n=11 for pre to post scores.

Analysis of the SRS-PS subscales follow-up data.

Similarly, the mean raw scores of the subscales were analysed to see if there were any differences in the pattern of the data compared to the total raw score means (see table 4.10). The subscale raw score means are illustrated in Figure 4.16. The y-axis needed to be individualised for each variable, due to the spread of the raw scores.

In order to allow each different graph panel to be meaningfully compared, the y-axis contains only 4 values incrementally increasing by 4 points resulting in the gradient being the same for each panel.

Table 4.10

SRS-PS: Subscale Mean Raw Scores for each Time Point (Treatment Group Only).

Time point	Mean	SD
SRS-PS: Social Awareness		
Pre treatment	13.09	3.39
Post treatment	13.45	4.06
Follow up*	14.44	3.84
SRS-PS: Social Cognition		
Pre treatment	22.82	5.25
Post treatment	20.55	4.68
Follow up*	20.67	5.12
SRS-PS: Social Communication		
Pre treatment	38.27	10.39
Post treatment	34.64	10.89
Follow up*	33.89	13.69
SRS-PS: Social Motivation		
Pre treatment	16.36	5.66
Post treatment	15.36	6.42
Follow up*	15.56	6.02
SRS-PS: Autistic Mannerisms		
Pre treatment	17.82	5.96
Post treatment	16.64	7.49
Follow up*	16.00	6.91

* 2 participants did not complete follow-up data, therefore n=9. n=11 for pre and post data.

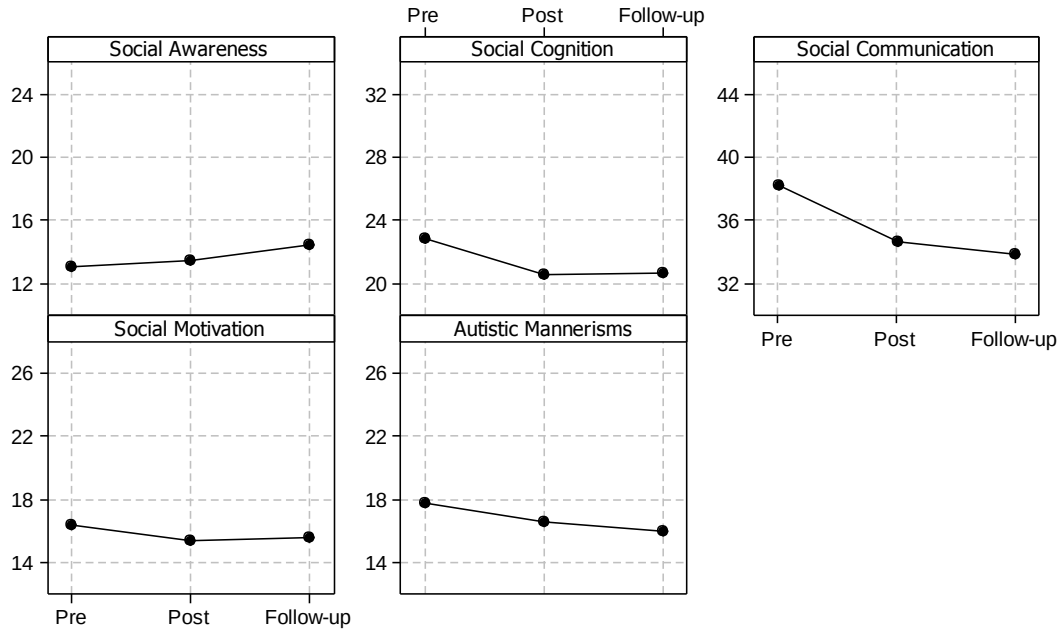

Figure 4.16. SRS-PS: subscale mean raw scores for each time point (treatment group).

The pattern of the Total Raw Score remaining at a lower level at follow-up was also evident for 4 of the 5 subscales: Social Cognition; Social Communication; Social Motivation; and Autistic Mannerisms. However, the Social Awareness subscale continued the rising pattern seen in Hypothesis 1 from pre to post with a rise in mean raw score from post to follow-up.

The null hypothesis for the change in mean for the periods pre-post and post-follow-up for each subscale followed this format:

There will be no difference in the location of the change in mean from pre to post and post to follow-up for the SRS-PS social awareness subscale score.

The results of the Linear Mixed Model analysis are presented in Table 4.11. As stated earlier, without a control it is not possible to separate the effect of the treatment from the effect of time (or developmental factors); however the mean follow-up scores for all of the SRS-PS subscales, with the exception of the Social Awareness subscale, remained at a lower level from post to follow-up, indicating maintenance of the reduction of symptoms.

Table 4.11

SRS-PS Mixed Linear Model Analysis

	Post-Pre Mean Difference		Follow-up* to Post Mean Difference			
SRS-PS	Estimate	95% CI	Estimate	95% CI	$F_{(2, 18)}$	*p*
Social Awareness	0.36	-1.35, 2.08	0.89	-0.96, 2.74	1.05	0.371
Social Cognition	-2.27	-5.27, 0.73	-0.30	-3.52, 2.92	1.83	0.189
Social Communication	-3.64	-7.96, 0.68	-0.49	-5.14, 4.17	2.25	0.134
Social Motivation	-1.00	-4.00, 2.00	-0.15	-3.37, 3.08	0.36	0.704
Autistic Mannerisms	-1.18	-3.62, 1.26	0.03	-2.60, 2.65	0.65	0.535

Note: Follow-up n=9 due to 2 participants who did not complete follow-up data. n=11 for pre and post scores.

Hypothesis 3 results: b) Speech & language.

The means for the Total Raw Scores at each time-point (pre, post and follow-up) for the MBCDI-W&G are presented in Table 4.12. Figure 4.17 illustrates the change in the mean across the three time points. Initially there is a rise in the mean from pre to

post, indicating an increase in communication skills. From post to follow-up, the mean continued to increase.

Table 4.12

MBCDI-W&G: Total Raw Score Means for each Time Point (Treatment Group)

Time point	Mean	SD
Pre treatment	188.80	109.50
Post treatment	267.70	155.30
Follow up	351.40	153.60

Note: Follow-up n=9 due to 2 participants who did not complete follow-up data. n=11 for pre and post scores.

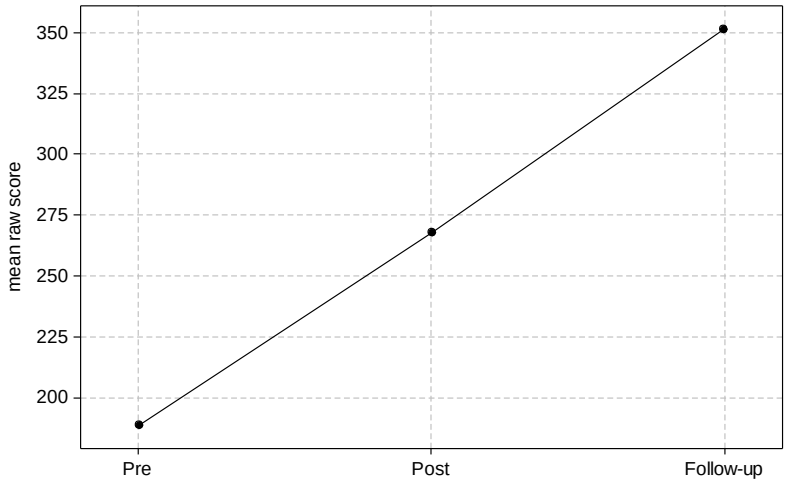

Figure 4.17. MBCDI-W&G: total raw score means for each time point (treatment group).

The null hypothesis for the change in mean for the period's pre to post and post to follow-up was:

There will be no difference in the location of the change in mean from pre to post and post to follow-up for the MBCDI-W&G total raw score.

The results of the mixed linear model analysis are presented in Table 4.13. Without a control it is not possible to separate the effect of the treatment from the effect of time (or developmental factors); however the total mean follow-up score for the MBCDI-W&G continued to increase. This continued increase may be due to a developmental component or a continuing effect of music therapy ($F_{(2,18)} = 11.28$; $p < 0.001$).

Table 4.13

MBCDI-W&G Mixed Linear Model Analysis

	Post-Pre Mean Difference		Follow-up* to Post Mean Difference			
SRS-PS	Estimate	95% CI	Estimate	95% CI	$F_{(2, 18)}$	*p*
Total Raw Score	78.91	19.66, 138.16	63.79	-0.08, 127.66	11.28	<0.001

Note: Follow-up n=9 due to 2 participants who did not complete follow-up data. n=11 for pre and post scores.

Analysis of the MBCDI-W&G subscales follow-up data.

Similarly, the mean raw scores of the subscales were analysed to see if there were any differences in the pattern of the data compared to the total raw score means (see Table 4.14). The subscale raw score means are illustrated in Figure 4.18. The y-axis needed to be individualised for each variable, due to the spread of the raw scores. The scales are different for each subscale and so it should be noted that the gradient of each graph is not the same. For each subscale, the mean raw scores continued to increase at follow-up.

Table 4.14

MBCDI-W&G: Subscale Raw Score Means for each Time Point (Treatment Group)

Time point	Mean	SD
Part 1B: Phrases Understood		
Pre treatment	14.27	7.07
Post treatment	16.64	7.50
Follow up	20.44	4.93
Part 1D: Words Understood		
Pre treatment	121.8	81.6
Post treatment	164.3	93.4
Follow up	209.0	70.4
Part 1D: Words Produced		
Pre treatment	22.91	32.60
Post treatment	51.90	62.90
Follow up	83.10	91.00
Part 2: Actions & Gestures		
Pre treatment	29.82	9.50
Post treatment	34.91	10.83
Follow up	38.89	6.99

Note: Follow-up n=9 due to 2 participants who did not complete follow-up data. n=11 for pre and post scores.

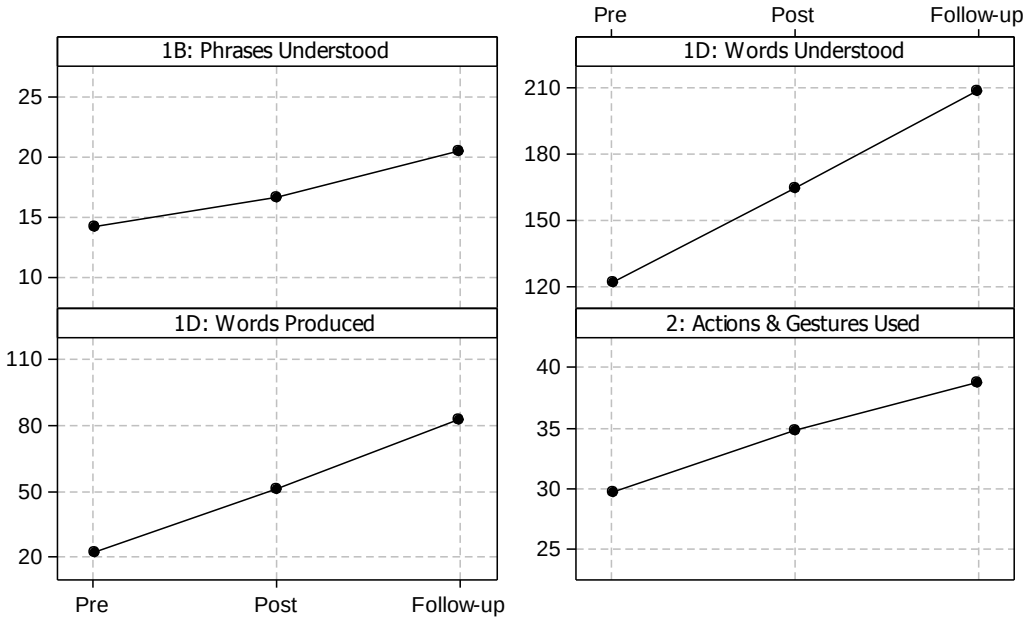

Figure 4.18. MBCDI-W&G: subscale mean raw scores for each time point (treatment group).

Each subscale had a different number of items for parents to rate, with 1 point for each item checked given. 1B: 28 items, ID: 396 items, 2: 63 items.

The null hypothesis for the change in mean for the period's pre to post and post to follow-up for each subscale followed this format:

There will be no difference in the location of the change in mean from pre to post and post to follow-up for the MBCDI-W&G Part 1B subscale score.

The results of the Linear Mixed Model analysis are presented in Table 4.15. As stated earlier, without a control it is not possible to separate the effect of the treatment from the effect of time (or developmental factors); however the mean follow-up scores for all of the MBCDI-W&G subscales continued to increase from post to follow-up, indicating a further increase in communication skills.

Table 4.15

MBCDI-W&G Mixed Linear Model Analysis

	Post-Pre Mean Difference		Post to Follow-up Mean Difference			
MBCDI-W&G	Estimate	95% CI	Estimate	95% CI	F(2, 18)	*p*
Part 1B: Phrases Understood	2.36	-1.10, 5.83	3.68	-0.05, 7.41	5.81	0.011
Part 1D: Words Understood	42.45	6.44, 78.46	34.89	-3.87, 73.65	8.96	0.002
Part 1D: Words Produced	29.00	-0.96, 58.96	24.36	-7.87, 56.59	6.16	0.009
Part 2: Actions & Gestures	5.09	2.03, 8.16	1.04	-2.27, 4.34	9.39	0.002

Note: Follow-up n=9 due to 2 participants who did not complete follow-up data. n=11 for pre and post scores.

Summary for hypothesis 3.

Based on these results, there is some support for skills being maintained 8 weeks after treatment ceased. Apart from the Social Awareness subscale (SRS-PS), which continued to deteriorate, all other skills remained equal to or better than at pre testing. Without a control, it is not possible to determine whether the improvement in skills at follow-up is due to a developmental component or a continuing effect of music therapy.

Hypothesis 4: Within the music therapy sessions, there will be positive, observable changes in symptomatic behaviours of ASD in the child in response to 16 weeks of music therapy plus standard care.

The MTDA is a non-standardised measure of the child's observable social communication skills and/or motivation to engage in music therapy sessions. As discussed in the Research Design Chapter, each video was viewed twice – once with the parent at the end of the session to gain their perspectives on their child's participation, and a subsequent viewing by myself later the same day to score the measure. The scoring guidelines were as follows: 0 = none of this behaviour was noticed, 1 = some of this behaviour was noticed, 2 = a lot of this behaviour was noticed. Scores increase with severity of impairment, with the maximum score possible being 22. Therefore, a reduction in score from pre to post is the desirable outcome. Improvement was observed in all children in the treatment group to varying degrees, ranging from -1 to -12 (see raw data in Appendix R).

Analysis of the change score was carried out using a one-sample *t*-test of change from zero using Minitab16 software (see table 4.16). The mean difference between pre and post scores was -5.00 (s.d. = 3.35), which was statistically significant ($p = 0.001$).

Table 4.16

Pre and Post MTDA Video Assessments

	Mean (s.d.)				
MTDA	Pre	Post	Change	95% CI	p^1
Total Scores	16.09 (3.51)	11.09 (3.83)	-5.00 (3.35)	-7.25, -2.75	0.001

Note: maximum score possible = 22. Higher scores indicate more severe impairment, so a reduction in score is a positive outcome.
[1]one sample *t*-test based on change score

Inter-rater reliability for the MTDA.

At the end of the data collection period, inter-rater reliability training with a research assistant (RA) who was an independent, experienced music therapist began. The first stage involved training the RA over a period of approximately 5 hours. Training was conducted using the MTDA videos from the control group's treatment phase, with three videos selected and rated by a process of consensus. During this process, the RA and I discussed any differences in our interpretations of the scoring protocol. These discussions revealed that it was difficult for the RA to rate items that required an interpretation of the meaning of the child's behaviours; especially items 1, 5, 8, 9, and 11 (see Table 4.17). For example, item 9 requires the raters to consider whether the exchanges between the child and therapist/adult develop into a dialogue. I was confident in my ability to assess this item, as my participation in the activity provided additional cues as to whether dialogue had occurred. The RA, who was an observer only, found it difficult to judge whether dialogue or simply copying had occurred (RA, personal communication, May 11, 2011). It became clear that the MTDA was heavily reliant on interpreting the meaning of the child's behaviour, and this seems to be considerably effected by whether you are a participant or observer. This is not surprising, given that non-standardised, profession-specific tools such as the MTDA are highly vulnerable to the theoretical orientation and approach of the rater (Pethybridge, 2012).

With these difficulties noted, training moved into stage 2. In a 2 hour meeting, the RA and I reached a consensus on how each item would be scored, with additional instructions noted on the scoring sheet (see Table 4.17). After this meeting, I prepared a selection of 5 videos from the control group treatment phase data for the RA. Videos were selected randomly by drawing the ID codes out of a bowl, and then prepared for the RA by deleting sections of video at the beginning and end of the recording if there were clues to whether it was a pre or post session. This time, the RA and myself independently scored the videos using the updated scoring protocol. The independent total scores from stage 2 are presented in Table 4.18. The discrepancy between the raters' total scores in stage 2 ranged from $\pm$ 2 to $\pm$ 5.

Table 4.17

Revised MTDA Scoring Instructions

Original category	**Scoring explanation**
1. Child's playing seems to be independent of therapist's playing. Therapist has to work hard to "remain" with child, and the child often seems to be doing his/her own thing.	"Playing" can refer to musical improvisation, musical activities or non musical interactions. 0 = the child joins the therapist/allows the therapist to join them in almost all activities. 1 = the child joins the therapist/allows the therapist to join them in some activities. 2 = the behaviour dominates. There is only one instance of the child joining the therapist/allowing the therapist to join them.
2. Child is not facially or physically engaged in playing process or unusual eye-contact (too little or too much).	0 = the child is facially or physically engaged in the session, and their eye contact is appropriate for their age and the activity they are participating in. 1 = the child is facially or physically engaged in some activities. 2 = the behaviour dominates. There is only one instance of the child being facially or physically engaged in an appropriate manner.
3. Child does not make <u>any</u> spontaneous suggestions (musical or verbal) with communicative intent; or story is excessively simple, showing inability to be creative or imaginative (this should not be caused by a general learning disability, but appear untypical of child's overall ability).	Spontaneous suggestions can be musical (e.g. changes in tempo/dynamics), verbal (telling someone what to do), or non-verbal (such as picture exchange, getting an object, pointing). The child may also make up a game or story (for this age group, any offering for a game or story is counted). 0 = the child makes 3 or more spontaneous suggestions. 1 = there are 1-2 instances where the child makes a spontaneous suggestion. 2 = the child does not make any spontaneous suggestions with communicative intent.
4. Child is unusually interested in structure of instruments; lines instruments or beaters up; "twiddles" with beaters of shakers; uses beaters in unexpected ways e.g. puts them in holes, sticks them on head...	0 = none of this behaviour was noticed 1 = there are 1 or 2 instances of this behaviour 2 = there are 3 or more instances of this behaviour
5. Child becomes self-absorbed and difficult to distract from certain instruments such as wind chimes or the ocean drum (not boredom or distractibility but a more isolated, engrossed type of playing, with possible repetitive playing).	Take into account what is age appropriate behaviour. The child may just be expressing that he doesn't want to finish yet. Gentle persuasion from the adults to assist the child to finish is permissible, for example, helping the child to put the instrument/object in a bag/finished box. 0 = none of this behaviour was noticed 1 = there are 1 or 2 instances where the adult needs to intervene to help the child to finish. 2 = there are 3 or more instances where the adult needs to intervene to help the child to finish. Or, the child is so engrossed in an activity that they cannot be distracted from it. They may be resistive to finishing.
6. Child's tone of voice/intonation has an unusual or repetitive quality.	0 = the child's voice sounds like what you would expect from a child of their age and cultural background. 2 = the child makes no sounds (because this is unusual for their age group), or the child's makes unusual sounds for their age and cultural background, or the child's intonation has an unusual quality for their age and cultural background.
7. Child is unable or unwilling to make up a story where we both contribute to the storyline. Child may be unwilling to make up a new story rather than telling a well-known story, or child may refuse to allow the therapist to contribute in any way.	This item is unable to be scored as the activity was not included in the assessment protocol due to the age and ability level of the children in this study.
8. Child develops obsessive/repetitive types of playing or obsessive repetitive patterns in a story.	Take into account what is age appropriate playing for the child. 0 = the child's playing is mostly responsive to other people. For example, the child can follow changes in tempo and dynamics initiated or suggested by other people. 1 = the child is sometimes responsive to the changes or suggestions made by other people. 2 = the child's playing is not responsive to the changes or suggestions made by other people.

9. Child is unable to have more than one immediate copying response. The exchanges do not develop into a dialogue.	Take into account the child's age – children in this age range tend to have quick turns of games and activities. 0 = there is a sense of dialogue in the child's playing (musical or non musical) with another person. 1 = the child is able to have at least 2 copying responses in the appropriate activities. 2 = the child is unable to have more than one immediate copying response in the appropriate activities.
10. Child is unable to have <u>any</u> playful or humorous exchange with the therapist.	The playful or humorous exchange can be with any of the adults present in the sessions. Playful or humorous exchanges are characterised by the following behaviours: smiling, laughing, requesting more of the activity, or initiating a playful interaction/game. 0 = the child responds to something that is funny by smiling or laughing. There must be a sense that the child understands that the activity is fun or humorous. Or, there are at least 3 times where the child smiles, laughs or requests more during a pleasurable activity. Or, the child initiates a playful interaction/game. 1 = there are 1 or 2 instances where the child smiles, laughs or requests more during a pleasurable activity. 2 = the child does not smile, laugh or try to participate in a game or interaction.
11. Child wants entire session to be on his/her terms and cannot accept <u>any</u> ideas or suggestions from the therapist (not in a calculated or manipulative way but rather in an "own world" way).	Take into account the child's age – are they being "bossy" in an age appropriate way or are they being resistive in a more "own world" way. 0 = the child is able to accept at least 3 ideas/suggestions from others in an age appropriate way. 1 = there are 1 or 2 instances where the child is able to accept the ideas/suggestions of others in an age appropriate way. 2 = the child cannot accept any ideas or suggestions from others.

Table 4.18

Training Stage 2: Raters' Independent Total Scores

Child ID (control group)	Researcher Ratings	RA Ratings
A17 pre	11	15
A03 pre	14	11
A11 post	12	10
A15 pre	7	2
A02 post	6	11

At this stage of the process, the total scores did not provide enough data for a meaningful intraclass correlation. With so few data points, the intraclass correlation coefficient (ICC) may have been favourable, but was expected to have a very large confidence interval which would diminish its value. In order to better understand the reliability between the raters, the exact score for each item for each child was examined. Out of 55 items (5 videos multiplied by 11 items per participant) 33 were matched between raters; or 60%.

With limited time and financial resources available for establishing inter-rater reliability, the percentage agreement on the individual items was considered to be the best data to report. Given there were only 3 possible responses from the raters (0, 1, or

2), you could expect a 30% agreement by chance. Therefore, the 60% agreement gives some indication of reliability being beyond that expected by chance.

Summary of Hypothesis 4.

The MTDA was conducted pre and post to measure the change in the child's social communication skills and level of engagement observed within the treatment sessions. Improvement in social communication skills and motivation to engage in the sessions was observed in all children in the treatment group to varying degrees. These descriptive-quantitative results are congruent with the improvements in the quantitative standardised measures, however inter-rater reliability for the MTDA was limited by the amount of numeric data and the subjective nature of the assessment.

Hypothesis 5: Parents will be able to implement music therapy methods with their child (without the music therapist) during the course of their usual week.

Each week, parents filled in a record sheet (see Appendix J) estimating how much time they spent in minutes participating in each of four specified categories/variables: singing; singing with instruments; improvisation; and listening to music with their child. The record sheet was collected at the end of each weekly session. If the parent had forgotten to fill it in they were encouraged to do so retrospectively so long as they felt they could estimate the time spent in the activities. A note was made at the bottom of the sheet if it was filled in retrospectively, with 15% of the weekly record sheets falling into this category. Data was missing for 7% of the weekly record sheets, as there were times when parent did not feel they could retrospectively fill in the sheet (see Appendix S for full data).

Rather than report a total time, the average weekly times were considered a more meaningful way of interpreting the data given that most families reported doing music activities each week. Average times in minutes per week were calculated by adding together the time for each participant in each category and dividing by the total number of completed weekly record sheets. The total average time per week was calculated by adding together each of the categories' averages.

Figure 4.19 shows the distribution of the participants' total weekly average time spent participating in music activities with their child. There is large variability in the data, ranging from 44.3 minutes to 639.5 minutes (or 10.65 hours) per week (M = 246.5

minutes). With such variability, and a distribution that appears to be skewed, the median may be more representative of the average. The median total average time spent per week was 169.3 minutes (or 2.8 hours). A summary of the data is presented in Table 4.19.

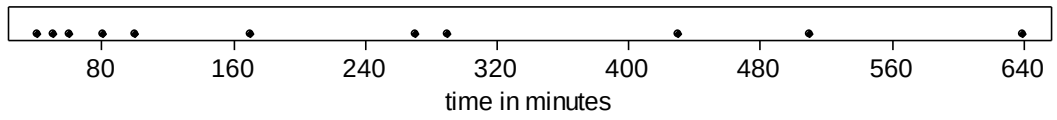

Figure 4.19. Treatment group: Weekly average time in minutes for each family.

Table 4.19

Treatment Group: Weekly Averages in Minutes Recorded by Parents in the Weekly Record Sheets

	Mean	SD	Median	Minimum	Maximum	% of total time[1]
Singing	88.6	85.4	47.3	11.1	236.0	37
Singing and playing instruments	36.3	38.1	18.3	0.0	119.0	15
Improvisation with the instruments	25.5	27.5	14.1	0.0	94.0	11
Listening to music	89.0	86.4	39.3	0.0	195.5	37
Total time spent in activities	246.5	219.6	169.3	44.3	639.5	

Note: n =11

[1]Percentage based on the mean.

The breakdown of the four variables as a percentage of the mean total weekly average is presented in Figure 4.20. In this presentation of the data, the mean needed to be used so that the variables could be expressed as a percentage of the total. Of the mean total weekly average, parents spent 37% of their time (89 minutes) singing with their child, 37% of their time (89 minutes) listening to music with their child, 15% of their time (36 minutes) singing and playing instruments with their child, and 11% of their time (25 minutes) improvising with instruments with their child.

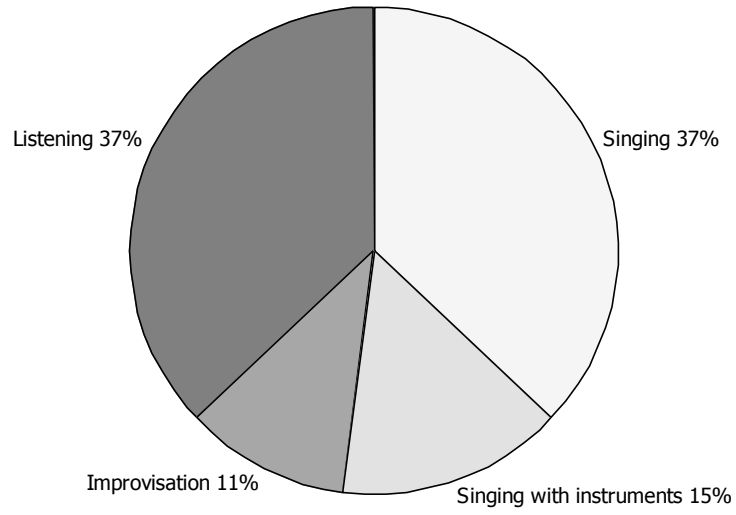

Figure 4.20. Treatment group: Weekly average time of each activity as a proportion of mean total time.

Follow-up data for Hypothesis 5.

At the end of the follow-up phase, participants were sent a summary record sheet to estimate how much time they had spent participating in each of the four categories/variables since the completion of the treatment phase (see Appendix T). Two participants did not return their follow-up measures, therefore n = 9 for follow-up data. As seen in Figure 4.21, parents reported lower weekly average activity levels for all variables at follow-up. Singing remained the most stable, with parents reporting a mean drop of only 4.4 minutes per week following the treatment phase. The biggest drop was for improvisation, falling from 25.5 minutes per week on average to 2.8 minutes per week (see Table 4.20).

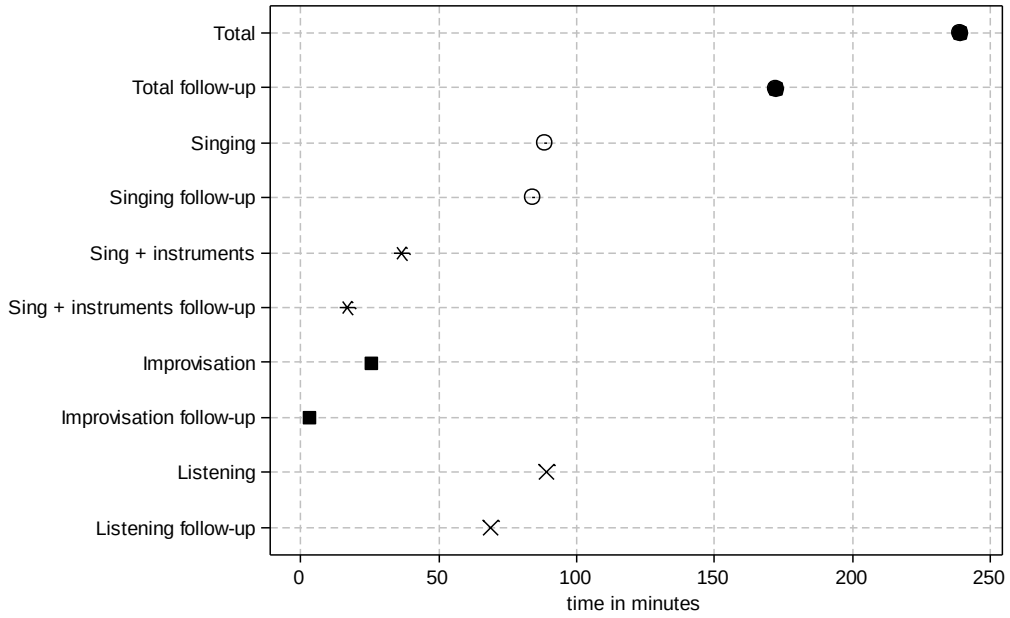

Figure 4.21. Treatment group: weekly average time of each activity compared to follow-up.

Table 4.20

Treatment Group: Follow-Up Period Summary Data for Weekly Record Sheets

	Mean	SD	Median	Minimum	Maximum
Total	172.5	148.3	95.0	30.0	410.0
Singing	84.2	60.8	70.0	30.0	210.0
Singing and playing instruments	16.7	25.1	5.0	0.0	60.0
Improvisation with the instruments	2.8	5.1	0.0	0.0	15.0
Listening to music	68.9	69.5	30.0	0.0	170.0

Note: n = 9 for follow-up data. Data is average minutes spent per week.

Summary for Hypothesis 5.

As described in the Research Design Chapter, the weekly record sheet was not presented to parents as a prescriptive list of activities. Parents did not have to adhere to a set of "homework" tasks, and simply had to interpret what they had done with music during the week with their child by recording their activity against one of the four categories on the record sheet. This hypothesis aimed to investigate whether parents would or could use music therapy methods with their child as part of their usual routine through the collection of preliminary data.

Parents reported using a variety of the music activities on their own with their child. Singing was the most popular of the active methods, and was best maintained at

follow-up. Without a baseline, it is not possible to know whether singing was typically a highly used method by parents. On the basis of this data there is some evidence to support hypothesis 5, however the lack of baseline and control data makes any inferences about the data tentative and requiring further research.

Conclusion for Quantitative Results

The quantitative analysis of the data related to Hypotheses 1 – 5 have been presented and, importantly, no harm to the participants was recorded. Two of the 23 families (one from each experimental group) withdrew from the study and did not complete the post measures. Their data was omitted from the change score comparative data. Two out of 11 families from the treatment group did not return their follow-up measures.

For the parent rated measures, there was a statistically significant result and large effect size for the Vineland SEEC. No further statistically significant results were found, however there was a large effect size for the PCRI (total score and involvement subscale). Medium (but not significant) effects sizes were recorded for the SRS-PS (total score and social communication subscale), the MBCDI-W&G (phrases understood subscale), and the PCRI (limit setting, autonomy and role orientation subscales). However, all the non-significant effect sizes had wide confidence intervals which included zero. The follow-up measures (SRS-PS and MBCDI-W&G) showed that skills did not return to baseline 8 weeks after family-centred music therapy sessions ceased, however both these measures had non-significant results for pre to post.

For the therapist rated MTDA, a strong group improvement was observed in the children's in-session behaviours and skills. However, this data related to the experimental group only and inter-rater reliability was limited to a percentage calculation of individual item responses.

For the weekly record sheets, parents reported using a variety of music activities independently during the week with their child. Singing was the most popular method and best maintained at follow up. However, data from the experimental group only was collected without a baseline.

Chapter 5 will present the results from a qualitative analysis of the structured interview data related to Hypothesis 6. All 11 parents from the experimental group participated in a structured interview on the day that the family-centred music therapy sessions ceased.

Chapter 5
Qualitative Results

Introduction

This chapter presents a qualitative analysis of the structured interview data gathered from the parents of the children allocated to the Treatment Group in order to address Hypothesis 6:

Parents will be able to identify positive changes in the nature of their parent-child relationship following 16 weeks of family-centred music therapy plus standard care.

In trying to understand changes in the *nature* of the parent-child relationship, the people who are *in* the relationship are the ones who can best illuminate any changes. A realist stance was adopted throughout this study, emphasising the importance of the context in which any data is collected (Robson, 2002). A structured interview not only enables specific data to be collected to address a research question or hypothesis, but also provides a forum for the nuance of the parents' personalities and perspectives to be heard. In this way, I believed that a structured interview would be both epistemologically congruent with the RCT design, and compatible with the collaborative family-centred practice philosophy that underpins this study. Further, I considered that the use of mixed data could ease some of the tension that is inherent in a study that engaged both ecological practices and evidence based approaches.

Hypothesis 2 was also concerned with the parent-child relationship. Chapter 4 presented a quantitative analysis of the numeric data from the PCRI to address Hypothesis 2:

That there will be positive changes in parents' ratings of the quality of their relationship with their child following family-centred music therapy.

The complexity of assessing the quality of parent-child relationships is frankly acknowledged by the author of the PCRI. This numeric assessment measure was designed to offer a particular perspective on the parent-child relationship relative to a normative sample, not a definitive assessment (Gerard, 2005).

Hypothesis 6 was seen as being related to Hypothesis 2, but with the emphasis on the parent's ability to identify positive changes in the *nature* of the parent-child relationship. After having completed the interviews with the parents, I realised that this descriptive data could potentially also be used to validate the numeric data from Hypothesis 2. As discussed in Chapter 1, an ecological approach to therapy is one

where traditional power balances of therapist-as-expert are rejected (Dunst et al., 1988), and the central role that parents play in their child's development is highlighted (Mahoney & Wiggers, 2007; Moore, 2009). The structured interview gave voice to the parents in this study and allowed them to choose the words they wanted to use to describe changes in the parent-child relationship rather than be restricted to the language pre-entered into the standardised assessment measure. This descriptive data offered the possibility for a richer response to investigating the quality of the parent-child relationship.

To briefly recap, parents in the Treatment Group were asked to participate in an interview at the end of the 16 week treatment period. Parents were given the interview questions the week before it was scheduled to take place, giving them time to think about their answers. This preparation time was desirable as the interview took place in their home at the end of the final session, and it was likely that there would be interruptions from time to time by the child. The interview was conducted by me directly after the closure session. I believe that I had a warm relationship with the parents I interviewed, and took particular care to let them know that their opinions were very important to me and would be of interest to other parents and professionals. While some parents reported that the interview felt a little strange to start with, the atmosphere across the board seemed relaxed and easy; parents engaged in the process and seemed to share their opinions openly. Conducting the interview myself was considered a natural extension of the collaborative nature of the music therapy sessions.

For ease of reading, the interview questions are re-presented in Table 5.1. All parents were keen to talk about their child and how much they had enjoyed the music therapy sessions. The first question was designed to be a warm up, and it allowed parents to start the interview in the manner they wanted to. As the parents had the interview questions the week before, they appeared relaxed about moving down the list and many addressed each question in turn. The interview questions focus on change in the child and parent, and addressed three topics: the responses of the child in music therapy; the parent-child relationship; and the role of the music therapist in the sessions. Despite the interview being formally structured, there was still flexibility for parents to talk about and give emphasis to the aspects they wished to. Some parents spoke freely after being asked the first question, and covered topics from a number of subsequent questions. At some point, I would draw the conversation back to the structured question and acknowledge that they had already addressed the theme of the question earlier,

Table 5.1 (re-presented from Chapter 3)

Structured Interview Questions

Focus	Question
Warm up	1. What did you think of the music therapy sessions?
Change in Child's responses	2. How did you think xxx responded in the music therapy sessions? 3. How did you think xxx joined in socially in the music therapy sessions? 4. When you think over the 4 months of therapy, is there anything about xxx's participation that particularly stands out?
Change in Parent-child relationship	5. What was it like for you taking part in music therapy with xxx? 6. How would you describe your relationship with xxx during music therapy and now afterwards?
Role of the therapist	7. Is there anything about the way I worked with xxx that particularly stands out for you? 8. Did seeing me working with xxx influence the way you are with yyy?
Open questions	9. Sometimes people say that music therapy changes the way they see their child, did anything change for you? 10. How do you think you will use music with xxx in the future?

Note. xxx was replaced with the child's name; yyy was replaced with him/her

before checking in with them to see if there was anything more they wished to add in relation to the structured question. The interview concluded with a broad question about changes in the parent's perception of their child (question 9), followed by a more straight forward question about the use of music in the future (question 10) in order to bring a close to the potentially more emotional material of the previous questions.

Mixed Methods Design Considerations

The numeric data from the standardised assessment measures and the descriptive data from the structured interviews were collected concurrently. That is, the interview was conducted within the same week as the post standardised measures were completed and, importantly, the numeric data had not been analysed before the interview was conducted. This approach to mixed data collection has recently been described as a "Convergent Parallel Design" (Creswell & Plano Clark, 2011, p. 77). Initially the descriptive interview data was designed to address Hypothesis 6, but as mentioned earlier, after conducting the interviews with the parents I realised there was potential for this data to address not only Hypothesis 6, but also Hypothesis 2.

A further design issue to consider in mixed methods research is the order of the analysis of different types of data. In this case, I chose to analyse the numeric data first due to the fact that 5 out of 6 Hypotheses relied on this data. The study is therefore clearly skewed towards the numeric data. Having identified that the descriptive data may also be used to address Hypothesis 2, and that there was potential for both the descriptive and numeric data to provide support and clarity to one another, I describe this as a 'Concurrent Triangulation Design' (Plano Clark & Creswell, 2008). While the word 'triangulation' has been considered troublesome in descriptions of mixed methods design due to the different meanings it has in the context of qualitative analysis (Creswell & Plano Clark, 2011), it does successfully convey the notion that the two data sources will be used to potentially validate each other (Plano Clark & Creswell, 2008; Robson, 2002). Similar to the Convergent Parallel Design, Concurrent Triangulated Design also features simultaneous collection of mixed data, with the different data types typically integrated in an interpretation phase. This integration will occur in Chapter 6: "Comparison of Mixed Data".

While Hypotheses 2 and 6 both address aspects of the parent-child relationship, separate hypotheses for the numeric and descriptive data were considered necessary due to the fact that Hypothesis 2 compares the Treatment Group to the Control Group, while Hypothesis 6 focuses only on the Treatment Group. It therefore did not seem logical to integrate the numeric and descriptive data in the analysis phase, as would be typical in a concurrent nested design (Plano Clark & Creswell, 2008).

Knowing the outcome of the quantitative analysis helped me to refine the questions I asked of the descriptive data, so that the analysis could successfully address aspects of both Hypotheses 2 and 6:

1. How did parents describe the nature of any changes in their relationship with their child?
    1.1. In what ways (if any) are these descriptions of change supportive of or challenging to the quantitative changes in parents' attitudes towards parenting and their child as measured through the PCRI?

Method of Analysis

Given the research question above, and the fact that parents were explicitly asked about changes in their parent-child relationship in the structured interview questions, the experience being investigated was pre-determined as 'the parent-child

relationship'. I therefore began to look at the descriptive data in a directed way right from the start in response to undertaking this analysis within the framework of a concurrent triangulated design. While I have laid out the steps of the analysis linearly, it is important to note that apart from step 1, there was movement backwards and forwards between each of the micro processes described in each step.

Step 1: transcribing the interviews.

Having conducted the interview myself, I already had knowledge of the content and tone of each interview. I listened to the audio recording of the interview as a whole, and then listened again and transcribed everything that seemed to be at all relevant to the conceptualisation of 'the parent-child relationship'. This process was similar to what McFerran and Grocke describe as "indentifying key statements" (2007, p. 277). Parts of the interview that were identified as potentially relating to the 'the parent-child relationship' were collated, while any descriptions of other topics were set aside (McFerran & Grocke, 2007). Typically, answers to questions 6 and 9 contained the bulk of relevant data; however questions 5 and 8 also generated pertinent material. Data was not restricted to responses to these questions, as some parents made relevant comments in response to various questions and these were also collated.

Step 2: the first reading of the transcriptions.

Having listened to the interviews and completed the transcriptions, I read through them all again as a whole looking for general themes in the data. The process of identifying themes was not purely inductive, with two factors influencing this phase. Firstly, the structured interview questions provided a strong framework for the parents' responses. Secondly, the concurrent triangulation design had already focussed the analysis on data related to 'the parent-child relationship' as described in step 1.

Parents' comments about the changes in the relationship with their child initially seemed to encompass three aspects, which I describe as themes. While two of these themes were strongly connected with interview questions, the third emerged inductively from the data. My initial descriptions of these themes were as follows:

1. the quality of the relationship with their child (explicitly referred to in interview question 6)
2. the perception of their child (explicitly referred to in interview question 9)

3. the parents' responses toward their child.

I took time to step back and reflect on these themes, and was reminded of Gary Ansdell's (1995) descriptions[2] of the types of relationship experiences encountered in improvisational music therapy methods. Ansdell (1995) describes the fundamental aim of improvisational music therapy as being to "meet" (p. 73) the client in the music. Initially, especially with clients who have social communication impairments, the therapist tries to make contact with the client by musically attuning to them. When the client becomes aware that the therapist's music relates to them, "contact" (Ansdell, 1995, p. 70) between the therapist and client is made. Now there is potential for the 'I' of the therapist and the 'you' of the client to become 'we'; where, within this intimate musical relationship, each person "somehow changes the other" (Ansdell, 1995, p. 67). The three themes identified early on from the key statements seemed similar to Ansdell's representation of the relationships that may occur within music making: 'I', 'you' and 'we'.

I stepped back again, and considered the questions I wanted to ask of the descriptive data. I then further refined the themes to focus on change:

1. Changes to the parent-child relationship
2. Changes in the parent's perception of the child
3. Changes in the parent's response to the child

Step 3: data swept into themes.

The transcriptions of all 11 interviews were read multiple times in order to immerse myself in the data. Initially, I read through the data and swept it quickly and lightly (Scott, 2010) into one of the three themes. Anything that no longer seemed relevant to the conceptualisation of 'parent-child relationship' was put aside.

I then focused on each parent's data separately, and immersed myself again; reading the data multiple times, and engaging in a dialogue with the transcription (Kvale & Brinkman, 2009). I considered the data for each parent in each theme closely, and stayed with each parent's data for a dedicated block of time so that I could read the chunks of interview data from different perspectives.

This step could be thought of as a preparation for coding the data, as I carefully considered whether the data was relevant to the theme, and whether the theme was still

[2] These descriptions were informed by the philosophical writings of Buber, M. (1958). *I and Thou* (2nd ed.). London: T & T Clark Ltd.

relevant to the data and the experience being investigated. While the structured interview and the focussed approach to the analysis provided strong boundaries on the data I extracted from the interviews, this was none-the-less an important step before coding to ensure that I didn't discard relevant material, nor include irrelevant material. Kvale and Brinkman (2009) challenge the researcher to embrace a "relational concept of meaning" (Kvale & Brinkman, 2009, p. 218) where the meaning of the data exists in the interaction of the researcher with the data. My aim was to conceptualise the descriptions given by the parents, and therefore to stay as close to the data as possible. I consequently read the data taking different roles such as: an observer; a critic looking for hidden meanings; and an investigator on the look-out for unspoken assumptions (Kvale & Brinkman, 2009). By doing this, I hoped to avoid what Kvale and Brinkman (2009) call the "expertification" (Kvale & Brinkman, 2009, p. 218) of meanings within the data. In other words, I wanted as much as possible to avoid the risk of becoming the expert interpreter of the parents' descriptions, and to make sure that the way I sorted the data into themes captured the sentiments of the parents.

An example of descriptive data that remained in the theme it was originally swept into is provided in Figure 5.1. This parent described the changes in the relationship with her child as a direct answer to interview question 6. The example in Figure 5.1 illustrates that there were many times where the structured interview format provided clarity when sweeping the data into themes.

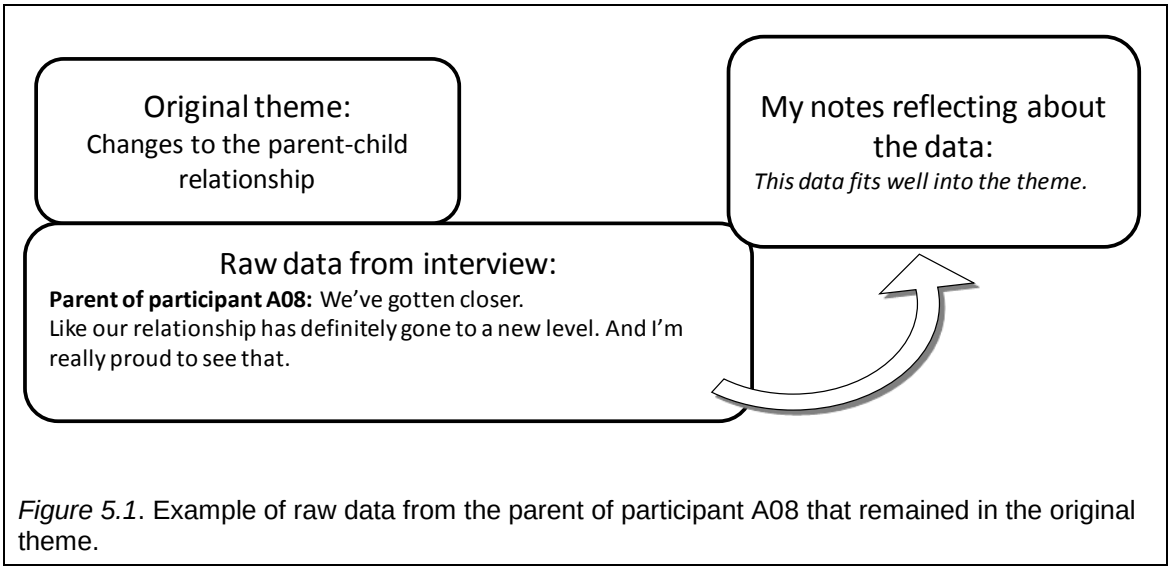

Figure 5.1. Example of raw data from the parent of participant A08 that remained in the original theme.

In contrast, Figure 5.2 is an example of descriptive data that was discarded as being irrelevant to the theme. While the parent described having fun in the music therapy sessions, and considers that her child had fun too, further contemplation of the data lead me to believe that this was more a description of the facilitation skills of the therapist rather than a change in the parent-child relationship.

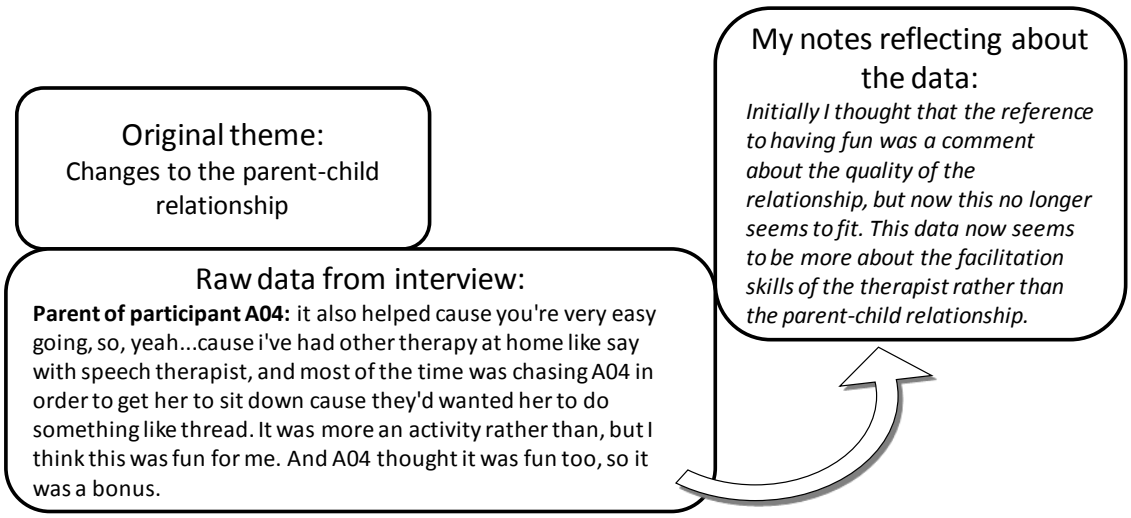

Figure 5.2. Example of raw data from the parent of participant A04 that was discarded.

Step 4: coding the data within each theme.

Once I was satisfied with the way the data was organised into themes, I began an in-depth analysis to code the data. Similar to step 3, I returned to the raw data (now organised in themes) and worked on one parent's data at a time. My aim again was to stay grounded in the data and as close to it as possible. I allowed time and space between the analysis of each interview so that I could step back; mindful that I might start to project the coding of the first interviews I looked at onto subsequent ones. Along the way I engaged in lengthy discussions with my supervisor, checking that my coding sufficiently represented the data. An example of coding the data is given below (parent of participant A16, pseudonym: Anna). This piece of data came from the theme 'changes to the parent-child relationship'.

Anna: ok, well I must say that I really enjoyed taking part with my son, you know, I love spending time, and you know, everything that he does is really special to me. Um, seeing

him happy made me happy. I was able to share wonderful moments with him, watching him learn and progress each week. Music sessions allowed us to have fun, sing and dance, and interact with each other. Every time was really special. My favourite time was when I was playing the slide whistle with him. During this time, he would constantly look into my eyes and smile. It would make me feel really special *(starts crying).*

Interviewer: ooh, that's beautiful.

Anna: it was, it was really nice, it was really special. I felt special, you know? Like, although he can't speak, just from his gestures and his body language I know that, you know, we've got a special connection.

In this example, Anna explains how participating in music activities intensified the closeness of the relationship with her son. The way her child looked at her in music both deepened and confirmed the special connection they have. This piece of data was coded as 'A special connection'.

A further example of data coding is offered, this time from the theme 'changes in the parent's perception of the child'. This data comes from the parent of participant A22, pseudonym: Hilda.

Hilda: I used to be really worried about, probably more about his future. That he won't have a good life. But then when I saw him with the music therapy and how happy it makes him, I realised that he could probably do so much that makes him happy, even if it's just listening to music all day. But it doesn't mean that he's not going to have a good life. Cause I think that was one of my main concerns about his future - is he gonna have a good life. And it's not all to do with "is he going to get a job", or *(pause)* ... I know there might be a lot of things he might not be able to do, but he will have a good life.

In this example, Hilda describes a profound shift in her perceptions of her child's capacity for happiness. She now defines a 'good life' for her child as a 'happy life'. This piece of data was coded as 'positive possibilities'. Detailed descriptions of the codes, along with the complete raw data for each participant organised into themes provided in Appendix U.

Step 5: abstracted categories.

When the coding of the data reached a level of satisfaction, I collated all of the codes from each parent into each of the 3 themes. I then immersed myself in each theme, beginning with 'changes to the parent-child relationship'. This time, rather than immersing myself in each participant's interview separately, I looked at the combined codes from all of the participants to see if a pattern emerged. This was a difficult process, summed up by Rice and Ezzy (1999): "The initial experience of emersion in the data may result in a chaotic confusion as a consequence of the complexity of the data and of exploring multiple possible interpretations." (p. 190). For me, this process involved 'playing around' with the codes, moving them into different groupings, and simultaneously engaging in in-depth discussions with my supervisor. Every time I thought I saw a pattern, I stepped back to give myself time to reflect. I returned to the codes with fresh eyes, and made adjustments or completely started again as needed.

Perceived changes to the parent-child relationship.

The codes within this theme suggested to me different depths of closeness being described between the parent and child. Some parents described that they were 'doing' more with their child. These parents overall described a change in relationship where there were more opportunities for the parent and child to interact together. By 'doing' more together, the parents felt a positive change in the quality of relationship. I labelled these codes as 'interacting' to reflect the sense of an increase in opportunities to be together. Five out of 11 parents had codes that became part of this category. Mary, mother of A14, put it this way:

Interviewer: so I'm interested to know what it was like for you to join in with the sessions as well.

Mary: This is the other interesting thing, because it made me

> very very excited, because led me to feel I'm close to him...more close to him, yes. We are doing the same things together, so we are learning together. Yeah, so that's quite a good one.

Other parents described actively trying to make a connection with their child in order to spark their engagement. Some parents described how they could successfully make their child 'happy', and that this made them feel close to their child. Others described that they were more able to focus on their child and be responsive to the child's needs. Further, some parents perceived that their child showed an awareness of their efforts to connect with them, which lead the parent to feel a new closeness with the child. One parent described feeling 'reintroduced' to her child as a result of the music therapy sessions. This parent perceived new patterns of response from the child that she attributed to her new ability (and opportunity) to tune in to her child. I labelled these codes as 'attuned' to reflect the active efforts of the parent to engage with their child. Three out of 11 parents had codes that became part of this category. Martha, mother of A04, described it like this:

> Martha: Say we're singing the song...I've got the opportunity to do the actions with her or, if she doesn't like what I'm doing, I sort of would change because I've got time to actually look at her and watch her face and sort of pick up "she doesn't like that I might try this".

Finally, other codes described a change in the parent-child relationship that I labelled 'interconnected'. For some parents, participating in music therapy confirmed in a new way that the relationship with their child is special and close, while for others the relationship went to a 'new level' with a heightened sense of closeness. Other parents described a new feeling of reciprocity in the relationship between parent and child, which they considered strengthened their bond and closeness. Anna, mother of "Ben" (A16), described it like this:

Anna: During our music sessions I noticed we bonded closer together, realised how special our relationship is, and how much I love him and enjoy him, spending time with him. I do.... I think it's the only time, because in other situations, trying to teach him something, we're not connected, it's always you know "Ben do this" it's constantly giving him instructions. But during music, we were connected together you know, so...

Interviewer: can you try and pin that down a little bit more Anna. So in other things it feels more like teaching?

Anna: yep, it's teaching.

Interviewer: so what is it about music that makes that connection?

Anna: you're free, you know, you're enjoying each other's time, watching each other, learning from each other, bonding closer, like it just brought us closer together you know?

Codes making up the 'interconnected' category described an emotional connection between parent and child where each influenced the other. The emotional reciprocity captured in these codes distinguished them from the previous category 'attuned'. While the emotional connection described above could have been labelled as 'bonding' (especially since Anna used that word herself), this term has a pre-existing connection to attachment theory. Labelling the category 'interconnected' avoided the insinuation that only the five out of 11 parents with codes in this category were bonded to their children. A summary of the process of analysis is presented in Table 5.2. The table shows how the process started with 'data'; which was then swept into the theme; which was then coded; and which then formed abstracted categories.

Table 5.2

Process of Analysis for Parents' Interview Data:Parent-Child Relationship

DATA	DATA	DATA	DATA
Data swept into the theme: Changes to parent-child relationship			
Codes			
A new level of relationship	Bonded closer	Time to connect	A special connection
Cooperation	Attunement	Focus on attunement	Reintroduced
Reciprocal emotions	Connected together as one	Getting acquainted	Shared emotions
Closeness	Bonding strengthened	Focussing on the child	Fragile engagement
Opportunities for physical closeness	Being together	More interaction	
Abstracted categories *Codes organised into these categories*			
Interconnected	Attuned	Interacting	
A new level of relationship	Attunement	Being together	
Cooperation	Reintroduced	More interaction	
Reciprocal emotions	Getting acquainted	Fragile engagement	
Closeness	Time to connect	Opportunities for physical closeness	
Bonded closer	Focus on attunement		
Connected together as one	Focussing on the child		
Shared emotions			
Bonding strengthened			
A special connection			

Note: Table layout based on an example from Anfara, Brown & Magione (2002)

Changes in the parents' perception of the child.

I then moved on to the codes for 'changes in the parents' perception of the child', following a similar process to the first theme. As I read and re-read these codes, it seemed that some parents were describing their children in ways that were not typical of children with a diagnosis of ASD. It wasn't that they were saying their child didn't have ASD anymore, but rather they were focussing on (or aware of) a different aspect of their child. The child was being perceived in ways that looked beyond the symptoms of ASD. I labelled these codes 'seeing the child rather than the autism' to capture this sense of perceiving different aspects of the child. Six out of 11 parents had codes that became part of this category. Martha, mother of "Samantha" (A04), described it like this:

> Martha: It sort of showed me a side of Samantha where she actually was interested in how I was feeling or reacting to her while she was playing an instrument. She wanted me to watch her or she tried really hard to join in.

Other parents seemed to be describing a new insight into how to best promote and support their child's development. These codes revealed that parents' perceptions of their child's motivations had been heightened. In particular, all of the parents with codes in this category gained insight into how much their child loved, and could be motivated by, music. I labelled this category 'recognising the power of music' to capture the confident assertions that parents made in their new perceptions of their child. Five out of 11 parents had codes that became part of this category. Anna, mother of A16, put it like this:

> Anna: In music sessions he was different. He enjoyed participating. I didn't have to push him into it. I thought it really helped him, everything that we did, because he wanted to be involved. In other surroundings when I teach him generally, he doesn't want to participate – it's like I have to force him to do certain things, but he actually enjoyed doing it so it made a difference you know.

Two parents had data coded 'positive possibilities'. Both these parents described profound shifts in the way they perceived their child's potential to have a happy life (as seen in the example of "Hilda" earlier). One of these parents also considered that before seeing the child in music, she had been underestimating her child abilities because she hadn't seen her child demonstrate his comprehension skills. I labelled this category as 'seeing potential for a happy future', to capture these two aspects; especially the confident way the parents had redefined their notion of a 'happy life' for their child.

A summary of the process of analysis for the theme 'parents' perceptions of the child' is presented in Table 5.3, which follows the same format as the earlier table

presenting the process of analysis. Three parents had data that fell into more than one category, and one parent had no relevant data in this theme.

Table 5.3

Process of Analysis for Parents' Interview Data: Perceptions of the Child

DATA			DATA
Data swept into the theme: Changes in the parents' perceptions of the child			
Codes			
Socially willing	Sociability revealed	Enjoys music	Personality revealed
Intrinsic motivation	Interested in my feelings	A love of music	Happiness revealed
Free from labels	Functional to personable	Music motivates	Positive possibilities
Love revealed	Efforts revealed	Confirmed love of music	Social responsiveness revealed
Abstracted categories *Codes organised into these categories*			
Seeing the child rather than the autism		Recognising the power of music	Seeing potential for a happy future
Socially willing		Confirmed love of music	Positive possibilities
Intrinsic motivation		Enjoys music	
Free from labels		A love of music	
Love revealed		Music motivates	
Sociability revealed			
Interested in my feelings			
Functional to personable			
Personality revealed			
Social responsiveness revealed			
Happiness revealed			
Efforts revealed			

Note: Table layout based on an example from Anfara, Brown & Magione (2002)

Changes in the parents' response to the child.

The data in this theme had a different feel to it. Rather than being about 'perceptions' as the other two themes had been, in this theme parents were describing changes they had actually made in response to their child following or while participating in the family-centred music therapy sessions. Overwhelmingly, almost all of the parents described various active changes they had made in the ways they interacted with and responded to their child. Some parents described a shift from trying to 'teach' to 'playing with' their child. Others started actively looking for play opportunities with their child, and/or incorporated the things that motivated their child

into their everyday interactions. I labelled this category ‘actively seeking engagement’ to capture the shift in the parents’ active responses and interactions with their child. Nine out of 11 parents had codes that became part of this category. Hilda, mother of A22, put it like this:

> Hilda: ...maybe I've learned how to, to kind of, well it's kind of a part of a communication for us now. Everything that we do now we add music to it. When I want him to go to the toilet, I just sing a little song, and I think he really enjoys it. This morning he was running around without a nappy on and I wanted him to sit on the toilet. To keep him on the toilet I just kept singing the song. And I could see he enjoyed it, because he was just kind of smiling. And I said "give mummy kiss on the nose" and he kissed me on the nose.

Other codes were not so much about an outward shift, but rather an internal shift in attitude towards their child. These codes describe positive shifts in the ways some parents thought about their child, which then ultimately influenced they way they approached interactions. Cara, mother of A08 described ‘turning away from grief’ in her responses towards her child. Rather than feeling sorry for her child’s lot in life, Cara confidently asserted that she can now make strong choices for her child so that she has future developmental benefits.

> Cara: I don’t know if it’s wrong how I’m gonna word it, but um, in a sense as a mother I felt sorry for my daughter initially, that I had to put her through this kind of things. But actually now I don’t feel sorry for her in that sense because you know what? If I hadn’t of been hard at the start, I wouldn’t be reaping the rewards that I am with her now.

Following their involvement in the music therapy sessions, some parents described being more gentle, patient or persistent in their interactions with their child.

Martha, mother of "Samantha" (A04), described the shift to being more persistent like this:

> Martha: I think most of our time is spent "oh, hurry up and learn it. Hurry up, I want you to learn it. I want to know if you're going to learn it. Will you get there?" You know, so it's always that anxiety. So we're like jumping from one thing to another rather than sitting...and watching you, the way you were with Samantha, you were very relaxed. "Ok, let's go like this, let's try it again." And slowly she'd come around, which she did with many of the songs that we sang. So that's what I have learnt..(laughing).

Other parents described prioritising pleasure, enjoyment and their child's happiness, which impacted the way they responded to their child. I labelled the codes in this category 'positive emotional response' to capture the internal shift in response, and the often emotional quality of the codes. Seven out of 11 parents had codes that became part of this category. A summary of the process of analysis is presented in Table 5.4. Four parents had data that fell into both of these categories.

Table 5.4

Process of Analysis for Parents' Interview Data: Response to the Child

DATA		DATA	
Data swept into the theme: Changes in parents' response to the child			
Codes			
Turning away from grief	Prioritise child's happiness	Recognise progress	Higher expectations
Trying novel strategies	Sharing child's enjoyment	Focus on the positive	Seizing play opportunities
Actively engage	Engaging for pleasure	More relaxed approach	Incorporate motivations
Patience with development	Supporting child's interests	Persistence	Being playful
Incorporate child's preference	Engaging rather than teaching	From orders to engagement	Playing rather than teaching
Gentler approach			
Abstracted categories *Codes organised into these categories*			
Positive emotional response		Actively seeking engagement	
Prioritise child's happiness		Trying novel strategies	
Sharing child's enjoyment		Incorporate child's preference	
Engaging for pleasure		Playing rather than teaching	
More relaxed approach		Actively engage	
Recognise progress		From orders to engagement	
Focus on the positive		Incorporate motivations	
Gentler approach		Being playful	
Higher expectations		Seizing play opportunities	
Persistence		Supporting child's interests	
Patience with development		Engaging rather than teaching	
Turning away from grief			

Note: Table layout based on an example from Anfara, Brown & Magione (2002)

A complete map of the coding according to each participant is presented in Table 5.5. This table shows the themes, codes and categories for each participant so that a sense of the combination of responses can be gleaned. In particular, the table makes it easy to see which parents had codes that fell into multiple categories.

Table 5.5

Coding Map by Participant

Participant	Changes in the parent-child relationship	Changes in parents' perceptions of the child	Changes in parents' response to child	summary of categories
A08	A new level of relationship **(IntCon)** Cooperation **(IntCon)** Reciprocal emotions **(IntCon)**	Socially willing **(Child)** Intrinsic motivation **(Child)**	Turning away from grief **(+ve)** Trying novel strategies **(Seek)** Focus on the positive **(+ve)** Recognise progress **(+ve)**	IntCon Child +ve, Seek
A18	Closeness **(IntCon)** Bonded closer **(IntCon)**		Incorporate child's preference **(Seek)**	IntCon - Seek
A16	Bonded closer **(IntCon)** Connected together as one **(IntCon)** A special connection **(IntCon)**	Free from labels **(Child)** Love revealed **(Child)** Sociability revealed **(Child)** Enjoys music **(Mus)**	Patience with development **(+ve)**	IntCon Child, Mus +ve
A01	Attunement **(Att)**	Confirmed love of music **(Mus)**	Actively engage **(Seek)** Higher expectations **(+ve)**	Att Mus +ve, Seek
B01	Bonding strengthened **(IntCon)** Getting acquainted **(Att)** Opportunities for physical closeness **(Int)** Focussing on the child **(Att)** Time to connect **(Att)**	Personality revealed **(Child)** A love of music **(Mus)**	Engaging rather than teaching **(Seek)**	IntCon, Att, Int Child, Mus Seek
A22	Shared emotions **(IntCon)** More interaction **(Int)**	Positive possibilities **(Pot)**	Trying novel strategies **(Seek)** More relaxed approach **(+ve)**	IntCon, Int Pot Seek, +ve
A04	Reintroduced **(Att)** Time to connect **(Att)** Focus on attunement **(Att)**	Interested in my feelings **(Child)** Functional to personable **(Child)**	Persistence **(+ve)** Playing rather than teaching **(Seek)**	Att Child +ve, Seek
A21	Fragile engagement **(Int)**	Social responsiveness revealed **(Child)**	Seizing play opportunities **(Seek)**	Int Child Seek
A14	Being together **(Int)**	Positive possibilities **(Pot)** Happiness revealed **(Child)** Efforts revealed **(Child)**	Gentler approach **(+ve)** Persistence **(+ve)** Prioritise child's happiness **(+ve)**	Int Pot, Child +ve
A10	More interaction **(Int)**	A love of music **(Mus)** Music motivates **(Mus)**	Sharing child's enjoyment **(+ve)** Engaging for pleasure **(+ve)** Supporting child's interests **(Seek)**	Int Mus +ve, Seek
A07		A love of music **(Mus)** Music Motivates **(Mus)**	From orders to engagement **(Seek)** Incorporate motivations **(Seek)** Being playful **(Seek)**	- Mus Seek

Change in the parent-child relationship: Interconnected (IntCon), Attuned (Att), Interacting (Int)
Changes in parents' perceptions of the child: Seeing the child rather than the autism (Child), Recognising the power of music (Mus), Seeing potential for a happy future (Pot)
Changes in parents' response to child: Positive emotional response (+ve), Actively seeking engagement (Seek)

Discussion of Qualitative Analysis

In order to reflect on the themes, codes and categories, I firstly stepped back to remind myself of where I started – an interview with parents at the end of 16 weeks of family-centred music therapy. I asked parents who had actively participated in music therapy sessions with their child specific questions about changes in their parent-child relationship. Their children were young and severely impaired in their social communication, so it was not possible to ask the children to reflect on their relationship with the parent. However, taking Buber's (1958) philosophical stance as Ansdell had done, intimate relationship is what lies 'between' two people; where the 'I' and the 'you' become 'we' (Ansdell, 1995). In this way of conceiving of relationships, the parent's perceptions of the changes in the quality of the relationship offer a valid way of understanding any changes that occurred for the parent-child dyad. Interview question 6 directly asked parents to consider if there had been any changes to the parent-child relationship (the 'we'). Interview question 9 asked parents whether there had been changes to the way they saw their child ('you' from the perspective of 'I'). Analysis of the interviews revealed that parents also discussed the changes in their own responses to their child (the 'I') as they reflected on various aspects of the music therapy experience.

Answering the research question: How did parents describe the nature of any changes in their relationship with their child?

Parents described the changes in the parent-child relationship in terms of their intimate experience of each other; in the ways they saw their child, and changes in their own responses towards their child. After participating in family-centred music therapy, some parents considered they were better able to *interact* and simply be with their child. Other parents described a more *attuned* relationship with their child; where they were better able to engage their child, and their child responded to their attempts to spark engagement with them. Further still, other parents were more conscious of the intersubjective nature of the connection between themselves and their child – often a bold affirmation that there had been an intimate feeling of *interconnection* between the two of them.

Some parents described *seeing their child rather than the autism*, and had a better understanding of how *the power of music* motivates their child. Some were better able to *see potential for a happy future* for their child. All of the parents identified changes in the ways they responded to their child as a result of participating alongside

their child in music therapy. Most parents described more *actively seeking engagement* opportunities with their child, while many described positive shifts in their *emotional responses* to their child.

There is a sense that the quality of the parent-child relationship is mutually dependent on the way the parent perceives the child, which in turn influences the way the parent responds to the child, which then impacts further on the quality of the parent-child relationship. These associated elements are represented in Figure 5.3. Each theme is represented by the circles, with the categories that emerged from the data attached to them.

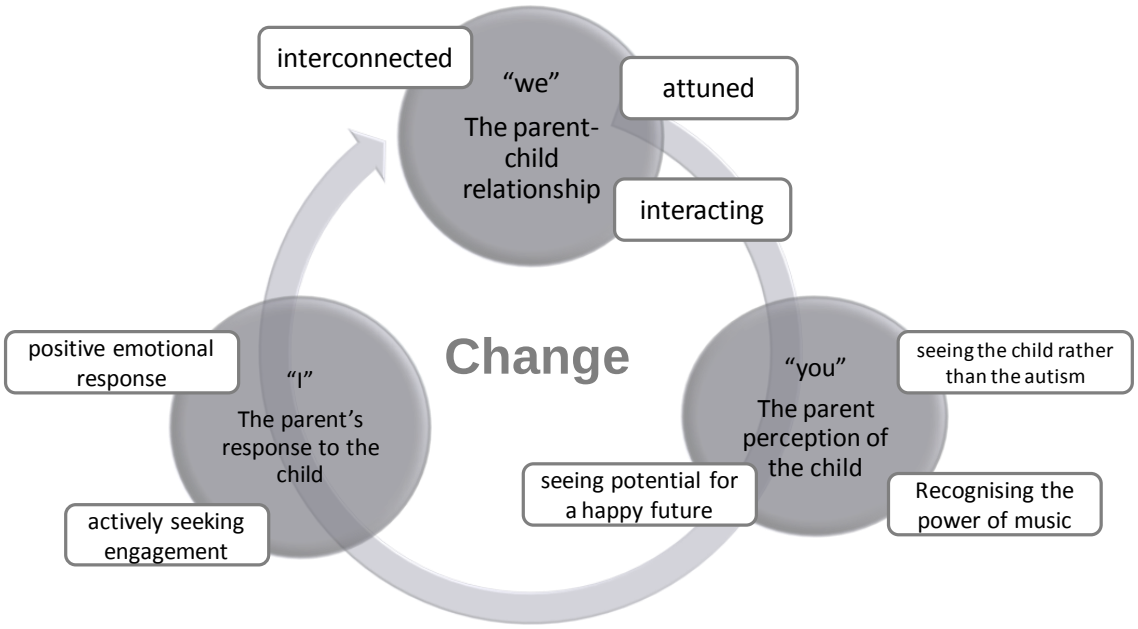

Figure 5.3. Change in relationship dependent on changes in "we", "you" and "I".

The descriptions of changes in the parent-children relationship by the parents in this study echo some of the findings of previous literature with parents who participated in music therapy sessions. While the literature has broadly identified that the bond between parent and child can be strengthened from participating together in music therapy (Oldfield, 2006a, 2011; Oldfield & Bunce, 2001; Warren & Nugent, 2010), the descriptions of change in the parent-child relationship in this study help to further refine our understanding, particularly in how changes may simultaneously occur in the parents' response to and perception of the child.

The family-centred music therapy approach of this study impacted on the way parents viewed their child; seeing them more positively as 'children' first, and understanding better their potential and the way music motivates them. Variations on these topics are found in the literature, where music therapy sessions inclusive of family members enabled the family to see the child in a more realistic way (Alvin, 1978; Müller & Warwick, 1993) that acknowledged the child's strengths (Allgood, 2005; Warren & Nugent, 2010).

At the same time, parents in this study described how family-centred music therapy changed the ways they responded to their children. While previous literature has noted that parents who participate in music therapy sessions pick up ideas to use with their child (Chiang, 2008; Warren & Nugent, 2010), and made changes in the general way they engage with their child (Woodward, 2004), the parents in this study offered more detailed descriptions of how the responses to their child changed. Rather than just learning skills or music activities from the sessions, parents described applying their experiences from the family-centred music therapy sessions in the natural daily interactions with their child. This shift from 'copying' the therapist to 'applying' what they experienced together with their child in the music therapy sessions improves our understanding of the benefits of family-centred music therapy approaches.

Parents' considered that family-centred music therapy facilitated these constructive shifts in the way they responded to and perceived their children. Apart from one parent who had no data relevant to the theme 'changes in the parent-child relationship', the other 10 parents confidently asserted there was an improvement in the parent-child relationship. The results from this study confirm that music therapy offers a space where parents can enjoy being with their child (Oldfield, 2008).

The parent-child relationship compared to therapist-child relationship.

Ansdell's (1995) "schema" (p. 67) of different levels of musical relationships provides a different way of looking at the analysis. Similar to this study, Ansdell (1995) describes improvisational music therapy methods with people who have considerable social communication limitations. The aim of improvisational music therapy, as Ansdell (1995) describes it, is to facilitate a moment of "meeting" (p. 73) between the therapist and the client. Rather than being a stage to reach, a moment of meeting may be fleeting or it may be the result of the therapist systematically facilitating 3 earlier stages: contacting, responding, or relating to the client.

Parents who described the relationship with their child as being 'interconnected' echo Ansdell's (1995) notion of "meeting" (p. 73) in the music. These parents felt specially connected to their children in a reciprocal way, similar to Ansdell's (1995) descriptions of the therapist's 'I' and the client's 'you' becoming a sense of 'we'.

The early stages of Ansdell's (1995) schema – contacting, responding and relating – are echoed in the parents' descriptions of the parent-child relationship as 'interacting' and 'attuned'. These parents described doing more with their children, and/or working to spark an interaction with them. Ansdell (1995) similarly describes how the therapist works to engage the client in these early stages of musical relationship, by initially providing music that matches the client and then working to spark the client's awareness of or interest in the therapist.

Benefits of working alongside parents.

Previous literature into parent-mediated approaches has focussed predominantly on the child's skill development outcomes. Parent participation in the child's therapy has been narrowly presented as a viable way to effect downstream change in the child's social communication skills (Aldred et al., 2004; Rocha et al., 2007; Schertz & Odom, 2007; Siller & Sigman, 2002). The rationale being that a more confident parent, who has sound social communication strategies to sensitively apply to their child, will provide developmentally appropriate environments resulting in improved skill or developmental outcomes for the child. Therapists should therefore respectfully work with the parent to effect change in the child. However, this view of including the parent in the therapy so that they can be a vehicle for child skill development is a limited portrayal of the benefits of working alongside parents. A recent study of a parent-mediated approach with 152 preschool aged children with ASD by Green et al. (2010) challenges the notion that there will be downstream changes in the child's skills. While the study reported significant increases in parents' interactions with their children, there were no significant downstream effects in the children's social communication skills, measured by the ADOS-G, as a result of parent mediated approaches after one year of intervention (Green et al., 2010). However, an earlier longitudinal study investigating the effects of the parent-child relationship on child development outcomes over 16 years showed that more attuned and responsive parent-child relationships resulted in greater improvements in the child's skills (Siller & Sigman, 2002).

The parents' descriptions of the changes in the relationship with their child in this study indicated that parents highly valued and cherished the improvements in the nature of the relationship. Parents were delighted that they felt closer and more connected to their children, and from an ecological perspective, the ramifications of this are complex and difficult (if not impossible) to isolate. In some instances, the changes parents made to the ways they respond to their child facilitated improved social communication behaviours from the child. Cara, mother of "Allie" (A08), described her new ability to support Allie to achieve more positive social interactions with family friends. Cara explains how she incorporated novel music strategies to support her own friends to interact with Allie:

> Cara: and even if we are at someone else's house...they tend to ask "what's wrong, how can we accommodate her?" And I say "how about we do something silly?" and we'll do a bit of a "ring-a-ring-a-rosie" or something, and I explain to them it will sort of break the ice with Allie, and she can probably join in and get a bit more familiar with you, and it's ok to actually interact with you guys. So, most people are very open to it. Some get a bit on the shy side, but it's good. It's an ice breaker (laughing).
>
> Interviewer: That's amazing. So it's something that's worked for you out of the home then?
>
> Cara: yes, definitely. And she hasn't been as reluctant as she used to be with people touching her or approaching her. So, as you would have noticed, she doesn't get very frustrated now.

Relationship as a primary goal of music therapy.

Perhaps it is too one-dimensional to describe family-centred work as being a mechanistic way to affect developmental change in the child. The parents in this study described how the improvements in their parent-child relationships were treasured in their own right. Rather than the parent-child relationship being a vehicle for promoting skill development in the child, strengthening relationship can be considered a primary therapeutic outcome. Given that social communication is a core impairment in ASD

displayed by a lack of social-emotional reciprocity, non-verbal communication behaviours, and the ability to develop and maintain relationships (American Psychiatric Association, 2011), a relationship-focussed outcome is valuable.

From a family-centred perspective, there are many factors in the mix that potentially impact on the parent-child relationship. Three factors were common to all of the families participating in this study: parent participation; music therapy methods focussed on engaging the child; and a collaborative family-centred approach. Rather than a mechanistic (or cause and effect) process, these factors can be viewed as catalysts for change in the parent-child relationship as depicted in Figure 5.4.

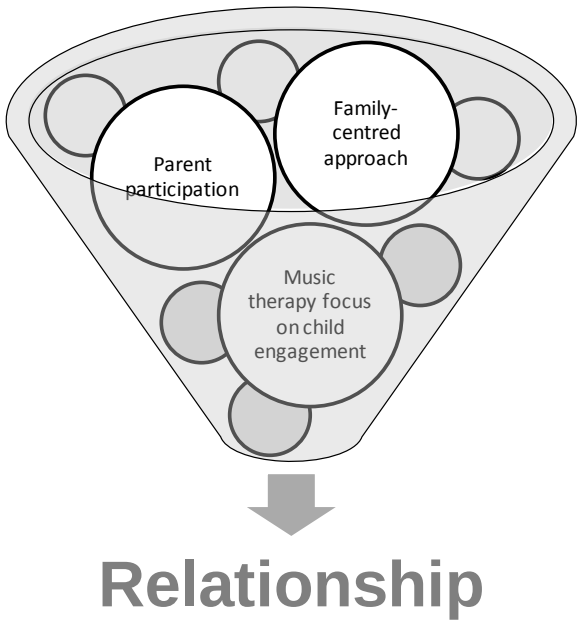

Figure 5.4. Catalysts for relationship.

Conclusion

A qualitative analysis of 11 structured interviews with parents who participated in family-centred music therapy sessions resulted in descriptions of a variety of improvements in the parent-child relationship. The changes described by parents were sorted into three mutually dependent themes: the nature of the parent-child relationship; the ways they perceived their child; and the ways they responded to their child.

Participating in family-centred music therapy was a platform for parents to transform the relationship with their child in three key areas: the way they saw their

child; the way they responded to their child; and their experience of the closeness within their relationship with their child. However, the impact of positive change in the parent-child relationship on the child's general developmental trajectory is still unclear in the literature. For all of the parents of these 11 young children with severe ASD, the changes in the relationship with their child were valued and cherished, with simultaneous changes occurring in the ways all of the parents responded to their child; either outwardly, inwardly, or both.

Chapter 6 will compare this qualitative analysis with the quantitative analysis related to Hypothesis 2. The comparison of these two sets of data will enable the second part of the qualitative data question to be addressed: *In what ways (if any) are these descriptions of change supportive of or challenging to the quantitative changes in parents' attitudes towards parenting and their child as measured through the PCRI?*

Chapter 6
Comparison of Mixed Data

Introduction

In chapter 3, six Hypotheses were proposed; four of which were concerned with the child's development of social communication skills, and two that focussed on the parent-child relationship. Both dimensions were included because the successful development of social communication skills in young children, including those with ASD (Moore, 2009), is frequently linked in part to the quality of the parent-child relationship (Hughes, 2009; Stern, 2010).

Standardised numeric measures were chosen to assess whether there had been any changes in the children's social communication skills in order to contribute to the growing demand for empirical evidence of therapeutic interventions for children with ASD. However, the collaborative ethos of the treatment approach (which aimed to promote a partnership between the family and myself) could be seen to be at odds with an empirical research design that favours the use of unfamiliar assessors determining whether or not outcomes were evidenced. This created a tension within the study that I addressed in part through the use of parent-report outcome measures as well as through the inclusion of an interview with parents.

Hypothesis 6 investigated the nature of the parent-child relationship using descriptive data from the structured interview with the 11 parents of children in the treatment group at the completion of the treatment. The analysis of this data was presented in Chapter 5. Hypothesis 2 investigated the quality of the parent-child relationship relative to a normative sample through the use of a parent-report standardised measure; the PCRI (Gerard, 2005). The analysis of the PCRI numeric data was presented in Chapter 4.

After having completed the interviews with the parents at the end of the family-centred music therapy treatment, I realised that this descriptive data could potentially also be used to provide support for the numeric data from Hypothesis 2, and vice versa. With the intention of using the mixed methods to validate each type of data, a concurrent triangulated design was chosen (Plano Clark & Creswell, 2008). As described in Chapter 5, a concurrent triangulated design aims to provide a comparison of the data to highlight points of congruence or discrepancy in the different data sets (Creswell & Plano Clark, 2011).

To re-cap, in Chapter 5, two questions were asked of the qualitative data:

1. How did parents describe the nature of any changes in their relationship with their child?
    1.1. In what ways (if any) are these descriptions of change supportive of or challenging to the quantitative changes in parents' attitudes towards parenting and their child as measured through the PCRI?

Question 1 was answered with a qualitative analysis presented in Chapter 5. This chapter presents a comparison of the mixed methods – the numeric data from the PCRI and the descriptive data from the interview – in order to address question 1.1.

Comparison of Mixed Data

The numeric and descriptive data were collected concurrently, with the interview taking place in the same week as parents were asked to complete the post measures (which included the PCRI). My early plans for the concurrent triangulated design were to compare the results of the mixed data in order to analyse whether the outcomes of each data set were congruent. This pragmatic plan had similarities to more recent developments in mixed methods analysis models. Creswell and Plano Clark (2011) now propose that for concurrent designs, the mixed data should be merged in some way so that the results of each can be compared. Comparing the mixed data can be carried out by considering the data from different angles: by looking at each type of data separately, and then by looking across the data types (Creswell & Plano Clark, 2011). So far in this thesis, the results for each type of data have been looked at separately.

In Chapter 4, the quantitative results for the PCRI were presented. To re-cap, the statistical results from the analysis of the PCRI varied. While the inferential statistics missed significance at the 0.05 level (p=0.099), the descriptive statistics were strong as seen through a large effect size (d=0.80) and mean difference in favour of music therapy.

Chapter 5 presented the qualitative results for the structured interviews. The interview offered an opportunity for parents to describe changes to the parent-child relationship that occurred during the 16 weeks of their participation in family-centred music therapy. In contrast to having to numerically rate the items on the PCRI, parents were encouraged to describe any changes using their own words and emphasising the aspects they considered to be important. A qualitative analysis revealed that parents' described the changes in their parent-child relationship in three different ways; from

interacting more together, to developing more *attuned* connections, to being *interconnected* with their child.

Following the completion of the independent analysis of each type of data, Creswell and Plano Clark (2011) propose that the first step in merging the data is to "specify the dimensions by which to compare the results from the two databases." (p. 215). I decided to broadly follow the steps outlined by Creswell and Plano Clark (2011) as my aim was to be able to compare two very different sets of data. In order to do this, I inspected the descriptive data to see if it was possible to quantise this data in some way.

Transforming the descriptive data.

In my qualitative analysis, I had identified that the changes in the parent-child relationship described by parents could be thought of in terms of a continuum of closeness. The category *'interacting'* included codes where parents described doing more with their child; *'attuned'* included codes where parents described tuning in more to their child; and *'interconnected'* included codes where parents described a heightened sense of emotional closeness with their child. This idea of a continuum of closeness within parent-child relationships is represented in Figure 6.1. The three categories from the qualitative analysis all describe an experience of closeness in the parent-child relationship, where the emotional closeness of the category *'interconnected'* could be seen as being the deepest form of closeness described, followed by *'attuned'*, and then *'interacting'* which described more opportunities to be engaged with the child.

Figure 6.1. Nature of intimacy in the parent-child relationship as perceived by parents.

From the perspective of this continuum, one dimension by which I could compare the mixed methods was the closeness of the parent-child relationship. However, the results of both the quantitative and qualitative analyses were reported for the group as a whole – the *change score group mean difference* for the PCRI and a *continuum of closeness in relationship* for the descriptive data. A comparison of the data for the group as a whole would only provide a limited statement of support: that parents described positive changes in the closeness of the parent-child relationship, and the group had a mean positive change score on the PCRI indicating that the quality of the relationship had improved.

In order to fine-tune the mixed methods comparison, I decided to return to the data for each individual parent. I gathered the individual PCRI change scores of the parents, as well as their codes in the theme 'changes in the parent-child relationship'. For most parents (8/11), the codes from the qualitative analysis belonged to one discrete category. While two parents had codes that fell into more than one category, and one parent had no relevant data in this theme, I believed that a comparison of the individual results could provide a useful comparison.

A side-by-side comparison.

The next step was to compare the rank order of the individual PCRI change scores with each parent's categories and codes describing the closeness of the parent-child relationship. Table 6.1 presents the side by side comparison of the mixed methods.

Table 6.1reveals some interesting points of congruence and discrepancy across the two different data sources. The three parents with largest change scores on the PCRI (indicating that the parent had a more positive view of the parent-child relationship following family-centred music therapy) were from parents of participants A08, A18 and A16. These three parents' interview responses were categorised as *'interconnected'*, which I propose is the deepest level of closeness described. Looking at the codes for these parents, two parents described being *'bonded closer'* to their child, and one parent felt the relationship had gone to *'a new level'* where the parent now shared *'reciprocal emotions'* with her child. The comparison of both sets of data for these three parents was therefore highly congruent.

Table 6.1

Participants' PCRI Rank Order (Highest to Lowest) Compared to Closeness of Relationship Categories

Participant	PCRI change score	Category	Codes
A08	24	Interconnected	A new level of relationship Cooperation Reciprocal emotions
A18	15	Interconnected	Closeness Bonded closer
A16	13	Interconnected	Bonded closer Connected together as one A special connection
A04	10	Attuned	Reintroduced Time to connect Focus on attunement
A01	8	Attuned	Attunement
A07	6	*no relevant data*	
A21	6	Interacting	Fragile engagement
A22	5	Interconnected Interacting	Shared emotions (IntCon) More interaction (Int)
A14	5	Interacting	Being together
A10	-12	Interacting	More interaction
B01	*no data*	Interconnected Attuned Interacting	Bonding strengthened (IntCon) Getting acquainted (Att) Focussing on the child (Att) Time to connect (Att) Opportunities for physical closeness (Int)

Note: There is no PCRI data for B01 due to errors in the way the parent completed the PCRI.
IntCon = Interconnected; Att = Attuned; Int = Interacting.

The four smallest change scores on the PCRI were from parents of participants A10, A14, A22, and A21. These four parents' interview responses were categorised as *'interacting'*. The codes within this category reveal that parents did see changes in the nature of the parent-child relationship, but they described these changes more functionally; there was '*more interaction'* between parent and child, and more opportunities for simply *'being together'*. One parent described that the relationship with her child was still a *'fragile engagement'*. These codes suggest that participating in family-centred music therapy sessions offered new opportunities for burgeoning closeness in the parent-child relationship. While this comparison of the mixed data showed a good level of congruence, there were discrepancies in the results for two parents. The parent of participant A22 also had a code from the *'interconnected'*

category where she described experiencing *'shared emotions'* with her child. This combination of categories suggests that the ways parents describe the relationship with their children may be complex and multifaceted; the parent-child relationship is rich and uniquely experienced and therefore any changes reported may be challenging to interpret.

A further discrepancy occurred for the parent of A10, who scored a negative change score on the PCRI (indicating a more negative view of the parent-child relationship), yet descriptions from the interview suggested that she perceived 'more interaction' between herself and her child. It may be that one of these data sets was not completed authentically, or that the parent interpreted the interview questions differently to the PCRI items. These discrepancies between the data further highlight the difficulties with interpreting results. Future mixed method designs may consider asking the participant to comment on any discrepancy so that a better understanding of the divergence can be gained.

The change scores ranked in the middle of the data set were from parents of participants A04 and A01. These parents' interview responses were coded and then categorised as *'attuned'*. The parents described how they were now more able to focus on *'attunement'* and be more responsive to the child's needs, leading them to feel closer to their child. One parent described feeling *'reintroduced'* to her child as a result of the music therapy sessions, and that she actively made *'time to connect'* with her child. The mixed data for these parents was therefore highly congruent.

The parent of participant A07 had no responses in the interview that were coded and grouped in to this category. Nonetheless, as seen in Chapter 5, Table 5.5, the parent did describe changes that were swept into the other two themes: changes in the perception of and response to the child. The parent of participant B01 filled in the PCRI inaccurately and this data was omitted from the statistical analysis (see Chapter 4), however they did have relevant interview responses for this theme which included codes from all three categories. These two parents further highlight the complexities of evaluating parent-child relationships, even when data is collected from a variety of sources.

Conclusion

The second part of the question posed to the qualitative data was as follows:

In what ways (if any) are these descriptions of change supportive of or challenging to the quantitative changes in parents' attitudes towards parenting and their child as measured through the PCRI?

The comparison of the mixed data offers partial support for both the quantitative and the qualitative analyses, with the comparison of mixed methods revealing highly congruent data for 7 out of 11 parents. Parents with larger change scores on the PCRI tended to describe the relationship with their child as '*interconnected'*; the category in the qualitative analysis considered to represent the greatest depth of closeness in relationship. Parents who scored the smallest change scores on the PCRI described more opportunities for '*interacting'* with their child; the category that describing a budding sense of relationship compared to the other categories. Both parents who described the changes in their relationship as being more '*attuned'* to their child had PCRI change scores in the mid range.

There were three parents with discrepancies when the data sets were compared: one parent who had no relevant descriptive data; one parent with a combination of responses in the descriptive data; and one parent with inaccurate numeric data and a combination of responses in the descriptive data. The discrepancies in the comparative analysis highlight the complexities of evaluating parent-child relationships even when a variety of data is collected. Given that the quality of the parent-child relationship is an important factor in many aspects of child development (Mahoney & Wiggers, 2007; Moore, 2009) and parent/family wellbeing (Barnett et al., 2003; Williams, 2010), further research investigating the impacts of different interventions on the parent-child relationship would provide useful information to the community. Future studies that intend to compare mixed data may be strengthened by the inclusion of an explanatory design option, where a further qualitative strand could be carried out based on any discrepancies in the results of the data comparison.

Chapter 7
Discussion and Conclusions

Introduction

The aim of this study was to investigate whether family-centred music therapy positively influences the social communication development of preschool aged children with severe ASD. Given that thriving interpersonal engagement between children and their parents is considered an essential precursor to successful social communication development (Moore, 2009; Stern, 1985, 2010; Stern et al., 1985), change in three areas was explored: the skills of the child; the parent-child relationship; and the home environment. A variety of data was collected, including: numeric data; survey data of the use of music in the home environment; and interview data.

The treatment consisted of 16 family-centred music therapy sessions which took place weekly in the family home. The treatment was a collaborative, ecological practice that views the child as part of the family system (Edwards, 2011). From this ecological perspective, the treatment also aimed to effect change in the child's environment. For young children, the quality of the parent-child relationship forms an important part of their environment. In response to the local demand for evidence based research, a RCT design was chosen to address the aim. To my knowledge, a RCT design has not previously been used to research a collaborative music therapy treatment approach with parents of children with ASD.

There are parallels between collaborative approaches and those where the music therapy treatment emerges in response to the clinical situation. Similar to recent research with an emergent treatment approach for people with mental health conditions (Erkkilä et al., 2011), the music therapy methods, theoretical framework, role of the therapist, and the therapeutic process were detailed in order to meet the needs for replicability. The treatment protocol was designed to be as close to my real-world approach to music therapy as possible, where I collaborate with families and respond to emerging events, thus rejecting the use of a strict treatment protocol that risks creating a "parody" (Ansdell, 2006, p. 97) of music therapy practice for the purposes of research.

The RCT design was made more accommodating of the collaborative treatment model through my choice of assessment measures. Within collaborative practice, the parent's perspective and involvement in assessing outcomes is integral. Therefore, standardised parent assessments of child outcomes were identified as the most appropriate outcome measures, particularly considering the severe impairments of the

children. No assessment of young children with severe impairments will be perfect, however I believe that parent assessment was the most valid and accurate in the context of this study (Fenson et al., 2007; Sparrow et al., 1998).

Attitudes towards hypothesis testing in the social sciences are continuing to evolve, with some authors explaining the importance of considering "to what degree a null hypothesis might be wrong" (Gold, 2004, p. 91). The emphasis on researching real-world clinical practice in this study aimed to investigate music therapy's effectiveness with this population. Therefore, descriptive statistics, including confidence intervals and effect sizes, were combined with inferential statistics. In studies with small sample sizes, reporting effect sizes with confidence intervals can be informative, even in non-statistically significant contexts (Anglim, 2011, January 28). Within the discussion to follow, 2 ways of assessing the effect of the treatment will be considered: the statistical significance; and the practical significance based on raw mean differences and effect size (Cohen's *d*). In small sample size studies, statistical significance should not be used as a stand-alone measure of the effect of an intervention (Valentine & Cooper, 2003).

While reflecting on the results, another question arose: "what is meaningful improvement for children with ASD?" While the children in this study had impairments requiring very substantial support, the results suggest that social communication improvement (measured in terms of relationship and engagement) is possible. The child's relationship with the parent was the point of reference for evaluating these skills. The intersubjective experience of the parent-child relationship theoretically validates the ability of the parent to 'know' the experience of the child. This view point considers that early brain development is socially influenced and dependent on emotionally close interpersonal relationships (Schore, 2005; Stern, 2010).

The results will be discussed in order of: outcomes for children; outcomes for the parent-child relationship; and impacts on the home environment. Along the way, qualitative results will be integrated with the quantitative results, followed by a discussion of new understandings to music therapy practice and research. The implications of the findings relevant to parents, music therapists and early intervention workers are presented, with conclusions made at the end of each section. The chapter ends with final remarks and recommendations for future music therapy research design.

Outcomes for Children

There were 3 hypotheses related to changes in the skills of the children; both their general social communication development and their in-session behaviours.

Hypothesis 1: *There will be greater positive changes in the early social communication skills of young children with severe ASD in response to 16 weeks of family-centred music therapy plus standard care compared to standard care alone.*

Hypothesis 3: *Any changes in the child's early social communication skills will be maintained for at least 8 weeks after the family-centred music therapy intervention ceases.*

Hypothesis 4: *Within the music therapy sessions, there will be positive, observable changes in symptomatic behaviours of ASD in the child in response to 16 weeks of music therapy plus standard care.*

The selection criteria targeted pre-school aged children with severe social communication impairments, as these types of children were representative of music therapy referrals typical in early intervention work with individual families. While this study recruited 23 participants, making it the largest RCT in music therapy with preschool aged children with ASD, this is still considered a small sample size for statistical analysis.

Child outcome 1: Improvements in the quality of the child's social interactions in the home and community.

The Vineland SEEC was the primary numeric measure used for assessing the social communication development of the children. This measure is specifically tailored to the preschool years, resulting in a good capacity for sensitivity to change. The Vineland SEEC delivered strong results, with parents reporting significant changes in their child's social communication functioning as observed in their child's interactions with others, including: responding to others; imitation skills; sharing; cooperating; playing with others; and communicative behaviours in social contexts. The skills measured by the Vineland SEEC relate to all 3 aspects of social communication skills described in the literature, namely: social-emotional reciprocity; non-verbal communicative behaviours; and developing and maintaining appropriate relationships (American Psychiatric Association, 2011). The family-centred approach to the sessions meant that parents had the opportunity to witness and experience these changes in the child's capacity to interact in both the music therapy sessions as well as

throughout the week. The control group made virtually no change on this measure, resulting in a large mean difference between groups and a large effect size in favour of music therapy.

With social communication now described in the DSM-5 as a core symptom of ASD (American Psychiatric Association, 2011), this positive outcome for social communication skills supports the use of family-centred music therapy for children with severe ASD. From a social orienting model of ASD, dyadic interaction impairments are at the heart of the challenges faced by these children (Clifford & Dissanayake, 2008; Mundy & Stella, 2000). Previous research has reported that social play may be less intrinsically rewarding for children with ASD, and that motivation plays a key part in the child's willingness to engage socially, which ultimately impacts on successful social communication development (Clifford & Dissanayake, 2008). Family-centred music therapy sessions provided a motivating social environment for the children, and fostered interactions between the children and their families that could potentially continue beyond the session. These results are supported by previous music therapy research which has described music therapists' ability to assist with foundational relationship skills such as awareness of self and others (Carpente, 2009), initiation of joint attention, and responding to joint attention bids from adults (Kim et al., 2008). Research has also described that music therapy is successful in motivating children to interact with others (Kim et al., 2009).

As the Vineland SEEC is a semi structured scored interview, it is important to note that the results are compatible with the analysis of the qualitative interview data. Relevant to the Vineland SEEC results, parents' described positive changes in the quality of the parent-child relationship, namely: more *interacting* between parent and child; a more *attuned* relationship; and a more *interconnected* relationship. This data supports the notion that social communication development is closely linked to skills in developing and maintaining relationships (Prizant et al., 2000; Stern, 2010). Further, parents described positive changes in their perceptions of their child in three ways: being able *to see the child rather than the autism;* better understanding *the power of music* to motivate their child; and *seeing potential a happy future* for their child. Williams (2010) found that when parents observe improvements in their child's abilities they are more likely to provide opportunities for the child to interact in the home and community. The qualitative analysis further supports this literature, with some parents describing their new efforts to support their child in a range of interactions including:

social outings with friends; bedtime routines; travelling to childcare; and following instructions related to daily living tasks. Family-centred music therapy thereby also supported some of these families to make changes to their broader environments; potentially creating further motivating contexts for their children's social interaction.

Notably, parents did not observe statistically significant changes in their child's speech and language skills (as measured by the MBCDI-W&G) or the diagnostic features of ASD (as measured by the SRS-PS). The total score effect size was small for the MBCDI-W&G, and medium for the SRS-PS, with wide confidence intervals for Cohen's *d* that included zero. Analyses of the subscales offer some preliminary interpretations as to where music therapy may be most beneficial. A medium (but not significant) effect size was found for both the MBCDI-W&G "understanding everyday phrases and routines" subscale, and the SRS-PS "social communication" subscale. These subscales are also compatible with the findings for the Vineland SEEC and the qualitative data, as they indicate improvements in responding to and interacting with others. However, the small effect sizes for word production and gestural skills on the MBCDI-W&G were not as strong as the effect sizes for these skills reported in the most recent Cochrane review of *Music Therapy For Autistic Spectrum Disorder* (Gold et al., 2006). The Cochrane review was, however, based on studies with children older than those in this study.

Both the experimental group and the control group recorded improvements in overall communication skills[3] on the MBCDI-W&G, with mean change scores of 78.90 and 58.70 respectively. Given the use of a standard care control, it may be that these changes indicate a quality standard care that made it difficult for family-centred music therapy to induce comparatively significant changes. While the results comparing groups were not significant, the gains made by the experimental group did not revert to baseline levels at the end of the 8 week follow-up period.

The outcomes for children captured by the numeric and descriptive data suggest ways that the family-centred music therapy approach was both beneficial and limited in supporting children with ASD. One way to analyse the benefits of the music therapy intervention is to look at the effect sizes of the numeric data. Table 7.1 provides a summary of the effect sizes for the numeric measures. Larger effect sizes were found

[3] The total score for the MBCDI-W&G combines: speech and language production and comprehension; and use of non-verbal gestures.

Table 7.1

Numeric Outcome Measures in order of Effect Size

Outcome measure	*d*[1] *(95% CI)*	Proximity to treatment approach
Primary Outcome: Relationship – social interaction (Vineland SEEC)	1.96 (0.92, 3.00)	Proximal – measured quality of interactions with family and other significant people.
Secondary Outcome: Relationship – social responsiveness (SRS-PS)	0.42 (-0.44, 1.29)	Proximal – measured social responsiveness with family and other significant people.
Secondary Outcome: Speech & Language (MBCDI)	0.26 (-0.60, 1.12)	Distal – measured child's acquisition of communicative behaviours and skills.

[1]Effect size: 0 - 0.3 = small effect; 0.3 - 0.6 = moderate effect; >0.6 = large effect size.

for the 2 measures that assessed relationship in various forms. The Vineland SEEC had the largest effect size and could be considered the most proximal measure to the treatment approach. That is, the family-centred music therapy treatment targeted the child's engagement and participation with the people in the session (the family and the therapist). The children were encouraged to engage in whatever ways they could, whether that involved non-verbal communicative behaviours, gestures, or words. The SRS-PS had a medium (but not significant) effect size and could also be considered a proximal measure to the treatment approach. However, unlike the Vineland SEEC, the SRS-PS was designed as a diagnostic tool for ASD. The items on the SRS-PS also take into account the behavioural aspects of ASD which were not specifically targeted by the music therapy treatment. Subscale analysis of the SRS-PS revealed that a medium (but not significant) effect size of d=0.50 was found for the Social Communication subscale which assesses the expressive and social communication abilities of the child through 22 items, such as: "Avoids eye contact or has unusual eye contact"; "is able to imitate others' actions"; "plays appropriately with children his or her age"; and "wanders aimlessly from one activity to another" (Constantino & Gruber, 2005, p. 18).

The small (but not significant) effect size for speech and language outcomes as measured by the MBCDI-W&G, suggests that music therapy treatment may have limited benefits for preschool aged children with severe ASD in this domain. As the family-centred music therapy approach did not target speech and language development in the same way as other, more direct, therapies such as Hanen (Sussman, 1999) and PROMPT (Rogers et al., 2006) programs, this outcome is perhaps not surprising. Instead, speech and language outcomes could be thought of as being distal to the music

therapy treatment. The family-centred music therapy approach targeted speech and language development in an indirect way; through focussing on engaging the child in musical/social interactions. Speech and language skill development was supported within the context, or perhaps as a consequence, of relationships and social interactions occurring through music making.

The outcomes from this study suggest that supporting children with severe ASD to interact socially in their home and community, and develop stronger relationships with significant people, are areas where music therapists can make a positive difference to the child's social communication development.

Child outcome 2: Improvements in the child's interpersonal engagement within the music therapy session.

The MTDA is a therapist rated assessment measure that evaluates various aspects of the child's social communication ability and/or motivation to interpersonally engage in music therapy sessions. Interpersonal engagement is a key aspect of social communication, particularly in the areas of social-emotional reciprocity and developing relationship and interest in others. I carried out the MTDA assessment protocol in the second and second last family-centred music therapy sessions, and video recorded those sessions. After each assessment, I scored the measure after having observed the session 3 times: once as a participant; then watching the video with the parent and listening to their impressions of their child's behaviours; and once on my own. While significant results were found for improved engagement in the sessions, inter-rater reliability was limited to a percentage calculation of the individual items of the MTDA. 60% agreement was achieved on the individual items; considerably more than the 30% agreement likely by chance. Difficulties with scoring this measure as an observer compared to a participant were noted, as many items required the rater to interpret the meaning of the child's behaviour.

While there are limitations with this data due to its unsuitability for more conventional statistical analyses of inter-rater reliability, the data does offers some support for a parallel improvement in the child's 'in-session' skills with their general social communication development as seen in the Vineland SEEC results. It is useful to consider that the changes observed in children's abilities in music therapy sessions could be aligned with changes to their general development. Correlating in-session

improvements with parent reports of changes in general development may help to refine music therapy assessment measures in the future.

Generalisability of child outcome findings.

Generalisability is often thought of as a trade-off between internal and external validity, with improvements in one area often resulting in weaknesses occurring in the other. Internal validity was strengthened through the use of: a documented treatment approach; the monitoring of control group participants to ensure they did not participate in music therapy services; and the use of one therapist to conduct all of the sessions. However, while using only one therapist strengthened internal validity, it also limits the generalisability of the findings.

External validity was strengthened through the use of 7 different early intervention centres for recruitment; however the small sample size and strict selection criteria limit the generalisability of the findings. The gender ratio of girls to boys was 3:18, which is similar to the 1:4 ration of girls to boys expected in the general ASD population (Fombonne, 2009); however, all of the girls were randomly allocated to the treatment group which may also limit generalisability.

When considering the ecological validity, or how "real-world" the research design was (Robson, 2002), the outcomes from this study may be considered highly generalisable from this practical stance. The family-centred music therapy sessions were designed to reflect practice as close as possible, and this, combined with the standard care control, improve the applicability of the findings to music therapy practice. The use of parent-report measures further strengthens the ecological validity, as parents' opinion of the value of an intervention for their child is vital in real-world contexts.

Limitations of child outcome findings.

This study was awarded funding from the Department of Education and Early Childhood Development (DEECD), Victorian State Government of Australia. The funding grant was for "practitioner-led" research projects, and aimed to encourage and support practitioner engagement with research. This grant, combined with the scholarship I received from the University of Melbourne, made this research possible. This study was very much a practitioner-led project, and while my clinical experience and expertise helped me to design an especially real-world study, my involvement at all

levels of the research introduced the possibility for bias. In order to address this bias, I engaged in regular supervision and consulted with a variety of colleagues including my supervisors, other experienced researchers, fellow PhD candidates, and clinicians. While there are personal challenges when researching your own practice, supervision combined with my own reflective practice helped me to stay focussed on the children and families I was working with; just as I would do in clinical practice.

The challenge of empirically researching a collaborative style of work required concessions to be made to both design and practice. Some of these concessions clearly limited the results, such as the predominant use of parent evaluation. While parent evaluation is respected and esteemed in real-world collaborative practices, from an empirical research design perspective, parents were unable to be blinded to the treatment condition and were therefore open to potential biases. In order to address this limitation, the parent-report measures selected were all standardised, had high test-retest reliability, and were highly correlated with non parent-report measures. Additionally, the measures were selected in a targeted way and analysed with restraint; I had a clear plan for the effect I wanted to measure, and did not impose a battery of tests on the participants or run a string of analyses on the data.

My aspiration to research a 'real-world therapy process' informed the choices I made in data collection, but these choices also imposed some limitations on the findings. I considered that it made good clinical sense for me to administer the Vineland SEEC with the families, as the interview protocol would allow rapport building and information sharing to occur straight away between us. This decision also reduced the burden on parents to tell and re-tell their story to myself and a separate interviewer. The published protocol for administering the Vineland SEEC reduced the potential for bias, as there were clear guidelines for how to fill in the form based on the parent's responses. In this sense, the Vineland SEEC is a parent-report measure that can be applied with more consistency, as the interviewer completes the form according to a strict protocol. However, the conflict between the roles of researcher and clinician were heightened by this decision, and introduced a potential for bias. To mitigate this bias, the Vineland SEEC was scored by a research assistant who independently calculated the total score and entered the data into a spread sheet.

The order of the post measures is also a possible limitation. In the second last session, the MTDA was conducted and video recorded. This process involved the parents watching the video at the end of the session and making comments about their

child's participation. I then gave parents the envelope with the post measures to fill in, which I collected the following week. As the parents watched the video, I directed them to comment on anything they found interesting[4] and did not ask them any questions. It is possible that watching the video before completing the post measures primed the parents to view the child's development as positive (C. Dileo, personal communication, October 17, 2011).

Looking back on the MBCDI-W&G communication inventory, the instructions to parents could have been clearer. Different parents may have overlaid different interpretations on the instructions, especially how they judged whether their child 'understood' words, or 'said' a word. For example, some parents may not have included word approximations, while others did. Assessing language skills in young children with severe language impairments is recognised as being fraught, with limitations in all types of testing (Fenson et al., 2007). Formal testing situations are easier to apply with consistency, but are vulnerable to the context and the child's mood and personality. While parents may over or under-rate their child's performance in evaluations, they are usefully able to consider the child's performance in a variety of contexts (Fenson et al., 2007). The limitations of parent-report language assessments were eased by the fact that the same parent assessed the child pre to post, with the change score used in analysis. The use of the change score removed some of the variability and individuality in the parents' interpretation of the scoring.

Outcomes for the Parent-Child Relationship

Two hypotheses were related to changes in the parent-child relationship.

Hypothesis 2: *There will be greater positive changes in parents' ratings of the quality of their relationship with their child following 16 weeks of family-centred music therapy plus standard care compared to standard care alone.*

Hypothesis 6: *Parents will be able to identify positive changes in the nature of their parent-child relationship following 16 weeks of family-centred music therapy plus standard care.*

Investigating changes in the parent-child relationship were relevant to this study as the early social communication skills under investigation (which are consolidated by

[4] My instructions to parents before we watched the video was as follows: *"We are going to watch the video of our session now. Pause the video when you see something interesting. It can be about you, your child or whatever you wish to comment on. I will write down what you say."*

18 months of age in typically developing children), are established and developed in the context of trusting and sensitive relationships with care givers (Prizant et al., 2000; Stern, 2010). Two data sources were used to address these hypotheses; numeric data from a standardised measure (the PCRI), and descriptive data from an interview with the parents of the 11 children in the treatment group at the end of the treatment phase. While Hypothesis 6 was addressed solely by the descriptive data, Hypothesis 2 drew on both data sources in order to potentially validate and clarify each of the data. A comparison of the mixed methods was presented in Chapter 6.

The PCRI is a standardised measure providing a quantified description of the parent-child relationship that allows comparisons to be made to a normative sample. The measure was originally designed to "complement other assessment procedures" (Gerard, 2005, p. 1) with children and families, and add another dimension to "qualitative evaluation of parent-child interactions" (Gerard, 2005, p. 1). The items on the measure assess the parent's overall attitudes to being a parent and toward their child. While the descriptive quantitative analysis of the results for the PCRI were promising, with a mean difference of 7.80 (the control group making only a small change of 0.20), and a large effect size (d = 0.80, however confidence intervals were wide and included zero), the inferential statistics missed significance (p = 0.099). When considering the effect size for the PCRI alongside the other standardised measures, it scored the next highest effect size after the Vineland SEEC (see Table 7.2). With relationship outcomes considered most proximal to the treatment approach, the PCRI results offer practical (but not statistical) significant support for family-centred music therapy.

PCRI subscales were also analysed to see where music therapy may have had the most impact. The Involvement subscale yielded a large effect size (d = 0.90) in favour of music therapy, but also missed significance (p = 0.066). The results for the Involvement subscale are interpreted by the PCRI Manual as follows:

> "Scores on the Involvement scale reflect the client's propensity to seek out his or her children and manifest an interest in their activities. The items on this scale are designed to assess the relative amount of time the client spends with the child and to indicate the client's level of knowledge of the child." (Gerard, 2005, p. 10)

Medium effect sizes in favour of music were found for the Limit Setting, Autonomy, and Role Orientation subscales. However, a small effect size in favour of

Table 7.2

Numeric Outcome Measures, Including the PCRI, in order of Effect Size

Outcome measure	*d*[1] *(95% CI)*	Proximity to treatment approach
Primary Outcome: Relationship – social interaction (Vineland SEEC)	1.96 (0.92, 3.00)	Proximal – measured quality of interactions with family and other significant people.
Secondary Outcome: Relationship – parent-child (PCRI)	0.80 (-0.13, 1.74)	Proximal – measured quality of relationship with family.
Secondary Outcome: Relationship – social responsiveness (SRS-PS)	0.42 (-0.44, 1.29)	Proximal – measured social responsiveness with family and other significant people.
Secondary Outcome: Speech & Language (MBCDI)	0.26 (-0.60, 1.12)	Distal – measured child's acquisition of communicative behaviours and skills.

[1]Effect size: 0 - 0.3 = small effect; 0.3 - 0.6 = moderate effect; >0.6 = large effect size.

the control was found for the Communication subscale. This subscale contains 9 items which examine how well parents feel that they communicate with their children, such as: "my child tells me when something is bothering him or her"; "my child tells me all about his or her friends"; and "when my child has a problem, he or she usually comes to me to talk things over". These items highlight that the PCRI was not designed for parents of children with disabilities, which is important to consider in the interpretation of the results. The results for this subscale potentially indicate that parents filled in the PCRI in a way that did not positively bias the results in favour of the treatment.

The complexity of measuring the quality of parent-child relationships is frankly acknowledged by the author of the PCRI. This numeric assessment measure was designed to offer a particular perspective on the parent-child relationship relative to a normative sample (Gerard, 2005). The responses of the parents in the structured interview provide a different perspective on changes in the parent-child relationship, with the integration of these two data sources offering the possibility for a richer response to Hypothesis 2. The interview offered an opportunity for parents to describe any changes to the parent-child relationship that occurred while they participated in family-centred music therapy. In contrast to having to numerically rate the items on the PCRI, parents could describe any changes using their own words and emphasising the aspects they considered to be important. The following outcomes for the parent-child

relationship are based on the integration of the data from the PCRI and the structured interview.

Relationship outcome 1: Improvements in the closeness of the relationship.

The comparison of the mixed methods, which compared the PCRI total change score and the theme from the parent interview "changes to the parent-child relationship", offered partial validation of both the quantitative and the qualitative analysis. In general, the ways parents' described the changes in their relationship with their child in the interview reflected their numeric score on the PCRI, with the comparison revealing highly congruent data for 7 out of 11 parents. Parents with larger change scores on the PCRI tended to describe the relationship with their child as '*interconnected'*; while parents who scored the smallest change scores on the PCRI described more opportunities for '*interacting'* with their child. Parents who described the changes in their relationship as being more '*attuned'* to their child had PCRI change scores in the mid range.

There were three parents with discrepancies in the mixed data, highlighting the complexities of evaluating parent-child relationships even when a variety of data is collected. The results from this comparison of mixed methods offer support for the belief that music therapy methods can offer opportunities for parents to enjoy being with their child (Oldfield, 2008), and that these opportunities can have positive flow-on effects for the closeness of the parent-child relationship.

Relationship outcome 2: Positive changes in parents' responses toward their child.

Parents described a variety of shifts in their responses and attitudes to their children in the qualitative data. Almost all parents described how they were now actively *seeking engagement* opportunities with their child; adjusting their responses toward the child so that there was more emphasis on playing rather than teaching, incorporating the child's preferences into interactions, and trying novel strategies to entice their child into interactions. Many parents described a more *positive emotional response* toward their child, explaining how they now have more patience, take a more gentle approach, or engage for pleasure with their child. These shifts in response appear to be interrelated to shifts in parents' perceptions of their children, with parents describing how they now *see the child rather than the autism*, understand better *the*

power of music to motivate their child, and now *see potential a happy future* for their child. When considered along with the PCRI results, it is notable that the only subscale with a large effect size was 'Involvement'; considered to indicate an improvement in the parent's level of knowledge and interest in the child.

The changes parents described in the ways they responded to their child were not simply a copying of the therapist's approach, but suggest they were able to apply what they had experienced in the music therapy sessions to a variety of other situations. Parents' new ways of responding towards their children may have facilitated improved social communication skills from the child. These outcomes suggest new ways for looking at the benefits of parents participating collaboratively in their child's therapies. The potential for music therapy methods to impact on both the parent's and the child's responses make it likely a powerful intervention for effecting change in children's capacity for interpersonal engagement.

Impact of the parent-child relationship on child development.

Including the parent in the child's therapy has previously been primarily described from two different viewpoints in the parent-mediated intervention literature. Firstly, including parents is seen as being a vehicle for improved social communication outcomes for children (Moore, 2009; Schore, 2005). As social communication skills are not easily trained or taught in young children with ASD (Schertz & Odom, 2007), there is some evidence to suggest that interventions supporting parents to respond sensitively and contingently to their child have better long term outcomes for children (Siller & Sigman, 2002). Secondly, there is acknowledgement that parent mental health and child outcomes are interrelated (Williams, 2010), and that impairments in the child's social communication abilities negatively effect attachment (Rutgers et al., 2007) and the quality of the parent-child relationship (Rocha et al., 2007). Difficulties with forming strong parent-child relationships and attachment may constantly reawaken feelings of grief and loss for parents of children with disabilities (Barnett et al., 2003), impacting on their ability to respond sensitively to their children. Therefore, it is considered beneficial for child outcomes if parents participate in the child's therapy so that they can see firsthand any progress their child makes. In contrast, the recent findings of Green et al. (2010) challenge the notion that parent-mediated approaches should only be seen from the viewpoint of improved child skill, with their results being non-significant for

child outcomes, but significant for secondary outcomes of changes in the amount of parent-to-child interactions.

The outcomes from this study suggest that music therapy inspired parents to change the ways they responded to their child, both outwardly in terms of active responses, and internally in terms of shifts in perceptions. The qualitative data offers support not only for the PCRI, but also for the Vineland SEEC that measured improvements in the quality of the child's social interactions in the home and community. The parents' descriptions of changes in the parent-child relationship as more *interacting, attuned* and *interconnected,* are likely reflected in their judgement of the child as having improved social interaction abilities.

Further, the improved engagement of the child within music therapy sessions as captured by the therapist rated MTDA, is congruent with the parent-reported changes in the child's abilities and parent-child relationship. A recent study of preschool aged children receiving group music therapy accompanied by their parents also found concurrence between parent-reported outcomes and therapist observations of changes in children's behaviours (Williams, 2010). Congruence between different sources of assessment may be a suitable way to establish validity in studies researching young children with complex needs whose skills are challenging to assess via traditional means (such as blinded assessors who are not known to the child).

Reflections on the feasibility of the family-centred music therapy model.

There is support from the literature in recognising that social communication skills are not easily taught or trained (Schertz & Odom, 2007), and that influencing the child's drive and desire to interact is a vital consideration for any intervention with children with ASD (Campbell et al., 2008; Poulsen et al., 2006). Music therapy literature makes numerous references to the importance of providing activities that both the child with disabilities and their play partner finds enjoyable (Allgood, 2005; Alvin, 1978; Chiang, 2008; Holck, 2004a; Kern & Aldridge, 2006; Müller & Warwick, 1993; Warren & Nugent, 2010).

When I reflect back on my model of family-centred music therapy, I am reminded that my overarching approach was to facilitate the children's engagement in the sessions, and of particular importance was my emphasis on modelling rather than directing parents in how to musically and emotionally attune to the child. Particularly, I modelled for parents how to be a play partner to the child – focussing on meeting the

child where they were and following their lead – and to focus on engaging the child in an interaction. Parents' responses to the standardised assessment measures and the interview questions support the view that they embraced this approach, and could find their own ways of incorporating music activities to support their interactions with their children.

Limitations of the parent-child relationship outcomes.

The PCRI offered a useful quantifiable perspective on the subjective phenomenon of relationship. It was easy and quick to complete, and yielded a range of results on different aspects of parent-child relationships. However, the fact that it was not designed with children with disabilities in mind, limits the generalisability of the findings. In particular, many items asked about verbal communication interactions between the parent and child which are clearly problematic for parents of children with severe speech and language impairments.

Using a structured interview format has advantages and disadvantages. On the one hand, the structured questions are well suited to generating relevant data to address a hypothesis. On the other hand, structured questions potentially limit the material; investigating what the researcher consciously thinks they don't know rather than curiously seeking to find "what they don't know they don't know" (Chenail, 2011, p. 257). The descriptive data generated from the interviews needs to be viewed with this limitation in mind.

My decision to conduct the interviews with the parents myself is a potential bias to the results. Power is a factor in human interactions, and certainly exists in research interviews. One obvious expression of the power within interviews is that of the interviewer's role as the seeker of information, and the interviewee's role as the holder of that information (Nunkoosing, 2005). Interviews that ask interviewees to reveal private thoughts are particularly affected by power dynamics. In this study, parents were asked to talk about their thoughts on sensitive topics that might expose their parenting approach to judgement from myself and others. While the power relationship at the time of the interview may have put pressure on parents to provide a publically acceptable response to the questions, parents retained the power to choose which aspects of their experiences they would or would not share (Nunkoosing, 2005). The interview questions did not explicitly ask parents to evaluate the program or my skills as a therapist, which avoided a further situation for parents to feel under pressure to

provide an positive, non-confrontational answer. Having worked collaboratively with the parents throughout the process, I believed that the interview was a natural extension of our relationship. My impression was that parents were relaxed and responded easily to the questions I asked of them, but there is always the potential that this was not the case.

Impacts on the Home Environment

Parents were asked to keep a record of how much and what types of music therapy methods they used during the week between sessions in response to Hypothesis 5: *Parents will be able to implement music therapy methods with their child (without the music therapist) during the course of their usual week.*

During my past clinical work in Early Childhood Intervention (ECI), I was always curious about whether parents were able to use and adapt the music activities from the sessions for their own use in the home. With government funding for ECI programs only able to provide one hour of intervention a week[5], workers often discussed with parents the importance of the experiences they provided to their children in the home and community for enhancing their child's development.

ECI programs in Victoria typically offer services in 3 different settings: the home; the ECI centre; and the community (preschools and child care centres). In my experience, working in the home has many advantages to collaborative practice. There is an immediate power shift with the therapist now being a 'visitor' in the home. Rather than dispensing information to the parent out of context, the therapist can see first-hand the challenges the child and parent are facing, and work collaboratively with parents to support them to embed therapeutic strategies in the home environment.

There is only limited data available on the music activities families typically use in the home, with some American literature reporting general information that many parents sing with their young children (Custodero, Rebello Britto, & Brooks-Gunn, 2003). Music therapy research projects have broadly documented high rates of parent reported use of music activities in the home environment following parent participation in music therapy programs (Chiang, 2008; Nicholson et al., 2008; Pasiali, 2004, 2010; Warren & Nugent, 2010). In the context of ECI services where parents are being

[5] This statement is based on my knowledge of working in the sector since 2001 in the Melbourne North Western suburbs. Families would receive an average of one hour per week of government funded intervention during the school terms.

encouraged to continue strategies in the home and community, this is an important aspect to document. However, to my knowledge, there have been no attempts to quantify or describe what parents do musically with their young children in between music therapy sessions. In this study, I explained to parents that the weekly record sheet was not intended to be a 'homework' task, but that I was merely interested in what parents did with music between sessions.

Home environment outcome 1: Parents use a variety of music activities with their child throughout the week to engage their child in interactions.

The weekly record sheet data revealed that parents were able to incorporate a variety of music activities into the home environment in between music therapy sessions. The record sheet asked parents to report on their use of four different methods:

1. Singing
2. Singing and instrument playing
3. Improvising with the instruments
4. Listening to music together

While parents reported using all of these methods, singing and listening to music together occurred most often during the treatment phase; averaging approximately 89 minutes per week. Of these, singing was the best maintained at the 8 week follow up, with a slight drop to 84 minutes per week on average.

These impacts on the home environment were supported by the parents' interview data. As mentioned earlier, parents reported changes in the ways they responded toward their child. Most relevant to this discussion are their descriptions of the active efforts they made to engage their child in interactions. Importantly, parents particularly commented on how they actively tried to incorporate more music activities in their interactions with their child, because they could see how motivating these activities were for them.

The interview data also revealed that, rather than just copying the techniques from the sessions, many parents applied what they had experienced with their child in the music therapy sessions to novel situations in everyday life such as travelling in the car, toilet training and bed-time routines. My emphasis on collaboration with parents meant that music therapy techniques were modelling and experienced by parents rather than formally taught to them. These outcomes indicate that gentle, respectful,

collaborative approaches are suitable and successful when working with families of young children with complex needs.

The survey and interview data combine to indicate that family-centred music therapy positively impacted the home environment. The survey data shows that parents did use music activities as part of their weekly routines, while the descriptive data provides evidence that the family-centred approach was successful in promoting the use of music therapy techniques in the home in ways that were meaningful and unique to each family.

Limitations of the impacts on the home environment outcomes.

While this data makes an important first step in reporting on parents' ability to use music methods in the home without a music therapist, research design issues limit the outcomes. Firstly, there was no baseline established for this data, which means that it cannot be inferred whether parents increased their use of music activity as a result of participating in family-centred music therapy. Secondly, there was no control for the data, which again makes it impossible to determine the impacts of participating in family-centred music therapy sessions. However, the interview data offers some support for the data collected via the weekly record sheets, with parents describing changes in the ways they responded to their child. Parents particularly described in the interviews how they incorporated music activities into everyday interactions because they saw how motivating music was for their child.

New Understandings: Collaborative Music Therapy Practice with Families

Having worked in an ECI team that was deeply committed to family-centred collaborative practice for more than 10 years, there were aspects of my work that I took for granted. Our ECI team was underpinned by a strong axiology: that working collaboratively with parents was the *right* way to work. As a team we held the firm view that our role was primarily to support families to support the developmental progress of their children. This view was not only driven by a desire to promote the child's development, but also the well being of the parent. Collaborative practice when working with families acknowledges the parent as the most important influence on the child's development, and respects the parent-child relationship. To state it in the reverse, as a team we would have considered we had not done our job well if we supported the child's development at the expense of the parent-child relationship or the

parent's sense of self efficacy. Undertaking this research project has helped me to examine my practice closely and, in particular, to reflect on what 'collaboration' means when working with families with children with ASD.

Successful collaborations with parents begin with sensitive rapport building. In these initial stages, the parents set the agenda and the pace of the relationship. In her collaborative research with young people, Bolger (2012, April) describes this stage as "hang out" time. While this language is perhaps more suited to adolescent participants, the sentiment is also a good match for my experience with families. Time taken at the beginning to be in the families' homes, combined with a willingness to 'step back' so that parents can set the agenda for what will follow, is a good start to working in partnership.

However, it would hardly be collaborative if the therapist was to always follow the lead of the parent. Rolvsjord (2004) makes this point clearly in her discussions of resource-oriented music therapy, where she highlights the contributions made by the therapist from her own resources, as well as those made by the client. Reflecting on my practice has helped me to recognise my capacity to offer options and ideas to the parent to support what they want to achieve with their child. Of course, determining the best moment to share my knowledge takes skill and sensitivity, and is prone to error. I consider that I am a resource to the family – to work with them to find paths and explore possibilities often related to promoting and enhancing their child's engagement with them. This aspect is echoed in my model for family-centred music therapy with children with ASD (presented in Chapter 3), where I describe 'enticing the child with motivating activities' as part of the approach. In a sense, I also offer an invitation to parents to participate and collaborate, as well as bring my own resources to share with them.

To explain this further, there are times when I 'step back' and times when I 'step forward', which to me evokes images of dancing. Dancing has often been used as a metaphor for collaborative practice (Davis et al., 2002), and it also echoes the descriptions of early social play between parents and infants (Stern, 1977). This is not to say that I treat parents as if they are infants; rather, I find it fascinating that there might be a parallel process being enacted. The way I work with the parent is similar to the way I hope they will work with their child: sensitively attuning and responding to the moment; stepping forward and back; following and leading. At the heart of this is a strength based philosophy which has a set of underlying aims for working

collaboratively with parents, including promoting their self efficacy and solution finding skills (Davis et al., 2002).

Collaborative approaches are a gentle, respectful way to work with families that allows parents to come to their own understandings of what works for their child, and to make the changes they want to the home environment. It was heartening to listen to parents describe the changes that they made in their own responses toward their child, and their reflections on how their responses impacted their child's functioning in various environments. Parents were able to adapt the music therapy approach in novel ways in order to help their child to interact better in the home and community.

New Understandings: to Music Therapy Research Design

Since this project began, I have been inspired by the words of many great researchers in music therapy and the social sciences. The challenges of designing an empirical study in music therapy are enormous, and yet the result may be the generation of new knowledge and better understanding of music therapy practice. Emergent processes, such as collaborating with parents, are difficult to explain and difficult to research. The individual tailoring of music therapy practice to the dynamic circumstances occurring in the session by nature resist specification. DeNora (2006) tackles the tensions of empirical research in music therapy head on with her philosophical considerations, and poses that many 'objective' outcomes often require a 'subjective' assessment. Reflecting on an RCT for music therapy's effectiveness in assisting sedation of children undergoing a hospital procedure, DeNora (2006) asks "what do we mean by 'sleep': isn't sleep a qualitative phenomenon?" (p. 86). As the aim of an RCT is to determine the factors that will lead to the best outcomes, there is an immediate tension created between emergent music therapy practices and empirical research that aims to control variables (DeNora, 2006).

While these tensions exist, they need not be dismissed as impossible to overcome. A variety of approaches to inquiry are needed to address the variety of questions that exist about music therapy practice. RCTs are needed to address 'what' questions; to provide a complementary view to other types of inquiry that ask 'why' or 'how' (Bradt, 2012). If music therapists expect governments and philanthropists to fund programs, then we have an obligation to be able to articulate the benefits of music therapy. However, the economic rationalist paradigm underpinning Western economies puts pressure on professional bodies to demonstrate the 'value add' of their

interventions. In countries like Australia, where the standard care being received by children with ASD is good quality, this poses huge challenges for research design. Even in comparative studies that put music therapy head-to-head with another active treatment, standard care will commonly still be occurring; adding complex variables and potentially influencing the size of the effect being measured.

Mixed methods research designs may provide usefully diverse perspectives on outcomes and experiences. However, there is debate amongst researchers concerning the philosophical validity of mixed methods. Biesta (2010) provides a useful summary of the argument against mixed methods PhD research, which some authors have described as the "incompatible thesis" (Biesta, 2010, p. 98) due to the tensions inherent in the different ontological perspectives of traditional quantitative and qualitative approaches to research. In contrast, while some authors argue for an approach to research that has a coherent and consistent ontology, perhaps coherence need not be such a prized position (B. Stige, personal communication, February 18 2012). While at the start of my study I was concerned about whether a qualitative analysis would 'work' within an RCT design, I now consider that the qualitative data has brought depth and greater overall understanding to the study. The descriptions given by the parents in the interview introduced individuality and a richness of language which is necessary when investigating the complex phenomenon of relationship.

Implications of the Findings

When reflecting on the implications of the findings from this research project, there are three main groups of people I would like to consider: parents; music therapists; and ECI workers. At the end of each section, there are conclusions made from the discussions.

For parents.

Home-based, family-centred music therapy was a feasible and accessible intervention for families. The only time parents cancelled sessions was due to illness, indicating that parents valued participating in the sessions with their children. Those families who had more than one preschool aged child expressed their pleasure that siblings were also welcome to join in the sessions. Music therapy methods were intentionally made accessible for parents, who actively join in with their child in the

sessions, and reported using and adapting the activities from the sessions to other situations in the home and community.

All of the children in this study required very substantial support in their social communication. For children aged 3 to 5 years old with limited communication skills (both verbal and non-verbal), it is common for parents to focus on language skill development[6]. However, after participating in family-centred music therapy, parents reported valuing the achievements of their children in early social communication skills such as engagement, social interactions, and the strengthening of relationship. While language skills may or may not develop for children who require very substantial support, this study shows that the parent-child relationship and the child's ability to engage socially can improve.

Parents not only saw changes in their child's social communication abilities, but also described changes in the ways they responded to their child. For example, in the category *seeking engagement,* parents described a shift from 'teacher' to 'mother'. Parents described this change in various ways, such as: playing with their child rather than teaching; trying to engage the child rather than ordering them to do things; being more playful; and engaging with their child simply for pleasure. It is difficult to interpret what these parents meant by a shift from 'teacher' to 'mother' based on the available data. My cultural perspective on mothering is that the role is typically broad; mothers respond to a wide variety of their children's needs, and these needs prompt many different styles of interactions between mother and child. Some of these interactions may have a teaching element, such as those where parents place strict limits on their child's behaviour or seek to promote skill development. However, because parents expressed this shift as a contrast to 'teacher', I suspect they were trying to say they felt they could focus on their relationship with their child rather than on teaching them skills. Martha, mother of "Samantha" (A04) described it like this:

Martha: [Music therapy] was fun for me, and Samantha thought it was fun too, so it was a bonus.

Interviewer: that's fantastic

Martha: I was happy, and happy to see my child looking at me in a different light in a way, not just a thing, (laughing) or

[6] This is an opinion based on my clinical practice with families of children with ASD in this age range.

someone who gives her lunch or just provides something.

Interviewer: because you were playing with her?

Martha: Playing with her, and doing something she was enjoying too. So, it wasn't that I was playing with her because I was really sort of sneakily trying to teach her - this was just relaxed, free. And I felt she felt happy.

Conclusions for parents.

Family-centred music therapy had a positive impact on the parent-child relationship, and was described as being a catalyst for change in the ways parents responded toward their children. The literature emphasises that parent and child well-being is reliant on thriving interpersonal engagement between them (Moore, 2009; Williams, 2010). This study shows that family-centred music therapy can support parents and children by facilitating relationship.

The delineation of the social communication category of impairment for ASD in the DSM-5 (American Psychiatric Association, 2011) has the potential to change our thinking about how to support the development of young children with ASD. Rather than seeing social and communication skills as separate entities, the DSM-5 category will encourage those supporting children with ASD to consider how to best support the development of foundational social communicative behaviours that occur in relationship. These encompass capacities for social-emotional reciprocity, non-verbal interactions and interpersonal engagement. The outcomes from this study show that family-centred music therapy had a positive impact on children's ability to interact and engage with others, especially their families. Through an approach that musically and emotionally attunes to the child, music therapists can support the development of social communication skills while working respectfully with the family and the child's strengths and interests.

For music therapists.

While music therapy research continues to evolve in Australia and elsewhere, there still remain some fundamental issues to address, such as: "what can music therapy help with?"; "what works for whom?"; and "when is music therapy less effective?". At a recent ASD research forum in Melbourne, the second question was asked to the audience of researchers from a variety of disciplines (Vivanti, 2011). It seems that,

especially in ASD research, this question (and the implied gaps in our current knowledge it suggests), is pertinent beyond music therapy.

Social communication.

The new focus on social communication skills in the DSM-5 will impact on how music therapy researchers address these questions in the future. In order to be able to design strong research with children with ASD, our understanding of what 'social communication' means is key. Similar to many parents, I have often confused 'speech and language' skills with 'social communication'. Social communication is explained as a precursor to speech and language development, so the areas are intertwined, but very different. The results from this study show that family-centred music therapy made a significant impact on the quality of the child's social interactions, engagement, and the parent-child relationship. These results challenge the way music therapists explain the benefits of music therapy with children with severe ASD, which is typically with an emphasis on the motivating properties of music to assist with communication skill acquisition.

When reflecting on the MBCDI-W&G (speech and language) measure, I have a new awareness of the difficulty in defining speech and language skills for children with severe ASD. Questions of meaning and definition arise, such as: are we talking about children copying or imitating language?; if a child copies a word, does that count as a 'word'?; is word approximation good enough?: and, what does the 'functional' use of language mean?. These reflections are clearly vital to research design, but they are also valid for music therapy practice, as clarity in our explanation of 'what music therapy helps' will assist the profession to move forward. The impacts music therapy had on the parent-child relationship in this study broaden the limited ways music therapy can sometimes be depicted – as simply for motivation, or as a type of behavioural reward.

In contrast to much parent-mediated research targeting improved social communication in children, this study focussed on working with the parent-child dyad rather than just the parent. Music therapy sessions were fun and motivating for both the child and parent, and for that reason offered a unique context for the pair to engage with each other. The presence of the music therapists allowed direct support for the parent to engage their child to be provided as needed. The therapist could also see first-hand the challenges in the home environment, which allowed nuanced strategies to support the child to be generated.

Music therapy methods.

The model of practice described in this study was an eclectic combination of music therapy methods implemented in a person-centred, attuned way. While reading music therapy publications, I am always fascinated to read about 'what' the therapist did, and 'how' they did what they did. I have attempted to describe the methods in detail to contribute to this valuable dialogue. Musically and emotionally attuning to the child and family is the 'how' in this study, and this approach is supported in earlier music therapy research describing improvisational music therapy methods (Carpente, 2009; Edgerton, 1994; Kim et al., 2008, 2009).

However, my Australian training influenced my use of a broad range of music therapy methods including improvisation, songs, original compositions, movement to music, and musical games. In this way, I see similarities in the music therapy methods I used to the work recently described by Gattino et al. (2011) as "relational music therapy" (p. 142). Gattino et al. (2011) described a non-directive approach incorporating improvising, singing, and musical games that aimed to promote relationship and child-initiated interactions. This approach to working with children with ASD places importance on intersubjectivity and working in the "present moment" (Stern, 2004, p. xvi); where an emotional response is co-created and shared between the music therapist and client (Raglio, Traficante, & Oasi, 2011). Improvisational music therapy is therefore seen as particularly useful with non-verbal clients (Raglio et al., 2011; Trevarthen, 2001), and to this I would more broadly add that an attuned approach to various music therapy methods is also valuable.

Conclusions for music therapists.

Much of the music therapy literature with children with ASD has focussed on evaluating the changes to the in-session behaviours and skills of the child. This is not surprising, given that music therapy methods are dynamic and focus on the moment-to-moment interactions between the therapist and client. This approach to research honours what DeNora (2006) describes as the "music therapist's craft" (p. 90) as being the active ingredient of music therapy. Yet the emphasis in ASD research is on generalised skills and outcomes, implying that if a skill is not generalised, its value is diminished. So far, whether the effects of participating in music therapy impact the general development of the child are widely unknown because there have been few attempts to investigate this. While the challenges of comparative research design in

music therapy are many, there is a place for analysis of both in-session and developmental changes. These two perspectives will help researchers and clinicians to illuminate where the "value" of music therapy lies.

This study also contributes to our understanding of what the 'active ingredients' of music therapy are. Some of these are similar to other interventions for children with ASD, such as: the therapist's use of positive affect with the child (Schertz & Odom, 2007); the incorporation of the child's interests and motivations (Schertz & Odom, 2007; Vivanti, 2011); and a non-directive, facilitated approach with parents allowing them to come to their own understandings of what is and isn't helpful for their child (Aldred et al., 2004). Identifying the similarities of music therapy to other interventions is important in facilitating a dialogue with the broader research community (K. Hudry, personal communication, November 2011). Music therapy research findings can therefore assist the field of ASD research in general.

While there are similarities in music therapy approaches to other interventions, there are also aspects that are unique to music therapy. The interview responses of the parents point to the ability of music therapy to create a unique opportunity for mutual enjoyment. For parents of typically developing children, shared pleasure and interests occur naturally in the first months of life and continue to evolve organically. The parents in this study, whose children have severe social communication impairments, indentified the new closeness and togetherness they experienced with their child as a cherished and rare opportunity. Many parents reported how much they enjoyed the music activities themselves, setting up the unique situation where parent and child have shared pleasure. I suspect there is something about music itself that can draw people together; creating moments of musical attunement that may develop into emotional attunement. This is where the craft of the music therapist is most needed; to skilfully respond to the moment-to-moment situations in order to facilitate attunement – whether that is between the therapist and child, or the parent and child.

For ECI workers.

The current ECI code of ethics in Australia requires that workers support and complement the skills of the family in a strength based way that respects families' rights to choose how they want to be involved in ECI services (ECIA, 2011). The emphasis for ECI workers in family-centred practice is therefore on building the capacity of the family (Dunst & Trivette, 2009). This is a complex task that requires workers to

promote parents' self efficacy (Dunst et al., 2007) in ways that support parents through the often stressful role of caring for a young child with a disability (Dempsey et al., 2009).

In this study, family-centred practice involved a collaborative relationship between the parent and myself, which developed during weekly home visits. I worked with the family unit; encouraging parents to set the agenda for the sessions, and then providing ideas and support to promote the engagement of the child in the session. I asked parents to keep a record of the music activities they did in between sessions, but did not provide them with instructions or 'homework' tasks.

The median time parents reported interacting musically with their children per week was approximately 2.8 hours. Singing and listening to music were the most popular, averaging approximately 1.2 hours each per week. This study provides a first step at examining the ways parents adapt and incorporate the ideas and activities from sessions into their regular routines.

Further, parents' responses to the interview questions revealed that they adapted the music activities to suit their own needs and circumstances, such as using music to engage their child when toilet training, for bed time routines and car trips. The survey and descriptive data indicate that music therapy was a successful way to work collaboratively with parents and support their self efficacy and solution finding skills.

Conclusions for ECI workers.

This study provides insight into what makes family-centred collaborative practices with families successful beyond the discipline of music therapy. Certain elements of this style of practice are relevant to all ECI workers, such as: providing regular, in-home sessions that address the needs of the family as a unit; providing parents with resources to support the uptake of ideas[7]; and the use of activities that are mutually enjoyable for the parent and child. Music therapy has much to offer ECI, as parents reported that the music activities were both motivating for their children and pleasurable for the whole family to participate in. Parents could experience first-hand how music could engage their child in the sessions, and were able to adapt these experiences to other situations in the home and community.

[7] In this study, a resource kit was provided to each family with literature, a CD, and a collection of instruments.

The popularity of singing and listening to music may help to guide music therapists and others in designing programs and resources that parents can use independently with their child. Supporting parents to adapt the use of instrument games and activities in their interactions needs further research, as the use of instruments were the least popular methods used by parents outside of sessions. Parents may need more support from a music therapist before they feel comfortable to use these activities with their child, or perhaps these activities are best facilitated by a music therapist.

Final words

In trying to answer the question *does family-centred music therapy positively influence the social communication development of preschool aged children with severe ASD,* the outcomes from this study point to positive change in three areas: the quality of the child's social interactions in the home and community; a new closeness in the parent-child relationship; and positive impacts on the home environment. The ecological treatment model has therefore resulted in an ecological outcome; something that was unexpected in a 16 week treatment period. Measures that investigated relationship outcomes – considered most proximal to the focus of the treatment – provided evidence in favour of music therapy. These outcomes will contribute to future understanding and articulation of the value of music therapy.

Family-centred music therapy was an accessible intervention for these children and families, with promising outcomes. The Australian context of this study provides a necessary local perspective, however more research is required. A variety of evidence is needed, and in particular, more empirically based research designs. While the challenges of empirical research with young children who have complex needs are great, it is possible to design good quality comparative research projects. RCTs have a great deal to contribute to our understanding of the effectiveness of music therapy, complementing case study and qualitative approaches to inquiry.

Few studies have focussed exclusively on children with severe ASD, and hence little is known about the capacity for change and development of these children. This study has shown that improvements in social communication skills can occur for children with severe ASD, particularly in their ability to engage and interact with others. Further research in this area is needed to build knowledge about how to best support children with ASD and their families.

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Appendix A: manager consent form

Confirmation of agreement to assist with recruitment

Music therapy and children with autism:
The effect of family centred music therapy
on the social communication skills of young children with autism.

I agree to assist the research candidate with identification of children who meet the study's eligibility criteria, provide the parents of these children with information about the study, and to invite these parents to participate.

Signed: _____

Name (printed): _____

Job Title: _____

Date: _____

Return to: Grace Thompson
by fax: XXXXX
or post: XXXXX

Appendix B: recruitment poster

Music Therapy Research Project

THE UNIVERSITY OF MELBOURNE

Do you have a child who:

- Has autism
- Is aged between 3 – 5 years (or six, but not going to school yet)
- Uses a few words or doesn't have words yet

Are you interested in:

- Having individual Music Therapy sessions for 4 months
- Receiving a set of instruments to keep

Are you able to:

- Fill in some questionnaires
- Participate in an interview

If you are interested, please ask your family service coordinator or key worker for an information sheet and consent form, or contact Grace 0414 373 075.

Appendix C: plain language statement

Music therapy and children with autism:

The effect of family centred music therapy
on the social communication skills of young children with autism.

Introduction

We would like to invite you and your child to participate in our research project, which aims to discover whether music therapy effects the development of social communication of your child, and if so, in what ways. This project has been approved by the Human Research Ethics Committee at the University of Melbourne, and the Education, Policy and Research Division of the Department of Education and Early Childhood Development.

What will I be asked to do?

If you agree to participate, you will be asked to contribute in the following ways:

To begin with, you will be asked to complete 4 questionnaires about your child's development which will take about an hour in total. This will give us your opinion about your child's development before starting music therapy.

Then you will be assigned to either the "music" group or the "waiting" group.

If you are in the music group, you will be asked to participate in between 12-16 weekly music therapy sessions with your child. These sessions can be held in your home, or another location if you prefer. We will also video your child participating in the second session and the last session, and then ask you to comment on your child's participation. If you are in the waiting group, your music therapy sessions will begin 4 months later.

We are also interested to know if you use the music activities in between sessions, so we have a form for you to fill in to keep track of this.

When all the sessions are finished, you will be asked to fill in 4 questionnaires. This is so that we can see if there have been any changes in your child's development after music therapy sessions. We would also like to know what you thought about the music therapy sessions, so we will invite you to do an interview with the researcher. This will be audio-recorded so that we can make an accurate record of what you say. You can have a copy of the transcript if you like, so that you can say if the information is correct and make any changes you feel are necessary.

We will then visit you again 2 months after you finish the music therapy sessions, and you will fill in 4 questionnaires. It is important that you do not participate in individual music therapy sessions with a music therapist in this time, but you are welcome to continue the activities with your child yourself. This is so that we can see if any changes in your child's development have been maintained.

As you can see, there are a lot of steps in this project. This is because we want to be sure about what the effects of music therapy are for children with autism and their families. Page 3 gives you a summary of all the steps involved.

Continued on next page...

What are the benefits of participating in this study?

Studies about music therapy and children with autism have shown that social and communication skills can improve when music activities are used with children. Receiving 12 sessions of music therapy may assist with your child's development.

Personally, you will receive a kit of resources to keep so that you can continue the activities at home. This kit will contain basic instruments such as a small drum, egg shakers, bells and hand cymbals, song lyrics, tip sheets and a CD of a relaxing children's song written by one of the researchers, Grace Thompson.

The knowledge that we gain from this study will help future children with autism and their families to select relevant services for their child.

How will my confidentiality be protected?

We do not want anyone to have access to details about your child and will protect your anonymity to the fullest possible extent, within the limits of the law. Your name and contact details will be kept in a separate, password-protected computer file separate from any other information that you supply. This will only be able to be linked to your responses or your child's development by the researchers, for example, in order to know where we should send your interview transcript for checking. In the final report and any conference presentations or publications, you and your child will be referred to by a made-up name (pseudonym). We will remove any references to personal information that might allow someone to guess your identity, however, you should note that as the number of people we seek to study is very small, it is possible that someone may still be able to identify you. The data will be kept securely in the Faculty of Music for five years from the date of publication, before being destroyed.

How will I receive feedback?

If you wish, a summary of the findings will be available to you once the research is completed. Your Early Childhood Intervention Centre will have a copy of the summary, or you are welcome to contact the Faculty of the VCA and Music.

What if I change my mind and don't want to participate any more?

Your participation in this study is completely voluntary. You are free to withdraw at any stage, and to withdraw any data you have supplied. We would like to assure you that your decision to participate or not, or to withdraw, will have no effect on the services provided by the Early Intervention Centre and you will still be able to participate in music therapy sessions in the future.

Where can I get further information?

If you require any further information, or have any concerns, please do not hesitate to contact either of the researchers on the numbers given above. Should you have any concerns about the conduct of the project, you are welcome to contact the Executive Officer, Human Research Ethics, The University of Melbourne, on ph: 8344 2073, or fax: 9347 6739.

How do I agree to participate?

If you would like to participate, please show that you have read and understood this information by signing the accompanying consent form and returning it in the envelope provided. The researchers will then contact you to arrange a mutually convenient time for you to begin the process.

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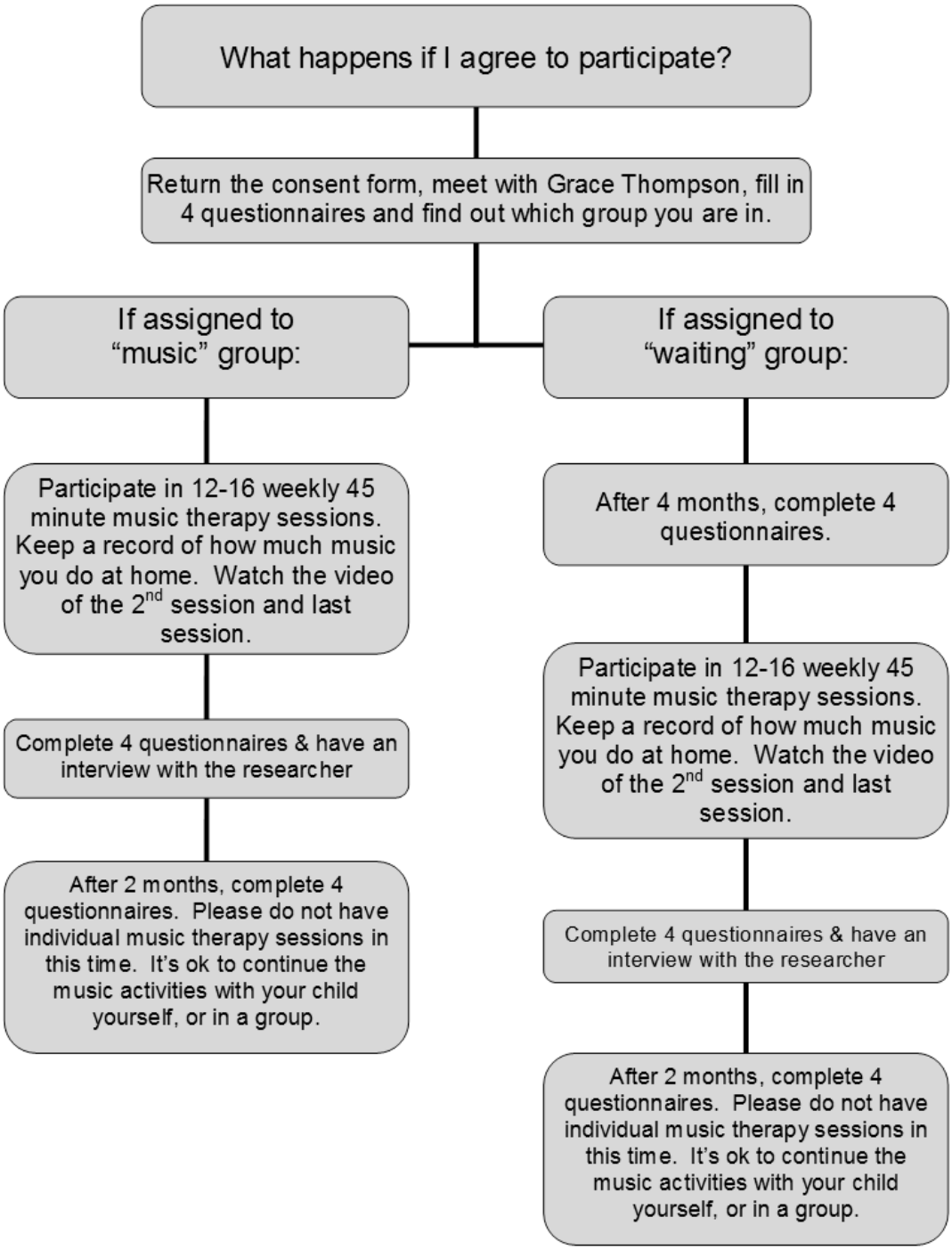
What happens if I agree to participate?
Return the consent form, meet with Grace Thompson, fill in 4 questionnaires and find out which group you are in.
If assigned to "music" group:
If assigned to "waiting" group:
Participate in 12-16 weekly 45 minute music therapy sessions. Keep a record of how much music you do at home. Watch the video of the 2nd session and last session.
Complete 4 questionnaires & have an interview with the researcher
After 2 months, complete 4 questionnaires. Please do not have individual music therapy sessions in this time. It's ok to continue the music activities with your child yourself, or in a group.
After 4 months, complete 4 questionnaires.
Participate in 12-16 weekly 45 minute music therapy sessions. Keep a record of how much music you do at home. Watch the video of the 2nd session and last session.
Complete 4 questionnaires & have an interview with the researcher
After 2 months, complete 4 questionnaires. Please do not have individual music therapy sessions in this time. It's ok to continue the music activities with your child yourself, or in a group.

Appendix D: participant consent form

Faculty of Music

Consent form for persons participating in a research project

Music therapy and children with autism: The effect of family centred music therapy on the social communication skills of young children with autism.

Name of child participant: _____

Name of investigator(s): Dr Katrina McFerran-Skewes and Grace Thompson (PhD student)

1. I consent to participate in this project, the details of which have been explained to me, and I have been provided with a written plain language statement to keep.
2. I understand that after I sign and return this consent form it will be retained by the researcher.
3. I understand that my participation will involve an assessment of my child, filling in questionnaires about my child's development, participating in 12-16 music therapy sessions, commenting on video footage from 2 sessions, and an interview about my experiences as a parent. I agree that the researcher may use the results as described in the plain language statement.
4. I agree that:

   (a) the possible effects of participating in the assessment, questionnaires and music therapy sessions have been explained to my satisfaction;

   (b) I have been informed that I am free to withdraw from the project at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;

   (c) the project is for the purpose of research;

   (d) I have been informed that the confidentiality of the information I provide will be safeguarded subject to any legal requirements;

   (e) I have been informed that with my consent the interview will be audio-taped and I understand that audio-tapes will be stored at University of Melbourne and will be destroyed after five years;

   (f) I have been informed that with my consent 2 sessions will be video recorded and I will be asked to comment on the video. I understand that the video footage will be stored at the University of Melbourne and will be destroyed after five years;

   (g) my name will be referred to by a pseudonym (a made-up name) in any publications arising from the research;

   (h) I have been informed that a copy of the research findings will be forwarded to me, should I request it.

I consent to the interview being audio-taped	□ **yes** □ **no** (please tick)
I consent to 2 sessions being video recorded	□ **yes** □ **no** (please tick)
I wish to receive a copy of the summary project report on research findings	□ **yes** □ **no** (please tick)

Participant signature: _____ Date: _____

Appendix E: participant information sheet

Personal information sheet

This information will be kept secure and only accessed by the student researcher

Your name: _____

Your address: _____

Your phone number: _____

What is your highest level of education? Year 10 or lower ❒ Year 11-12 ❒ Tertiary training ❒ University degree ❒

Your child's name: _____

Your child's date of birth: _____

Is your child: Male ❒ Female ❒

Does your child have a diagnosis of autism? Yes ❒ No ❒

If yes, are you able to give a copy of the diagnosis report to the researchers? Yes ❒ No ❒

Please list any other conditions your child may have (adhd, vision impairment, etc.) _____

Does your child say single words? Not yet ❒ Yes ❒

If yes, how many words does he/she say? Less than 5 ❒ 5-10 ❒ 10-20 ❒ More than 20 ❒

Does your child put words together in a "sentence"? Not yet ❒ Yes ❒

If yes, how many words does your child put in a sentence? 2 ❒ 3 ❒ 4 or more ❒

Is your child receiving early intervention services? Yes ❒ No ❒

If yes, how many hours a week of early intervention do you receive? 1 hour ❒ 2 hours ❒ 2-5 hours ❒ More than 5 hours ❒

Has your child ever received Music Therapy? Yes ❒ No ❒

If yes, were the sessions: Group ❒ Individual ❒ Both group and individual ❒

Is your child receiving private therapies? Yes ❒ No ❒

If yes, how many hours a week of private therapy do you receive? 1 hour ❒ 2 hours ❒ 2-5 hours ❒ More than 5 hours ❒

Please list the private therapies you receive: _____

_____

_____

Appendix F: lyrics of songs included on the CD for participants

Play with me (to the tune "Twinkle Twinkle Little Star")
Play with me, play with me,
You can play along with me.
Hum the next two lines of the melody.....
.....
Play with me, play with me,
You can play along with me.

Star song © Grace Thompson 2008

This is my star, this is my star *(make a star shape with fingers)*
Shining just for me *(sway side to side)*
This is my star, this is my star *(make a star shape with fingers)*
Shining just for me *(sway side to side)*

Up, up, up, up, up, up *(lift arms slowly up)*
Way up in the sky.
Down, down, down, down, down, down, *(slowly lower arms)*
Shining down on me

This is my star, this is my star *(make a star shape with fingers)*
Shining just for me *(sway side to side)*
This is my star, this is my star *(make a star shape with fingers)*
Shining just for me *(sway side to side)*

We are finished © Grace Thompson 2009
We are finished, we are finished,
Our music time is finished.
Give a hug, give a kiss,
Our music time is finished.

Appendix G: example from the social communication skills information booklet for participants

Developing social and communication skills

The following information is adapted from "Joint Attention Mediated Learning: Promoting Social Communication for Toddlers." By Dr. Hannah H. Schertz, 2009.

Our music time will focus on three areas of social communication, all important building blocks for interacting socially with others and developing communication skills. These areas are:

- Looking at others' faces (Focusing on Faces)
- Taking turns in back-and-forth play (Turn-taking)
- Sharing attention about things your child is interested in (Joint Attention)

Focusing on Faces and Turn-taking are important ways to help your child include you in their play and to prepare for Joint Attention. Your child will show Joint Attention when they look at you and at something you are both interested in – as a way to "talk" about it without words.

These skills are the building blocks or foundations for social communication. All three stages are important because children who share socially with joint attention are more likely to learn to talk and to interact socially with others.

Continued over the page...

Ideas for playing with your child with music

It usually works best if you sit on the floor with your child in the same place. If your child wanders, you can try sitting together on a small blanket so they understand the boundaries.

- *Manage the time.* If your child seems stressed or unable to engage with you, try starting with a few very brief music times, extending the time as they become familiar with the routine. Rather than allowing music time to become difficult, plan to end playing together just *before* rather than *after* negative behavior occurs. You can use the amount of time that was successful in the first couple of music play times as your guide, extending each new music play time just a few minutes longer. Remember, you want these times to be pleasant social interactions for both you and your child.

- *Use calming strategies.* Help your child find ways to calm themselves if they get upset by too much noise, visual distraction, or touch during music time. Follow their lead to learn what they can tolerate. Gradually increase the variety, intensity, and frequency of sights, sounds, and touch in your interaction. Allow quiet, alone time if your child seems stressed. Experiment with touch and your voice to see what is calming, discovering how much and what kind of soothing your child prefers (hug, cuddle, back rub, quiet song, etc.)

- *Minimise distractions*. In the beginning it may help your child to have your music time in a place without too many distractions. This can be a quiet, orderly, softly lit place without TV, radio, or other people.

Appendix H – example of PCRI items

Item 6: When it comes to raising my child, I feel alone most of the time

Item 7: My feelings about being a parent change from day to day.

Item 24: I regret having children.

Item 26: My child is out of control much of the time.

Item 27: Being a parent isn't as satisfying as I thought it would be.

Item 34: I sometimes feel overburdened by my responsibilities as a parent.

MTDA Protocol **maximum 30mins session length**

Activity	Method	What to Observe
Hello song (Oldfield) Hello in D (Trad adaptation)	• Use the child's name • Try to sing directly to the child	• emotional response of the child. • ability to listen and focus on a song without them having to do something else or join in.
Child offered a choice (Oldfield) **Improvised song** (Thompson) Twinkle G Old Mac C D7 G7 A7 Wheels on bus C	• Make an open statement to the child with a gesture "what shall we do?" • Set up: ball, guitar, small instruments, song pictures, slide whistles.	• how easily the child makes a choice • whether the choice has to be simplified (offered two objects) • whether the child rejects the situation.
My choice: **Free improvisation** (Oldfield) E slide *emotions too Cmaj7 Dm G	• Child given a small selection (1-3) large percussion instruments. Drum, cymbal, chimes. • MT accompanies on guitar • MT uses a mixture of improvisation strategies – following the child, deliberately challenging (stopping, changing the style unexpectedly), weave in a familiar tune.	• how we play together • MT's reactions (bored, excited, excluded) • child's abilities (copies, initiates ideas, avoids leading, always wants to lead, repetitive patterns) • child's emotions (confident, anxious) • child is able to be creative.
Child offered a choice (Oldfield) **Improvised song** (Thompson)	• Make an open statement to the child with a gesture "what shall we do?" • Now all instruments previously used are available	• how easily the child makes a choice • whether the choice has to be simplified (offered two objects) • whether the child rejects the situation.
My choice: **Percussion dialogue** (Oldfield) **Kazoo/Slide Whistle dialogue** (Oldfield)	• Using any combination of untuned percussion • MT and child sit facing if possible and take turns on their own or the same instrument. • Modelling to the child how to play the instrument MT makes different emotional sounds into the slide whistle – sad, happy, angry.	• how easily a child shares, takes turns, enters into a dialogue. • Child imitates, initiates. • It is a closer proximity, so how comfortable is the child with this. • child imitates, initiates, is able to take more than one turn • how does child respond to emotional content of the MTs kazoo.
Child offered a choice (Oldfield) **Improvised song** (Thompson)	• Make an open statement to the child with a gesture "what shall we do?" • Now all instruments previously used are available	• how easily the child makes a choice • whether the choice has to be simplified (offered two objects) • whether the child rejects the situation.
Goodbye (Oldfield)	• MT sings goodbye accompanying on bongo drums.	• how does the child share an instrument • does the child have difficulties with ending (both the song and the session).

Improvised song (Thompson)

- MT improvises a song for the child based on what they are doing, or changes a familiar song to be about the child.
- MT accompanies on guitar or percussion
- Observe: child's response to MTs singing – smile, eye contact, communicative response.

Improvised story (Oldfield) – cannot do with non verbal children. Do not score.

Appendix J: weekly record sheet

What we did during the week with music

	/ /10	/ /10	/ /10	/ /10	/ /10	/ /10	/ /10
	Time spent in minutes	Time spent in minutes	Time spent in minutes	Time spent in minutes	Time spent in minutes	Time spent in minutes	Time spent in minutes
Singing without instruments							
Singing and playing instruments							
Improvising with the instruments (making up our own music)							
Listening to music together							

Any comments:

(continue on back if needed)

Ideas for this week:

Songs
Try some of the songs we did this week:

Songs with instruments
- Try singing a song with your child and keep the beat with the instruments. Don't worry if your child doesn't play the instruments, they might join in later.

Instruments
- Bring the instruments out for special music time together.
- Try to copy what your child is doing with the instruments.

Listening to music
- Choose a time when your child is calm and quiet. Put on the CD from your book and sit close to your child.
- Try slowly rubbing your child's body and look at their face.

Sheet filled in retrospectively: yes ❒ no ❒

Appendix K – photo of instrument kit for families

Appendix L: photo of equipment brought to sessions

Appendix M: lyrics and instructions for "Bounce and Sway"

Bounce and Sway © Grace Thompson 2006

And we bounce and we bounce and we bounce and stop *(bounce child on your lap or a trampoline, or bed, or couch, or large ball)*
And we bounce and we bounce and we bounce and stop
And we bounce and we bounce and we bounce and stop
And we bounce and we bounce and we bounce and stop
And we bounce and we bounce and we bounce and stop
And we bounce and we bounce and we bounce and stop

And we sway and we sway and we sway and stop *(rock with child in your arms, or stand and rock side to side holding hands)*
And we sway and we sway and we sway and stop
And we sway and we sway and we sway and stop
And we sway and we sway and we sway and stop
And we sway and we sway and we sway and stop
And we sway and we sway and we sway and stop

Appendix N: lyrics and instructions for "Bee Hives"

Bee Hives Traditional

(while singing the verse, hold hands and march around the room, or bounce child on your knee)
Here are the bee hives, but where are the bees?
Hidden away where nobody sees.
Watch and you'll see them come out of the hive
1-2-3-4-....5!!! *(stop moving, and count 5 with your fingers. On "5" tickle, cuddle, or wrestle)*

Appendix 0: raw numeric data for number of sessions attended for each participant in the music group

Treatment Group	Number of music therapy sessions completed (16 maximum possible)
A01	15
A04	13
A07	15
A08	12
A10	13
A14	15
A16	14
A18	15
A21	14
A22	16
B01	13

Appendix P: Social communication subscale items for the SRS-PS

Question number	Social communication subscale questions
12	Is able to communicate his or her feelings to others.
13	Is awkward in turn-taking interactions with peers (e.g. doesn't seem to understand give-and-take of conversations).
16	Avoids eye contact of has unusual eye contact.
18	When on the playground or in a group with other young children, child does not attempt to interact with the other children.
19	Gets frustrated trying to get ideas across in conversations.
21	Is able to imitate others' actions.
22	Plays appropriately with children his/her age.
26	Offers comfort to others when they are sad.
33	Is socially awkward.
35	Has trouble keeping up with the flow of a normal interaction with other children.
36	Has difficulty "relating" to adults.
37	Has difficulty "relating" to peers.
38	Responds appropriately to mood changes in others (e.g. when a friend's or playmate's mood changes from happy to sad).
41	Wanders aimlessly from one activity to another.
46	Has overly serious facial expressions.
47	Is too silly or laughs inappropriately
51	Responds to clear, direct questions in ways that don't seem to make any sense.
53	Talks to people with an unusual tone of voice (e.g. talks like a robot or like he/she is given a lecture).
55	Knows when he/she is too close to someone or is invading someone's space.
57	Other children do not like to play with him/her.
60	Is emotionally distant, doesn't show his/her emotions.
61	Is inflexible, has a hard time changing his/her mind.

Appendix Q: Social awareness subscale items for the SRS-PS

Question number	Social awareness subscale questions
2	Expressions on his/her face don't match what he/she is saying.
7	Is aware of what others are thinking or feeling.
25	Doesn't seem to mind being "out of step" or not on the "same wavelength" with others.
32	Wants to be changed when diaper or underwear are soiled or wet.
45	Focuses his/her attention to where others are looking or listening.
52	Knows when he/she is talking too loud or making too much noise.
54	Seems to react to people as if they are objects.
56	Walks in between two people who are talking.

Appendix R: raw scores pre to post for the MTDA

Treatment Group	MTDA scores		
	Pre	Post	Change Score
A01	15	13	-2
A04	13	12	-1
A07	13	4	-9
A08	20	12	-8
A10	19	15	-4
A14	20	8	-12
A16	16	11	-5
A18	10	7	-3
A21	21	18	-3
A22	15	12	-3
B01	15	10	-5

Note: maximum score possible = 22. Higher scores indicate more severe impairment, so a reduction in score is a positive outcome.

Appendix S: raw data from the weekly record sheets

Blank lines mean that no record sheet was completed in that week.

Week	Participant A04 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1				
2	4	22	25	4
3	12	22	24	0
4	7	11	25	0
5	12	19	15	0
6	35	7	27	0
7	17	2	14	0
8	25	17	20	10
9				
10				
11	10	4	20	0
12	9	7	10	0
13	2	0	5	0
14				

Week	Participant B01 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1	280	90	0	50
2	130	45	0	90
3	210	0	0	630
4	0	0	0	350
5	120	30	0	70
6	40	20	5	65
7	55	10	20	80
8				
9				
10	45	30	25	110
11	50	100	10	55
12	95	15	45	65
13	65	15	30	80
14				

Week	Participant A10 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1	30	15	0	0
2	40	15	30	30
3				
4	0	0	0	0
5	40	35	0	20
6	25	20	25	15
7	0	0	0	0
8				
9	15	30	15	10
10				
11	10	25	10	35
12	20	25	0	0
13				
14				

Week	Participant A14 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1				
2	3.5	8.5	2.5	15
3	12	11	4	15
4	13	17	11	34
5	17	23	19	55
6	15	23	17	40
7	7	13	9	25
8				
9	11	12	12	36
10	13	14	15	53
11	13	26	15	82
12	13	19	12	38
13	7	11	9	33
14	9	16	16	46

Week	Participant A07 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1				
2	0	0	5	0
3	7	0	15	0
4	33	0	0	0
5	23	0	0	0
6	140	0	0	0
7	140	0	0	0
8	0	0	0	0
9				
10	70	0	0	0
11				
12	0	0	0	0
13	35	0	0	0
14				

Week	Participant A08 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1	60	85	0	150
2	140	0	0	215
3				
4	65	0	0	120
5	65	20	0	150
6	180	0	0	0
7				
8	420	0	0	360
9				
10	420	0	0	600
11	420	0	0	0
12	180	0	0	120
13	240	0	0	240
14				

Week	Participant A01 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1				
2	430	220	170	235
3	205	115	80	160
4	230	115	135	160
5	210	105	70	185
6	230	160	130	245
7	230	165	75	210
8	210	110	60	190
9				
10	200	60	70	195
11	280	100	100	170
12	135	40	50	155
13				
14				

Week	Participant A16 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1	25	25	0	0
2	63	0	0	0
3	55	0	0	10
4				
5	15	60	110	5
6	60	0	0	0
7	50	40	45	0
8	70	15	0	0
9	15	0	0	0
10	165	45	0	0
11	105	0	0	70
12	35	0	0	0
13				
14				

Week	Participant A18 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1	10	41	30	30
2	35	25	230	60
3	50	50	15	70
4	25	50	35	0
5	35	55	0	30
6	45	55	30	15
7	50	80	0	75
8	40	60	15	45
9	70	270	0	0
10				
11	55	35	0	0
12	90	60	0	0
13	60	40	0	20
14	50	20	0	45

Week	Participant A21 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1	100	75	200	215
2	15	0	20	50
3				
4	38	45	90	225
5				
6	13	15	70	110
7	23	0	0	170
8	60	0	0	210
9	29	18	0	140
10	24	29	14	210
11	35	21	14	210
12	36	14	21	140
13	21	14	35	210
14	21	14	35	210

Week	Participant A22 - time per week in minutes			
	Singing without instruments	Singing and playing instruments	Improvising with the instruments	Listening to music together
1	420	25	25	155
2	260	115	65	185
3	225	70	45	200
4	250	85	50	200
5	150	85	50	155
6	165	75	50	200
7	140	95	45	175
8	170	100	45	185
9	135	110	65	175
10	160	110	50	190
11	125	100	45	170
12	90	65	40	95
13	105	120	45	135
14	265	100	75	265

Appendix T: follow-up survey of parents' use of music in the home

Musical Activity Questionnaire

Child's ID: _____

Today's Date: _____

Have you continued to use music activities with your child since music therapy sessions have ended? Yes ❒ No ❒

If yes,
What sort of music activities have you used? (tick all the ones that apply)

Singing without instruments ❒
Singing and playing instruments ❒
Improvising with the instruments ❒
Listening to music together (CDs) ❒

If yes,
Please estimate how much time you have spent doing music activities:

Singing without instruments	**Singing and playing instruments**	**Improvising with the instruments**	**Listening to music together (CDs)**
Every day for _____ minutes	Every day for _____ minutes	Every day for _____ minutes	Every day for _____ minutes
or	or	or	or
Every week for _____ minutes	Every week for _____ minutes	Every week for _____ minutes	Every week for _____ minutes
or	or	or	or
Every month for _____ minutes	Every month for _____ minutes	Every month for _____ minutes	Every month for _____ minutes

Any further comments: _____

_____

_____

_____

Thank you for completing this information sheet.

Appendix U: raw data from the qualitative analysis

Themes	Codes	A01
Changes to the parent child relationship	Attunement There is positive emotion attached to being closely involved with the child. The parent considers that she can now make her child happy. This brings a perception of closeness and togetherness in the relationship.	it's just more um I'm maybe I'm more close because I'm dancing and singing more with her and i think i make her happy because she's laughing and she starts clapping. she doesn't clap before, or maybe if she clapped she doesn't understand. i think she understands clapping is for happy. yeah, that's changed. we always say "bravo" and she's clapping and she's loving it so she understands. so more, we more together. we doing the things together. that's changed. but yeah, i love her the same.
Changes in the parent's response to the child	Actively engage Parent takes initiative in finding activities to engage her child in. Considers it is important that these are activities that her child enjoys and is familiar with. Higher expectations Parent now sees that the child can handle being challenged, and that this is what the child needs. Greater confidence in the parent in acting on what they think is best for the child.	I'm doing more with her now. i try um check the kinder more often, what sort of, because once a week they have um music programs so i check what sort of songs they have and i try practice the same at home. because she brings sometimes funny things and i don't know what she is doing. so after i go to the kinder and i try to find. I'm dancing with her more often. I know all your songs now, so i singing the songs for her. *(originally I had described this as "agency" to describe the active problem solving of the parent; but it seemed too removed from the data)* *(continued from below)*...And you know, just now i know for sure i have to push her more even in the future i want to find some music school for her maybe, something, you know. *(what is she trying to say here? Now she feels confident she can push her child? She now perceives her child can handle it? Needs it? Or is this a shift in her response to the child? She can expect more from her child?)*
Changes in the parent's perception of the child	Confirmed love of music Being in the music sessions provided evidence of the mother's perception of how much the child enjoys and loves music.	Interviewer: did it change anything for you in the way you see A01? Person 1: just again, it showed me what i think before. how much she loved music and how much music can help her. um, like maybe it's coincidence because she started talking the same things, but the words which she say is from song. so, i always know, because my mum loves music, she loves singing (grandmother), i love music, and we all really love music and we always have some music at home, and A01's always dancing, she always likes music...

Themes	Codes	A04
Changes to the parent child relationship	Reintroduced Parent and child discovered each other afresh.	even though you felt like you were just kind of there, you still... I think introduced that, i don't know, A04 and i to each other again but in a different way. so in that aspect, that's how i felt with the change in our relationship.
Perceptions of what impacted the changes in the parent-child relationship	Time to connect The parent experienced a shift in role which reaffirmed her as the child's mother rather than therapist. There was opportunity for mother and child to simply be together and make a connection. Focus on attunement The mother now has time to look at her child and judge whether her child is engaged and enjoying the activity. She can then decide to try something different if her child doesn't like what she's doing. The emphasis is on attuning to what the child needs/wants from her.	so in a sense you did free up a lot of that time so it could be just A04 and myself. like, i think having that third person, and i find that with a lot of therapy, if there's someone else there, it gives mum and child the opportunity to make that connection, rather than mum having to work like a therapist and be a mum and...so yeah, i think you played a huge part in that change. *(This is about changes to the parent-child relationship, but is more a reason for the change in relationship...how to code this? Moved it out of "changes to p/c relationship".)* also because, say, we're singing the song, I've got the opportunity to do the actions with her or, if she doesn't like what I'm doing, I'll sort of would change because I've got time to actually look at her and watch her face and sort of pick up "she doesn't like that i might try this". whereas if i was playing the guitar, and that's why even with the instruments you've provided, I'll just sit back and copy rather than just try to initiate so that she doesn't just run away from cause it's like "that's not your role...we're supposed to be doing this together" *(similar...moved it from "changes in parent's response to the child". Seems to be a recognition of motivations – if her child doesn't "like" something, she will make an adjustment. It seems this data overlaps with a couple of themes. It could also be an insight gained about the child.)*
Changes in the parent's response to the child	Persistence The mother now reminds herself to calm down and try again if her child is irritated by her. Rather than give up when her child is irritated by something she is doing, she tries to be patient and persists. In the past she could be impatient and want her child to hurry up and learn things. If her child wasn't learning quickly enough, she would feel anxious and jump from one thing to another. Playing rather than teaching There is a sense that the mother used to be focused on teaching her	one thing that stood out was it made me stop and wait a bit and be patient rather than...i mean a lot of times I'm trying something at home and if i see the irritation, maybe because I'm sort covering a whole lot of roles at home, i sort of give up - she doesn't like it, forget it. whereas watching you it was like, "ok just wait a minute M (own name)" that self talk - wait, try this, try something else. just to be a bit more patient. *(originally had this as a separate code: "positive self talk", but now consider that it's the persistence that is the response of the mother.)* Interviewer: interesting, patience has come up for other mums as well. it's been a comment that's been made. Person 1: because its, i think it's a huge factor. cause we're so....i think most of our time is spent "oh, hurry up and learn it. hurry up, i want you to learn it. i want to know if you're going to learn it. will you get there?" you know, so it's always that anxiety. so we're like jumping from one thing to another rather than sitting...and watching you, the way you were with A04, you were very relaxed. "ok, let's go like this, let's try it again" and slowly she'd come around, which she did with many of the songs that we sang. so that's what, i have learnt..(laughing) Interviewer: because you were playing with her? Person 1: playing with her and doing something she was

	child, and that this was always the agenda with every interaction. Now there is acknowledgment of the value of play and doing something the child enjoys.	enjoying too. so it wasn't just I'm playing but I'm sort of sneakily try to teach her - oh well let's sit down and play, but no, you've got to colour that in or you've got to draw a circle. this was just relaxed, free.
Changes in the parent's perception of the child	Interested in my feelings Here the mother is trying to imagine her child's inner thoughts and motivations. She is now viewing these more positively, and feels that her child is more connected to her now.	i think it sort of showed me a side of A04 where she actually was interested in how I was feeling or reacting to her while she was playing an instrument. she wanted me to watch her or she tried really hard to join in. *(there is a sense of finally seeing the child as connected to her; interested in her)*
	Functional to personable There is some double thinking going on here. The mother has a changed perception of her child's perception of her. The mother feels less like an object or vehicle for the child to get what they want, and more like a mum. The child is more interested in her socially and affectively rather than functionally.	i was happy, and happy to see A04 looking at me in a different light in a way, not just a thing, (laughing) or someone who gives her lunch or just provides rather than yeah, i would say A04 has definitely grown closer to me. she's always looking for my recognition when she's doing various things. so, prior to music therapy she was mainly looking for me, like i was saying before - "can i have some food or chips, or banana, peel the banana." it wasn't any sort of social interaction or interest in me as her mum. it was just "ok, i want to go outside, get the hat, get this". whereas now she wants to show me she has drawn something. she really wants me to look at it - "look mum, a body of a cat or the ears or the...look what I've done". so i think the relationship, it could be that she's getting a bit older, but I'm sure all these other facets of doing stuff that she's enjoying is bringing out a happier A04 i guess. Interviewer: and like you said before, seeing you in a different function Person 1: yeah, always wanting to, i don't know...like, different things, sort of like a normal child would be saying "hey mum look at me". she might not be using her words, but i know the way she's trying to get my attention "look what I'm doing" rather than just "ok can you get me a drink or..."

Themes	Codes	A07
Changes in the parent's response to the child	From orders to engagement Previously the mother used more direct approaches with her child – giving orders or instructions. Now she uses more indirect approaches to communicate with her child, which feels like their communication has gone to a different level. She has found that if she can positively engage her child, then he will be more amenable to her requests.	It was kind of, I've been taught a lesson like I've been taught something, on how to communicate with him on a different...rather than just you know "no don't do that" or "let's do". i sometimes break out in song. we sing a song, and I can engage him, and get his attention and then its "ok, let's go and do this" and he'll easily go and do it.
	Incorporate motivations The parent is describing a real shift in her approach to her child. She realises that using her child's motivations will engage him and this may help when the child is fussy and does not want to cooperate at times like having his nappy changed.	Interviewer: wow. so how would you sum up what you've learnt then? what is...can you pin it down? what is it that you've learnt? Person 1: um...i don't know, it's just, you know, having to communicate with him on a different level, like you know, like, singing a song never occurred to me that that might motivate him, that that might engage him in something - an activity - or in something I wanted him to do. so know now, if I'm changing his nappy and he's being a little bit fussy you know, I'll sing a song "eyes and ears" or the hello song, or get Wags involved. *(this didn't seem to fit a change in perception of the child anymore)*
	Being playful This is another shift in the parent's approach to her child. She now sees that she can more successfully communicate with her child if she makes it fun for him.	Interviewer: yes, well you became Wags. there was a point at which Wags started to join us, and then you were Wags. What was that like for you, playing that role? Person 1: yeah, it was fun. it was good that he could...that was another way....like I do that too sometimes now, I'll say "oh, what about Wags? let's go and get Wags and see what Wags wants to do" and he's like "oh, dog, dog" and then you know he'll...and he sometimes treats the dog, like he's showing the dog something, like he did with the Woody (doll). he does that sometimes. yeah so you know I've learnt a whole new different aspect of trying to communicate with him. and even (his father) sometimes will sit on the couch and sing to him and...
Insights parent has gained about the child	A love of music There is a sense of confidence in the way this mother expresses her realisation of her child's love of music. She used to feel very unsure about what her child liked, but now she asserts that she knows what he likes.	i never knew what he liked, because it was hard for him to say "mummy get that". like at 2 years old, (older sibling) was able to tell me he loved Buzz and Woody and he loved cars and...he was able to tell me what he was interested in. and if people asked me "what can i get him for his birthday? what does he want?" i was able to say "he loves this or he loves that". i never...we could never answer that with A07. And ever since doing music, we found his love for music, and he actually loves a good tune and something on the radio. if i turned off the radio he'll say "mummy turn me on" like, instead of turn it on he's like "turn me on". *(this now seems to have a different quality...it's not really about a change in perception of the child, but rather an insight about the child? Moved out of "changes in parent's perception of the child")*
	Music motivates The parent has realised that she can be get her child to do more if she works with what motivates him, such as singing or playing.	feel i understand him a bit better, um, in that what motivates him and that what i can get him to do if you know if i sit down and sing a song or do an activity. *(again, a shift in insight rather than perception. Parent seems to be understanding that she can have an effect on her child now that she understands him better)*

Themes	Codes	A10
Changes to the parent child relationship	More interaction The child has been approaching the mother more to request her help and attention, and she has enjoyed sharing the child's interests.	Interviewer: that's so good. when you think about your relationship with A10, what was it like during music therapy and now maybe afterwards? what would you like to comment about that. Person 1: well, the same thing i just said. he comes to me more now with CDs and all that sort of stuff. so he's wanting that, he's wanting me to do that for him. but, yeah, it was nice, it was really nice, and it was something good to share. um, i mean we had a few tough moments, a few little outbursts here and there, but um, you know not compliant sometimes, but you know he did, he enjoyed it. and we enjoyed it. *(this could be a comment about perception of the child, but it was her response to the relationship question – seems right to analyse her comment through that lens.)*
Changes in the parent's response to the child	Sharing child's enjoyment There has been a shift from just going through the motions together, to sharing mutually enjoyable activities. It's as if she gives herself permission to do this rather than be solely focused on the child's learning. Engaging for pleasure Rather than pushing and directing the child, the mother now feels that her interactions with her child are more pleasurable. This pleasure is linked to stepping back from directing her child's participation. Supporting child's interests When she realised her son's love of music, she was keen to support his interests by providing resources such as a CD player. Providing resources based on the child's interests have given the child more opportunity to interact with her and other family members.	Interviewer: and you know, you, you're somebody who i think had a very strong relationship with A10 right from the start. Person 1: oh yeah, God yeah. we do. we do do a lot of things together, like general things, things at home, a lot of activities. just general things, we do. and it was nice just to enjoy something that he enjoyed doing, more so, instead of a lot of structured stuff. it was structured, but you know, he enjoys music, so therefore he's wanting to do it instead of like the stuff he doesn't really really want to do, but he sort of has to learn how to do it. *(initially had this in "changes to p/c relationship", but I think she is more describing a shift in her response to the child. She is now valuing shared enjoyment rather than just doing things for learning. However, there is a sense of distance – the parent is enjoying what the child enjoys.)* Interviewer: and so you have a different role in those sort of activities Person 1: yeah, well you're more sort of pushing and you're more sort of "ok, no, this way" and then you get the outbursts of getting angry and all that. otherwise with music, it was more pleasurable. there was a few little outbursts and stuff, which happens, but it was um good. that, well ok, we'd never listened to a CD before. honestly, i went out and bought a CD player...before we had music therapy. and he now brings me CDs. we listen to it in the car all the time and he loves it. he actually chills out when we're in the car and we listen to his music. it's just lovely, and it gives him to a nice space. and we all, you know, participate in the songs, and we're all singing along in the car, and he yeah, he loves it. he loves it. but yeah it does, it makes you realise how much they enjoy it, and especially seeing all that eye contact that he gets, especially something that he loves. *(made in the context of realising A10's love of music.)*
Insights parent has gained about the child	A love of music There is a sense of amazement at how much her child loves music. It's as if this is a revelation to her.	I thought it was wonderful and it was enjoyable to do something really nice with A10 as well, like, to participate. but yeah, i think he really did enjoy it, when we could get him to sit and concentrate those little times. and it also made me understand how much he loves music and dance. It actually made me realise how much he really does love music. and, i mean, i knew he loved it, but he really loves it and he loves dancing and he loves rhythm. it actually really made me understand more of A10. it makes you realise that, you know, they can express

	Music motivates Seeing her child participate and respond in nonverbal music activities has given the mother insight into the importance of motivation. The child will show their skills when they are participating in a desired activity.	themselves through music, even though they might not be able to talk....they can at least express themselves through music. do the slow, the fast, the stop, you know, the different rhythms and the different, what would you call it, textures in music. and that helps you know, i think it does help you understand them a bit. cause they are listening and they are aware of things around them. sometimes you just forget that because they can't talk or tell you things, that they're, you know....and because they're so isolated in themselves, that you forget, you know. and when they do things like (participate in the music) you think "oh, they are listening" or "they are wanting to interact with us in certain ways". do you know what i mean? they're wanting to, if it is through something they desire. Interviewer: and there's an understanding there? Person 1: yes, yes, yes, most definitely. but see with A10, his is music.

Themes	Codes	A14
Changes to the parent child relationship	**Being together** Sharing activities with her child and learning together is a new experience for her. This results in feeling closer to her child, which makes the mother feel excited.	Interviewer: so I'm interested to know what it was like for you to join in with the sessions as well Person 1: this is the other interesting thing because it make me very very excited because led me to feel I'm close to him...more close to him, yes. we are doing the same things together, so we are learning together. yeah, so that's quite a good one.
Changes in the parent's response to the child	**Gentler approach** There is a new awareness that she doesn't have to order her child around to get him to do something. She now sees that she can have a different relationship with her child; she can get him to do something in more gentle ways focussing on his happiness.	Interviewer: do you think that you've changed what you want to do as well? do you think you changed from maybe wanting to teach him to more being careful about him being happy? Has that changed? Person 1: yeah, for me, I just changed something. Because for me I always ask him do something - just like use the order. Interviewer: like an order? Person 1: yeah yeah, "A14 go to do that". But from the music I think "ok we can change that relationship with him. How to make him happy, and to do something at your directions. yeah, so that's quite good things.
	Persistence This mother now considers that she needs to be more patient and keep trying in her interactions with her child.	Interviewer: (talking about the therapist's approach) ...and did that make you think about how you can do things with him as well? Person 1: yeah, that's quite good. just like I say, now at home I will pay more patience. Interviewer: ok. Keep trying? Person 1: yeah, yeah keep trying and just see what happens.
	Prioritise child's happiness Mother describes importance of trying to make her child happy and incorporating her child's favourite activities into their interactions. She considers it's important to help her child relax.	at home, i will try my best to make him happy, and to do some things. yeah, do some activities that were his favourite and the basic things. Interviewer: So it sounds like you feel that your relationship with him has changed? Person 1: yeah, that's quite good. Especially um, just like, led me to learn how to make the autistic kids happy and make him, ah, relax. And Yeah, I learnt a lot of those things like this one.
Changes in the parent's perception of the child	**Positive possibilities** There has been a profound shift in the mother's perceptions of the future possibilities for her child; from a miserable life to a happy life.	it's a great way to keep positive about the child...music...it always make him happy, excited . Yeah, it's quite a good one. And it makes me I can see some good things in his future. otherwise I think "oh no, that's miserable life".
	Happiness revealed Mother now perceives her child as being happy at kindergarten and in music activities.	*(overlap of ideas from quote above)*...music...it always make him happy, excited . Interviewer: Do you think about him differently now? Person 1: i think so. yeah. now you can see in kinder he is happy...
	Efforts revealed The mother sees that her child is trying to communicate with other children.	...*(continued from sentence above)* he try to communicate with the other kids yeah, yeah.

Themes	Codes	A08
Changes to the parent child relationship	A new level of relationship There was a sense of achievement in the mother at the new closeness of the relationship.	We've gotten closer. Like our relationship has definitely gone to a new level. And I'm really proud to see that.
	Cooperation There is a sense of understanding between parent and child in terms of expectations. Parent and child are more patient with each other now. The child knows what the parent expects of them and is able to accept this, and the parent accepts that tantrums will happen from time to time and that's ok.	And her obedience has just improved so much. I mean, initially she was obedient, but you'd have the moments where she'll have her tantrums and nothing to do with it, I can't be stuffed. Now, I actually have a little more patience, and so does she...and she knows what I expect of her, and if I need her to pick up toys, she would gladly do it and pick them up and put them in the bucket or the box. Um, things like that, giving her orders was a bit difficult at times, but now it just sort of comes naturally, and she's been great. *(each has more patience for each other, which seems to be a shift in relationship. An attunement? Working together – understanding each other's needs and expectations?)*
	Reciprocal emotions The mother describes how her own emotions rub off on her child, which in turn rub off on her. This statement was made in the context of the mother's new appreciation of her child, which makes her happy, which then makes the children happy. She considers that the child's emotions / responses mirror her own.	And they see that, that when Mummy's happy, they're happy. So I'm getting less frustrated nowadays which has been great, and it's been rubbing off on them. So I think the majority of things with children it goes to the parents, what they make of it. So if mum's stressed out and a bit of a control freak and looney ballooney, it's gonna rub off on your kids and it's gonna make it even worse. ME: and then there's a cycle that happens there. So you're seeing their behaviours change, so that helps you to feel more patient. MUM: more patient. ME: and then because you're feeling more patient, you feel that's impacted on their behaviours as well? MUM: It has because they're like mirrors. They reflect the parents. *(originally had this in "changes in attitude to parenting", but didn't feel right. The mother's changes rubbing off onto the children seems to be pointing to a change in relationship.)*
Changes in the parent's attitude to parenting	Focus on the positive The mother identifies her new ability to step back when things are getting tough with the children and remind herself to think positively.	And a lot of it has to be, hasn't just been A08's changing, it's been my changing as a mum, and saying I don't want my kids to be aggravated or sort of pretty much drown themselves in a glass of water when there's an obstacle. I've had to step back and take a deep breath and say, "ok, you can do this, it's all good", even if it's I'm not feeling that way, I've had to put on a brave face with a smile and say "it's ok, you can do this".
	Recognise progress Being able to take a step back from her children has allowed her to see the gains in maturity they have made and appreciate them.	ME: that's beautiful. And yet when you use the word patience, it sounds to me like there's a shift inside you as well? Because patience is about how you're feeling. So what does that feeling of patience mean for you? MUM: In all areas. Not just in my relationship with kids, but in the sense that they're more obedient, maybe they've matured a little bit more, and I'm

		appreciating them even more. *(a sense that the mother is liking her child's qualities more now, understanding the child's nature, recognising the child's abilities, greater acceptance? Being thankful? Having a new attitude towards the child.)*
Changes in the parent's response to the child	Turning away from grief There is a shift in the parent's responses towards the child. Rather than feeling sorry for her child's lot in life, she confidently asserts that she can now make strong choices for her child so that she has future developmental benefits. Trying novel strategies There is a sense of playfulness and experimentation in the mother's interactions with her child now. She is confident to try something random (like singing or doing something silly) to capture her child's attention or help outsiders to break the ice with her.	ME: yeah, but yet you feel you have a bit more patience in that now. MUM: yeah. Definitely. And I don't, I don't feel, I don't know if it's wrong how I'm gonna word it, but um, in a sense as a mother I felt sorry for my daughter initially, that I had to put her through this kind of things. But actually now I don't feel sorry for her in that sense because you know what? If I hadn't of been hard at the start, I wouldn't be reaping the rewards that I am with her now. And even if she may not be listening to me, if I break into a random song, trying to say what I need to say, she'll actually pay attention. ME: (Laughing) oh that's really good to hear. You've been really um creative then in lots of ways, not just in making up songs, but in how you're thinking about how to incorporate music. MUM: trying to see different ways and measures how we can communicate and help her learn the quickest way possible, so that's what we've been trying to do. yes, and even if people in the house that's not our house...they tend to ask "what's wrong, how can we accommodate her?" and I say "how about we do something silly" and we'll do a bit of a "ring-a-ring-a-rosie" or something and sort of break the ice with her, and she can probably join in and get a bit more familiar with you, and it's ok to actually interact with you guys. So, most people are very um open to it. Some get a bit on the shy side, but it's good. It's an ice breaker (laughing).
Changes in the parent's perception of the child	Socially willing The mother identifies a breakthrough for her child. After persisting with social activities with the siblings, the parent perceives that her child is more able to interact. This has opened up new social opportunities for the child as the family can take her to more places, and the child can tolerate new people approaching her. Intrinsic motivation Parent perceives an internal shift in her child. She now seems to participate more happily and freely. There was no need to force the child to participate – no need for external motivation.	Um, gradually when we incorporated I guess "Giddy up Horsey" where she had no choice other than to um interact with her siblings. And she eventually got it. And now she's got no problems in holding their hand, giving them a hug or a kiss or even playing a couple of games with them she's actually, socially she's less frustrated than she used to get. So now we can actually take her to places and she's great. She's been great. yes, definitely. And she hasn't been as reluctant as she used to be with people touching her or approaching her. So, as you would have noticed, she doesn't get very frustrated. It's been a while. ME: yeah, I think we could have kept going a few times too. MUM: and she was happy to do so. It wasn't that we were forcing her, on the contrary she was enjoying what she was doing.

Themes	Codes	A16
Changes to the parent child relationship	Bonded closer This is a very emotional statement that expresses an overflowing of love and pleasure between mother and child. Connected together as one Rather than focussing on teaching the child, there is now a focus on togetherness and shared experiences. This results in a feeling of connectedness.	*(part of the same comment as above)*....During our music sessions I noticed we bonded closer together, realised how special our relationship is, and how much I love him and enjoy him, spending time with him. I do.... *(part of the same comment as above)*...I think it's the only time because in other situations, trying to teach him something, we're not connected, it's always you know "A16 do this" it's constantly giving him instructions. But during music, we were connected together you know, so... ME: can you try and pin that down a little bit more MUM. So in other things it feels more teaching? MUM: yep, it's teaching. ME: so what is it about music that makes that connection? MUM: you're free, you know, you're enjoying each other's time, watching each other, learning from each other, bonding closer, like it just brought us closer together you know? ME: mmm, mmm MUM: like through the singing and the dancing, doing things that he enjoyed but I enjoyed also. ME: hmm, so you're enjoying them together. MUM: yeah, like I enjoy singing and dancing with him, so it was good you know. Imitating, role playing with him, doing things that he enjoyed doing.
Insights the parent has gained about the parent child relationship	A special connection Participating together in music activities highlighted the closeness in the parent child relationship for this mother. The way her child looked at her made her feel special and confirmed her feelings of being connected to her child.	MUM: ok, well I must say that I really enjoyed taking part with my son, you know, I love spending time, and you know, everything that he does is really special to me. Um, seeing him happy made me happy. I was able to share wonderful moments with him watching him learn and progress each week. Music sessions allowed us to have fun, sing and dance, and interact with each other. Every time was really special. My favourite time was when I was playing the slide whistle with him. During this time, he would constantly look into my eyes and smile. It would make me feel really special (crying). ME: ooh, that's beautiful. MUM: it was, it was really nice, it was really special. I felt special, you know? Like, although he can't speak, just from his gestures and his body language I know that, you know, we've got a special connection.
Changes in the parent's response to the child	Patience with development This new response to the child is linked to a new insight about the child's abilities. The parent identifies her own needs for the child to succeed and progress, and now perceives that this might be at the expense of fun and relationship. She now sees that she needs to step back and give the child space to develop at their own pace.	Well after seeing you work with A16 I realised that I needed to be more patient with him, try to make more time for music and to have more fun in teaching him to learn. ME: this is extraordinary..um..this is the 8th interview that I've done, and each time people have mentioned this word "patience". So, what is that, because I see you as a patient mum? MUM: I just think that everyone has got expectations and you wanna meet certain goals and it's really hard for teaching a child with autism. Like a normal developing child picks up things very easily and I think with our kids we have to step back and think, you know, they can't do everything and just be patient and take one step at a time in allowing them to develop certain things, not just expect them to pick it up or learn it straight away, so I think I need to be a lot more patient with him. Cause I just want him to learn, like I'll have to repeat something to him maybe 100 or 1,000 times and sometimes I sit back and think he still doesn't get it. And you know I just think or I want him to learn so much that, you know, I push him a bit too hard sometimes and I think I just need to, you know, enjoy it and make it a fun experience for both of us.

Insights parent has gained about the child	Enjoys music The child's enjoyment of music is revealed to the mother through the music sessions. She can see that if he is motivated, then she doesn't need to push her child to participate.	ok, well with the social I think A16 joined in extremely well, as he has great difficulty socially interacting with others. Um, but in music sessions he was different. He enjoyed participating. I didn't have to push him into it. Sometimes he would switch off or walk away, but would still come back. yeah, no, you know, I thought it really helped him, everything that we did, because he wanted to be involved. In other surroundings when I teach him generally, he doesn't want to participate – it's like I have to force him to do certain things, but he actually enjoyed doing it so it made a difference you know.
Changes in the parent's perception of the child	Free from labels Rather than seeing the "autism" in her child, the mother can see the child as a child. She stresses that she can see that he is happy. Love revealed The mother sees the child's love for her expressed in the way the child approaches and looks at her. Sociability revealed The mother now sees her child as being happy to interact with others.	Music therapy for me changed the way I saw my son. On many occasions watching him, I saw a happy, normal boy interacting, learning and having fun. He was free, doing something he enjoyed. He didn't look or act autistic. And I did notice that, maybe you didn't see it, but for me he just looked normal (crying). he just looked like a free, happy boy, enjoying doing something that he wanted to do. Like, he didn't have any unusual behaviours that really stood out to make him or label him as a child with special needs, and you know, it was really nice to see. In other situations, he never looks at me like that, unless he comes for a cuddle or a kiss. But you know, it was some meaning that I didn't understand but I knew that in some way he was trying to communicate something saying "I love you" just by the way he would look at me when I would play, so it was special. but it is, it is, like you could tell he was happy. He waited, he looked at you, gave a smile, then he looked at me and continued to play and wanted us to. And I know that is something really hard, especially for kids with autism.

Themes	Codes	A18
Changes to the parent child relationship	Closeness While the parent child relationship has always been good, more one to one time has brought mother and child closer. Bonded closer The child is initiating interactions with the parent, and the parent is responsive to her child's initiations. The mother feels emotionally connected to the child because of the child's initiations to interact with her. There has been a boost in the time spent interacting together.	like i said we've always (had a) good (relationship)...we probably would be a little bit more closer now cause we do sing everyday and a lot of it is one on one. so i think it has brought us, bonded us closer in that way cause he'll come up to me and want me to do the actions and take me, you know, grab my hands and get me to do the (actions) - we do that every single day. so it's probably brought us closer. and that music in that way has brought us even a lot closer, and then he'll want his hugs after that, and he'll go off and do his own thing. and I'll call him back over when he's come back into the lounge room and we'll sing a different song.
Changes in the parent's response to the child	Incorporate child's preferences This mother recognises that if she identifies what her child's preferences are, she can structure interactions with her child that encourage communication.	We do the instruments, but it's more singing than anything...giving him a choice of song, so it's influenced me in that way on how exactly to go about it rather than just singing something that he wouldn't like, I'll give him a choice of what I know he's going to like.... And I'll say "ok, you don't want twinkle twinkle. do you want "great day"?" and then yeah, he'll say "great day" and start the actions. that's his way I guess of telling me "that's what I want". it's funny. *(this could be interpreted as being about perception or insight about the child's preferences, but I think the main idea here is more about how the mother responds to the child).*

Themes	Codes	A21
Changes to the parent child relationship	Fragile engagement The mother is seeing her child as beginning to be responsive to her. She is unsure about what her child's behaviour means, but they are able to share an emotion-filled gaze.	when I sing to him, when he happy and i try sing to him and play with him i can see he's very happy. he's happy and he um try to follow me. or for example, I sing, and he come (over to me), and he try to look at me - straight in my eye, something like that. *(there is something deep the mother is perceiving here – a loving gaze? It's sad that she experiences this as something new – as if the relationship had not encompassed these moments before. This sounds like an early social communication skill: interpersonal engagement.)* I don't want to say that's what it does mean, but I think he's happy. i don't know if he's asking for more, or..."oh, you sing well" something like that. but I just can see he happy, he smile and he, yeah, make a lot of eye contact.
Changes in the parent's response to the child	Seizing play opportunities The mother perceives a shift in her child's interest in her, and seizes the opportunity to play. She provides more of the activities that are motivating for her child, such as singing.	Interviewer: and um, for me, i think that his instrument playing in our sessions was very special. What about for you, was that something special to watch him do? Person 1: ah yeah, coz i see they enjoy that, and um, before, i never sing to A21 like, singing a song to him, coz he never care about that before. but now sometimes every day i sing to him and he make eye contact and he look at me for long, so yeah. *(this part of the response is really about changes in the parent's perception of the child – it is left in this section to give context for what follows.)* and before, he just watching the video. and I start singing to him when the session running, yeah, so, i think i can see different from that and yeah, and I have something to play with him, yeah like singing. Interviewer: and it's something you can play together? Person 1: yeah
Changes in the parent's perception of the child	Social responsiveness revealed The mother reflects that her child has never cared whether they interacted in the past. She now considers that her child enjoys it when she sings, and seems interested in her.	Interviewer: and um, for me, i think that his instrument playing in our sessions was very special. What about for you, was that something special to watch him do? Person 1: ah yeah, coz i see they enjoy that, and um, before, I never sing to A21 like, singing a song to him, coz he never care about that before. but now sometimes every day i sing to him and he make eye contact and he look at me for long, so yeah. *(so now he does care about it...wants it...or mother has now noticed he cares about it...now she can see it??? What can she see? A response of some sort in the child – looking her straight in the eye. This is an important aspect for reflection – was the child's social interest always there and now the mother recognises it, or is it a new development?)*

Themes	Codes	A22
Changes to the parent child relationship	Shared emotions The happiness of the parent is bound up in the happiness of the child, and this is a point of connection between them.	Interviewer: so what was it like for you to take part in sessions with A22? Person 1: oh, i loved it. seeing him so happy, it just makes me happy. it's like the saying "happy wife happy life" and now ours is "happy child happy life".
	More interaction Music has provided more opportunities for the mother and child to interact.	Interviewer: ok, so if you think about your relationship with A22...is there a difference having done the sessions to now? Person 1: um, we've always been pretty good. but i think we kind of, we probably interact more now than what we interact before, kind of, i don't know. *(the following is about changes in response to the child, but is left here for context)* maybe I've learned how to, to kind of, well it's kind of a part of a communication for us now. because we kind of, everything that we do now we add music to it. when we, like i said, when I want him to go to the toilet, i just sing a little song. and I think he really enjoys it. this morning he was running around without a nappy on and I wanted him to sit on the toilet. to keep him on the toilet i just kept singing the song. and i could see he enjoyed it, because he was just kind of smiling. and I said "give mummy kiss on the nose" and he kissed me on the nose. and I'm like, oh, maybe he understands what nose is. in that form i didn't think that he understand nose because i don't know if he understands this. and sometimes i think he probably understands so much more than what i know he understands. but because it's not, he's not always giving attention when i talk to him, i don't know if he understands it or not, or he doesn't know how to respond to what I'm saying, so he doesn't show that he understands it.
Changes in the parent's response to the child	Trying novel strategies There is a sense of playfulness and experimentation in the mother's interactions with her child now. She uses music to heighten the child's social awareness and help her child to regulate emotions.	Interviewer: you're doing a lot with the music too without me also Person 1: yeah but it's not like we, like we really have to work hard at it or anything, it's just, if we jump on the trampoline we just sing the bouncing song. or we make up another song, or, if they playing in the sand we just make up a stupid song. or, even if they're drinking their milk I'll make up a silly song for them. Interviewer: yeah, that's fantastic, it can slip into the normal day then rather than feeling like you have to do your exercises kind of thing, or make it hard work. Person 1: it wasn't hard work, it was just part of the normal day. and a lot of things that, just, if I wanted him to go to the toilet I just sing him a song, and he, I don't know if he understands the words of it, but he started knowing the song and he knew what it meant. for the last few weeks of child care A22 was started whinging and crying and really being really really clingy. and then one day i thought, ok, today if he starts whinging I'm going to start singing. so i did that. and the first day i did that - not a whinge, nothing. he started whinging and as soon as i started singing he stopped and there was no tantrums when we got out of the car - nothing. maybe I've learned how to, to kind of, well it's kind of a part of a communication for us now. because we kind of, everything that we do now we add music to it. when we, like i said, when I want him to go to the toilet, i just sing a little song. and I think he really enjoys it. this morning he was running around without a nappy on and I wanted him to sit on the toilet. to keep him on the toilet i just kept singing the song. and i could see he enjoyed it, because he was just kind of smiling. and I said "give mummy kiss on the nose" and he kissed me on the nose....
	More relaxed approach The mother identifies that a	I think I probably realised if I'm calmer and more relaxed and more patient it kind of rubs off on them. that's really with both of them (her two children). they kind of probably get that vibe and they are calmer.

	relaxed approach to daily activities will have a reciprocal effect on the children.	
Changes in the parent's perception of the child	Positive possibilities The mother considers that maybe she underestimates her child's abilities. There has been a profound shift in the mother's perceptions of the future possibilities for her child; a good life is now defined as a happy life.	*(continued from above)*...and I'm like, oh, maybe he understands what nose is. in that form i didn't think that he understands "nose" because i don't know if he understands this. and sometimes i think he probably understands so much more than what i know he understands. but because it's not, he's not always giving attention when i talk to him, i don't know if he understands it or not, or he doesn't know how to respond to what I'm saying, so he doesn't show that he understands it. *(she considers that she might be underestimating her child's comprehension abilities. At one stage this was coded as "understanding motivations", but now it seems more about feeling more positive about her child's potential).* i used to be really worried about, probably more about his future. that he won't have a good life. but then when i saw him with the music therapy and how happy it makes him, i realised that he could probably do so much that makes him happy, even if it's just listening to music all day. but it doesn't mean that he's not going to have a good life. cause i think that was one of my main concerns about his future - is he gonna have a good life. and it's not all to do with "is he going to get a job, or".....I know there might be a lot of things he might not be able to do, but he will have a good life.

Themes	Codes	B01
Changes to the parent child relationship	**Bonding strengthened** The child is initiating more interactions with the mother, which heighten her sense of closeness with her child.	we've always been close, but it's even strengthened his thing that... B01 will come and get my hand now and like "come on we're going to bed" .... so to me, it strengthens our bond even more but it's given me something i didn't get at the start. *(this line is at the end of the mother's explanation of what has "impacted on the changes in the parent child relationship". As it overlaps with "changes to parent child relationship", it is included here.)*
	Getting acquainted There is a sense that the relationship is beginning a fresh, with the parent feeling like she is starting to get to know her child.	i um, I'd have to say with B01 in the last year, even especially probably in the last 6 months, I've really started to get to know him. because he's so drastically different from the other autistic kids that i have. and cause everyone says to me, "you've got more than one, you must know". and yes they all have traits, but he's so so different.
Perceptions of what impacted the changes in the parent-child relationship	**Opportunities for physical closeness** Using music as part of the bedtime routine has provided cuddle time for the mother and child, which she considers important for bonding. Cuddle time was missing in their early relationship.	Interviewer: right....so are you part of music now? is that what you mean by that? Person 1: not really, it's....it's the one time that both of us...what a lot of parents take for granted is they get that cuddle time. it's one time that i can....what i didn't get with Bryce was due to the bad birth and he was really....i get to cuddle him and just be a mum. i didn't get that when he was little. and as much as my husband will say "you're setting yourself up here", i don't care. coz it's the one thing i didn't get with him at all, and now i don't mind. there are the odd night that's just too hectic here and i feel guilty for not going in (to the bed room) cause i want to. *so to me, it strengthens our bond even more but it's given me something i didn't get at the start. (this is the overlapping line – also included in "changes to parent child relationship".)*
	Focussing on the child Previously, the parent felt that her focus was all on autism – a focus on behaviour. Music allowed her child to go with the flow, which seems to have made their interactions more natural and child focussed.	Interviewer: so what was it like for you taking part in music therapy with him? Person 1: well i suppose what i said before. for once it wasn't all about autism. that what it was like for me. *(this seems like a profound shift).* Interviewer: and when i first met you, I wondered how it would be for you. because knowing you have so much knowledge of ABA and behavioural approaches i wondered how it would be for you being in a program that was perhaps more following B01's lead. did you want to comment on that? Person 1: I've...done some, i think even with (sibling) or one thing last year with B01 where it was following the lead. and sometimes following the lead they...trying to think...in this it was following the lead but it was just very normal. in the other things, it was almost reinforcing bad behaviour traits if that makes any sense. and yes i know more since I've done some of those things, but I did pull out of those because he wasn't responding to them. where this, he was just going with the flow. and he went with the flow even when he wasn't well, and especially when he was well. *(so it wasn't about autism...it became about the child?)*
	Time to connect There was opportunity for mother and child to simply be together and make a connection.	Interviewer: and what about a side out of yourself, has it brought a different side out of what you do with him? Person 1: um...I'm just grateful for the bit that um, i get time with him that i didn't get. coz both him and me had a really bad start. and for a long time it felt like it was lost completely. and to sort of get it back, um. but my type of personality is that i always feel that I'm not doing enough for him. so I'll always underestimate.
Changes in the parent's response to the child	**Engaging rather than teaching** There is a sense that the mother used to be focused on teaching her	um, there's something that gives him great gratification out of it that I'd never seen because to me working with him, being the last of all of them, everything's a purpose, and we're working on this to gain this. you don't get to see....i think one of the questions on one of them (the measures) was "do you get great pleasure out of

	child, and that this was always the agenda with every interaction. Now the parent makes time for simply enjoying being with her child, and enjoying something together.	parenting". i don't get time to think of that. there's a point to everything I do with him. and music...i could just see he got...he enjoys things. and that's not something you think about, where I've had that pleasure only with one other child. Interviewer: right. wow *Mum*. and that's great, because you do have a lot of activities where you're teaching B01 and so that's nice that you've been able to enjoy something different. Person 1: to watch him be happy, and happy that he's doing something, and the fact that he could follow your beat - strum, strum - it's like, he gets it. *(permission to just enjoy the child and not to be so goal orientated.)*
Insights parent has gained about the child	A love of music There is a sense of confidence in the way this mother expresses her realisation of her child's love of music.	Person 1: and he loved it. i saw a side to him that I've never seen before. Interviewer: and what was that side? what did you see in him? Person 1: his love of real music.
Changes in the parent's perception of the child	Personality revealed There is a sense that the parent is seeing her child as a child, rather than as a set of behaviours. The child's music preferences and participation have allowed the mother to perceive an aspect of the child's personality.	Interviewer: so sometimes people say music therapy changes the way they see their child. did anything change for you? is there anything you want to add to what you've already said? Person 1: just he's....the fact that I, he's love of drum and heavy music, sort of...ok he does have a strong personality, but always imagined, coz not so much now coz he's hair's cut, but his personality also portrays what you call, um...I'm trying to think of this the right way...um, you know, a garage-head sort of person. coz he does....compared to most kids he's a very mellow kid. and, when the love of drums and the love of heavy music, it was like "oh this all fits, this so fits him". i didn't think music could be part of a personality. people talk that they like music, but with him it's part of the personality. coz it is, it's so him! Interviewer: that's a nice way to say it. you got to know the music side of him.