EVIDENCE FOR MUSIC THERAPY IN CHILD DEVELOPMENT: CONTENTS

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# EVIDENCE FOR MUSIC THERAPY IN CHILD DEVELOPMENT

# Background and scope

As part of significant restructure of the New Zealand health system in 2022, changes were made in respect to funding and delivery of Child Development Services (CDS). CDS work with children who have a developmental disability, and their families, providing community-based support towards the achievement of development goals. The aim is to provide “cohesive”, “multi-disciplinary”, “whānau focused” services which include “provision of appropriate therapies to facilitate and enhance the development of neurological and motor skills and function; swallowing and feeding skills; respiratory skills and function; and speech, language, and communication”. Music therapists are not specifically listed as potential service providers in current documentation, although there is reference to the prospective utilisation of ‘other’ services. Music therapists have been asked to provide evidence of the potential for music therapy to support children who have a developmental disability, and in turn to promote utilisation of music therapy within CDS.

Music therapy takes place in a range of locations, including homes, schools, hospitals, and other healthcare settings, with children who experience a wide range of challenges including those related to diagnoses of Autism; ADHD; Global Developmental Delay; learning disabilities; and intellectual disabilities. Goals to support physical; cognitive; communicative; social-emotional; and/or adaptive development are negotiated with children and young people, their whanau, and other team members, as appropriate. Given the breadth of the topic, the author has engaged in scoping review, undertaken to identify key characteristics of music therapy and child development and the types of evidence that are available in the field. “Scoping reviews do not aim to produce a critically appraised and synthesised result/answer to a particular question […] (but) provide an overview or map of the evidence” (Munn et al., 2018, p. 3).

Data was sourced from Victoria University of Wellington’s Te Waharoa library database (which encompasses key databases for music therapy such as MEDLINE, EBSCO, CINAHL, PsycINFO, ERIC) and using a keyword search for “music therapy” and (“child\* or adolesc\*); plus a series of additional strings including key words such as “cerebral palsy”, “attention”, “disabled, disability or disabilities”, “intellectual disability”, “learning disability”, “developmental delay”. To manage the large pool of data, only peer reviewed articles published in the five-year period between (2018-2022) have been included. A hand search of the New Zealand Journal of Music Therapy (2002-2022) was also undertaken.

Moreover, in recent years, two relatively large-scale projects, based in the New Zealand context, have been able to provide evidence of the value of music therapy for a wide range of children, by drawing on the perspectives of people who have been engaged with the therapy processes. These projects, an evaluation of services provided by Raukatauri Music Therapy Centre Trust (Field et al., 2020) and Music Therapy for Autistic Children (Rickson, 2022), are summarised below, and their literature reviews have been included in APPENDIX 2, p. 20 and APPENDIX 3, p. 30, respectively.

In addition, a review of the music therapy and autism literature was undertaken by Broadstock (2021) for Whaikaha - Ministry of Disabled People, & Ministry of Education’s Aotearoa New Zealand Autism Guideline: He Waka Huia Takiwātanga Rau (2022). Music therapy received a ‘B’ rating by the guideline committee which means the recommendation is supported by “FAIR evidence” (studies are considered to be mostly valid). It also means there are some concerns about the volume, consistency, applicability and/or clinical relevance of the evidence that may cause some uncertainty, but findings are not likely to be overturned by other evidence. As a result, the Guideline’s Group concluded **“music therapy can enhance social communication skills and should be considered for children and young people on the autism spectrum” (Broadstock, 2021, p. xii)**. A further full literature review is unlikely to add significantly to the current and comprehensive overview provided by these researchers. However, an update is included in the wider review, on p. 8.

# Raukatauri Music Therapy Trust Evaluation Research (Field et. al., 2020)

The Raukatauri Music Therapy Centre (RMTC) provides services for over 530 clients (based on 2019 figures) who experience a variety of needs or disabilities, “including cerebral palsy; autism spectrum and other developmental conditions; traumatic brain injury; mental health distress; bereavement; dementia; exposure to family violence and neglect; trauma; genetic conditions such as Down syndrome; and poor community engagement due to socioeconomic challenges” (Lowery et al., 2020, p. 88). Programmes are provided via a primary centre in Auckland, two regional centres in Hawke’s Bay and Northland, five Auckland satellite services, and outreach programmes in partnership with over 20 schools and organisations (Field et al., 2020). Each week approximately 230 individual (75%), group (20%) and paired (5%) music therapy sessions were being facilitated by nine Registered Music Therapists (RMThs).

An independent evaluation, to determine the factors that support and challenge participation the service was published in 2020 (Field et al., 2020; Lowery et al., 2020). A mixed methods approach was employed. Survey findings revealed that music therapy was highly valued by over 90% of the 100 respondents, with over 80% reporting it to be “very beneficial” (46%) or “reasonably beneficial” (38%) to their whanau. Key benefits were identified as improved social functioning (such as attention, empathy, and turn taking); self-expression (both verbal and non-verbal); cognitive functioning (such as comprehension, focus and engagement); social connections and relationships; communication skills, and speech and language; physical coordination and movement; and overall mental health and wellbeing (Lowery et al., 2020, p. 96). These findings were supported by themes from interviews identifying musical participation, enjoyment, building of relationships with the therapist and others, within a tailored approach, as primary factors in the success of programmes.

# Music Therapy with Autistic Children (Rickson, 2022)

*Music therapists have been working with children on the autism spectrum for many decades, and practice in this field is now well established. Recent workforce surveys have revealed that 44% of music therapists worldwide and 48% of Australian music therapists work with people on the autism spectrum. A New Zealand survey published in 2015 indicated almost 50% of NZ RMThs (29) were working with an estimated 150 children and 30 adults on the spectrum in this country. These high percentages are perhaps not surprising given that takiwātanga often have an affinity for music and may exhibit special musical abilities. Music is a non-verbal form of communication and play which can be powerful in addressing the core features of autism and music therapy is considered to have high potential as a therapeutic option. (References in original have been removed).*

 (Rickson, 2022, pp 47-48)

Rickson’s (2022) research, undertaken between 2017-2020, involved ten music therapists working individual with ten autistic children (tamariki takiwātanga). The music therapists produced case studies of their work, including video and/or audio examples, which were in turn evaluated by 32 external commentators. Twenty-six of the commentators were family members, teachers, or other professionals who knew one of the children, and interpreted their case. Six other autism experts who did not know the children, interpreted all ten cases. The ‘other’ autism experts had various and multiple expertise as parents, teachers of typical and diverse populations, a member of ASD disability action group, an education lecturer, a psychologist, an autism advisor, a policy analyst, an autistic adult, and a cultural advisor.

*Commentators summarised that music therapy can support tamariki takiwātanga to regulate emotions, to express themselves in a variety of ways, and therefore to develop communication and socialisation skills. The child-centred nature of music therapy, the development of authentic and respectful therapeutic relationships, the children’s inherent interest in music, and the music therapists’ expertise which involved careful balancing of freedom and structure within sessions enabled all the children to feel comfortable to engage in play, try out new ideas, take leadership and communicate with others in a variety of ways.* (Rickson, 2022, p. 355)

# Enabling Good Lives

Both above projects (Field et al., 2020; Rickson, 2022) situated their findings alongside the principles of the Enabling Good Lives (EGL) framework. Enabling Good Lives (Ministries of Health, Education, & Social Development, 2021) aims to provide supports for disabled people that are tailored to individuals’ needs and goals (person-centred); build and strengthen relationships between them and their whānau and communities (relationship building); and are simple to use and flexible (easy to use). It aims to ensure disabled people have control of their lives (self-determination); that their contributions are recognised and respected (mana enhancing); they have access to mainstream services before disability services (mainstream first); and are supported to live ordinary lives (ordinary life outcomes). The approach emphasises the need for early investment in families and whānau to promote aspirations and build community supports (beginning early). Observers of music therapy are readily convinced that music therapy values and processes align with the ‘person-centred’, ‘relationship’, ‘self-determination’, (Field et al., 2020; Rickson, 2022) and ‘strengths-based’ and ‘preferred activity’ values espoused in these documents (Rickson, 2022).

# Conclusion following the Brief Update of Literature Pertaining to Music Therapy in Child Development

To enhance readability of this document, the conclusion of the update is represented here, and the full review is presented in APPENDIX 1, beginning on p. 8.

Music therapy practice in child development is a broad field. Experimental research, especially randomised trials, which have traditionally been required to produce “proof” of effectiveness or efficacy, are extremely difficult to initiate given the breath of practice, the individualised nature of programmes, and the heterogeneity of music, therapist, and music therapy participants (Mayer-Benarous et al., 2021).

Nevertheless, sufficient positivist research has been available to determine that music therapy can enhance social communication skills for children and young people on the autism spectrum (Broadstock, 2021). Moreover, this current scoping review has demonstrated that music therapy music therapy processes can support bonding and attachment and the development of relationships (Houde & Narendran, 2018; Samadani et al 2021); attention (Geist and Geist, 2012; Jacob, Pllay & Oyefeso, 2021; Sholeh & Supena, 2021; Thorell, Holst & Sjöwall); auditory processing skills (Senkal and Muhtar 2021); language development (Houde & Narendran, 2018); the alleviation of selective mutism (Jones and Odell-Miller, 2023); movement skills for children with cerebral palsy (Kobus et al., 2022; López‐Ortiz et al. 2019; Vinolo-Gil et al. 2021); the development social skills (Blanky-Voronov & Gilboa, 2022; Pasiali & Clark, 2018); the reduction of anxiety (Geipel, 2018; Pérez-Eizaguirre et al., 2022; Theurer, 2019) and increase empathy, positive social behaviour, assertiveness, and performance (Wölfl, 2019).

In medical environments music therapy has potential to support children to tolerate invasive treatment and reduce treatment cost (Montero-Ruiz et al., 2020; reduce time in hospital for low-birth-weight infants and their parents (Menke et al., 2021); and support children and parents in bereavement processes (Walden et al., 2021). In school settings, music therapy can support the inclusion of children with different needs (Esperson Pecoraro et al., 2020; Margetts et al., 2021) and contribute to the reduction of bullying and violence (Uhlig, Jansen & Scherder, 2018; Wölfl, 2019). Music therapy in early childhood has a positive impact on child development (Birch & Thompson, 2023; Houde & Narendran, 2018) potentially reducing the need for more costly remedial intervention in the future” (Houde & Narendra, p. 28). Moreover, children and young people experience music therapy as a safe and predictable space where they can have ‘fun’ (Field et al., 2021; Klyve & Rolvsjord, 2022; Rickson, 2022) and express themselves (dos Santos & Wagner, 2018; Uhlig, Jansen, & Scherder, 2018).

Changes in social policies and definitions of disability have led health practitioners away from deficit models which focus on fixing children’s problems to social models which focus on the accommodation of children’s needs (Birch & Thompson, 2023; Rickson, 2022). New Zealand music therapists frequently employ Music-centred (Aigen, 2014), Resource-oriented (Rolvsjord, 2010), and Community Music Therapy (Stige & Aaro, 2012) approaches that turn the lens towards maximising health and well-being through the mobilisation of the children’s strengths and resources. Music therapy therefore leads to a wide range of benefits for children with various needs across a range of contexts which would not necessarily be captured through experimental research and behavioural analyses.

Moreover, parents, carers, and other team members, are increasingly involved in their children’s music therapy in a range of ways, not only supporting and/or observing, but also as direct participants (Annesley, McKeown & Curtis-Tyler, 2020; Hernandez-Ruiz & Lehrer, 2022; Strange, 2021). “A different dynamic is created when the third person in a child’s music therapy session is a caregiver. Such a significant other is not simply a collaborator, but rather a key figure in the child’s therapy and a uniquely qualified informant helping the therapist understand the child” (Strange, 2021, p. 44), who ultimately supports the child to generalise skills developed in therapy (Pater, Graaf & Yper, 2019). Further, music therapists acknowledge that teamwork is crucial in maximising outcomes for clients (Twyford, 2016), describing effective collaborations with physiotherapists (Kobus et al., 2022; Vinolo-Gil et al., 2021; Montero-Ruiz et al., 2020) dance and movement therapists (López‐Ortiz et al., 2019; McConnell, Pureti & Rickson, 2023) and speech and language therapists (Barrett & McKenzie, 2022; Garcia-Docampo et al. 2022). Such crucial collaborations reduce the potential to attribute change directly to music therapy.

Randomised trials will continue to be important in some, particularly medical, contexts. Houde & Narendran (2018) note, for example, that new brain imaging technologies and advances in music cognition and neurological research present exciting prospects for research with young children. On the other hand, rather than focusing on behavioural change, music therapists are increasingly interested in whether children and others close to them are satisfied with the music therapy process, whether it has some benefit in the children’s lives, and whether the institutions, agencies, and communities they engage with can also see those benefits (Aigen, 2015; Rickson et al., 2016; Rickson, 2022). People who witness music therapy develop significant understanding and appreciation of the practice, and new perspectives of what children can achieve (Annesley, McKeown & Curtis-Tyler, 2020; Rickson et al., 2016; Rickson, 2022; Warwick, 2019).

As this review has demonstrated, music therapists are increasingly learning about the impact of music therapy by drawing on the perspectives of music therapy participants or others close to them. This is important and valid, given the New Zealand governments commitment to Enabling Good Lives (Ministries of Health, Education, & Social Development, 2021) which aims to support disabled people by offering “greater choice and control over the supports they receive, so that they can plan for the lives they want.” (<https://www.enablinggoodlives.co.nz/about-egl/>).

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*APPENDIX 1*

# APPENDIX 1: A BRIEF UPDATELITERATURE PERTAINING TO MUSIC THERAPY IN CHILD DEVELOPMENT (2018-2023)

Music therapy to support attachment and family relationships

Music therapists support child development from the beginnings of life. Using infant-directed singing for example, they support emotional communication between parents and babies, especially premature new-borns in neonatal intensive care units (NICU) (Houde & Narendran, 2018). Following a review of the literature exploring the influence of early childhood music and music therapy on child development, Houde & Narendran (2018) argued that music therapy processes involving infant directed singing or speaking can support emotional regulation, and promote feelings of intimacy, crucial to bonding and attachment. This finding was reinforced by Samadani et al. (2021) who observed signiﬁcant child-parent interbrain synchrony over the time course of music therapy sessions with non-speaking children who had severe physical disabilities (see Music therapy to support children with neurological disorders, p. 2). Moreover, music therapy increases parent confidence, enjoyment, and the frequency with which they share music with their infant (Houde & Narendran, 2018). This is crucial, since when parent’s attachment strategies are changed, families can experience rapid and long-lasting change with more security and stability for everyone (Swanick & Papatzikis, 2022).

Music therapy to support very young children

Reviews determining that music therapy in early childhood has a positive impact on child development (Birch & Thompson, 2023; Houde & Narendran, 2018) suggest the practice can help to ensure children will be “better equipped to confront and overcome the many challenges that are part of life” (Houde & Narendran, 2018, p. 27). Houde & Narendran (2018) found that the studies they reviewed encompassed six important facets of child development including prenatal and neonatal music exposure, parent-infant bonding, attention development, communication and language development, physical development, and social development. They suggest that early childhood music therapy and music education programs serve as a “form of environmental enrichment, based on the notion that a child’s inherent response to music may serve as a key determinant in shaping sensory neuronal interactions involved with learning and developmental growth” (p. 28).

For their review, Birch and Thompson (2018) evaluated 19 studies, most of which were grounded in developmental perspectives and used objectivist designs. The music therapy was taking place in classrooms, playgrounds, or separate rooms, and thus encompassed a range of delivery models, including individual sessions, group-based programs, and consultation, with music therapists employing a range of methods including vocal techniques, instrumental play, receptive listening, and original compositions (Birch & Thompson, 2023, p. l). Houde & Narendra (2018) note that while music therapy sessions and music instruction for young children may share similar structure or content, they are differentiated by context, intent, the populations they serve, and the expertise of the clinicians. “Music education and therapy programs for infants and toddlers could mitigate developmental issues and reduce the need for more costly remedial intervention in the future” (Houde & Narendra, p. 28).

Hernandez-Ruiz & Lehrer (2022) engaged fourteen parents of young autistic children, in virtual focus groups, to explore their understand of music therapy, research, and parent coaching. They found that most participants had very little or no knowledge of music therapy services, and limited experience with research in general. While several had positive experiences with parent coaching outside of music therapy, only two had experienced parent coaching in a music therapy context. Nevertheless, they appeared willing and eager to develop music strategies that they could use to support their child’s development. Music therapists should provide information to first-contact providers (paediatricians and early intervention services) who in turn can ensure parents are aware of music therapy programmes as an option for them and their children.

Music therapy to support attention and motivation

Research in music neuroscience, especially related to rhythm, suggests music therapy can have a positive effect on attention, and in turn on improved literacy and mathematics (Geist and Geist, 2012). Jacob, Pllay & Oyefeso (2021) found that twenty-four sessions of music therapy, incorporating traditional folk songs with pictorial illustrations, had a significant effect on the attention span of children with intellectual disabilities compared to those in the control group. These researchers suggested circular benefits can result from active participation in singing, which leads to increases in sustained interest as well as increased levels of participation. Others have observed that music therapy can stimulate the self-esteem of children diagnosed with ADHD; in terms of their self-awareness and self-acceptance, feelings of being accepted by others, ability to complete tasks and make decisions, self-control and decision making (Sholeh & Supena 2021). After finding that passive listening (background music) was helpful for increasing reading comprehension for pre-adolescents diagnosed with ADHD, Madjar et al., (2020) concluded that calm music may assist to regulate autonomous responses and enhance performance. Children and young people who have diagnoses of attention disorders (ADHD, ADD) typically experience challenges with academic tasks, activities of daily living, and social interaction (Jacob, Pillay & Oyefeso, 2021; Sholeh & Supena, 2021; Thorell, Holst & Sjöwall, 2019) the impact of which can last a lifetime (Thorell, Holst & Sjöwall, 2019). While comorbidity of intellectual disability and ADHD makes it difficult to know whether attention-related issues are due to learning disabilities or triggered by them (Jacob, Pillay & Oyefesoi, 2021), the ability to attend is crucial. Music therapy has an important role to play in this space.

# Music therapy to support autistic children

Recent research not captured in Rickson’s (2022) review is included here.

Geretsegger et al., (2022) have updated their earlier (2014) review, including 16 new studies and bring the total number to 26 (1165 participants). The studies examined the short- and medium-term effect of music therapy for autistic people in individual or group settings, and 21 of the studies included children aged from two to 12 years. They report that the levels of symptom severity, language skills, and cognition varied widely across the studies, but were able to conclude that “music therapy compared with 'placebo' therapy or standard care probably increases the chance of overall improvement by the end of therapy, likely improves quality of life and total autism symptom severity immediately after therapy, and probably does not increase adverse events” (p. 3). While the quality of the evidence means that the findings may change when further research is included, the authors note that this new evidence is important for autistic people and their families as well as for policymakers, service providers and clinicians (Geretsegger et al., 2022, p. 3).

Ke et al.’s (2022) systematic review and meta-analysis of music therapy with autistic children included eight randomised controlled studies involving 608 participants. The authors were able to conclude that music therapy is effective in improving the social interaction of children with ASD, although there was little evidence of sustainability. Like Geretsegger et al., (2022) they argued that future research should specifically examine how long the effects of music therapy last.

Salomon-Gimmon & Elefant (2018) engaged in a rigorous video microanalysis of 4 cases of children who received music therapy over the course of 5 months, found that improvisational music therapy has the potential to support autistic children to produce increased vocalisations.

Music therapy to support children with neurological disorders

Following a systematic review of literature relating to cerebral palsy López‐Ortiz et al. (2019) argued that there is important potential for dance and movement to music help balance, gait, and walking in children and adults with cerebral palsy. However, cerebral palsy involves impaired movement which can be associated with abnormal reflexes, strain or stiffness of the limbs and trunk, abnormal posture, involuntary movements, and/or unsteady gait (de la Bandera Cabezas et al.,2021) and research is complicated by the complexity and diversity of patient presentations. For example, a further systematic review of the literature by Vinolo-Gil et al. (2021) argued that the combination of music therapy and physiotherapy can be effective in improving motor function, yet the diversity of studies analysed made it difficult to extrapolate results. Nevertheless, recent studies continue to provide promising results. Kobus et al. (2022), for example, involved seventeen hospitalised children with neurological injury or disease aged 0-18 years in a study which compared physiotherapy alone to physiotherapy incorporating live music. They found that music therapy can support children during their physical therapy programmes by decreasing heart and respiratory rates and increasing oxygen saturation.

Children who experience brain injury from birth, accident, or medical events are often involved in long term care to regain or develop motor, cognitive, and/or communication skills (Kobus et al., 2022; Santonja-Medina et al., 2022), and patients with limited functional abilities often lack the motivation to repeat active voluntary movements (Santonja-Medina et al., 2022). Music therapy that is tailored to a child’s needs can therefore be powerful in the neurorehabilitation context, because it can activate brain regions involved in reward, motivation, emotion, and arousal; and potentially increase mood, enjoyment, motivation to engage in rehabilitation programmes (Kobus et al., 2022; Santonja-Medina et al., 2022), and with tasks which demand higher levels of skill, increased repetitions, and for longer periods (Santonja-Medina et al., 2022). For example, Santonja-Medina et al. (2022) found that a programme of neurologic music therapy (NMT), involving 17 children and adolescents with severe bilateral cerebral palsy using percussion instruments, significantly increased their willingness to engage in manual tasks such as reaching, stroking, grasping, and hitting. An even larger randomised controlled study, involving 50 children with cerebral palsy, combined sensory integration training with music therapy (Shi et al., 2022). Shi et al. (2022) reported in their abstract that the twelve-week programme highlighted significant differences between groups on measures of functional independence; however, their full paper is not published in English.

When people engage in social interactions they become ‘synchronised’, automatically mirroring the physiology and behaviours of their social partners, and this is in turn has been associated with motor, cognitive, and emotional empathy (Samadani et al., 2021, p. 7). Noting that “brain-to-brain synchrony between parent and child is an emerging neurobiological marker of socio-emotional development” (Samadani et al., 2021, p. 2) researchers measured the levels of interbrain synchrony in ten parent-child dyads during music therapy. The ten children/youth were all non-speaking and living with severe motor impairments resulting from cerebral palsy, seizure, epilepsy, and anoxic brain disorder. The musical content of the therapy sessions was tailored to the child’s preferences. Using electroencephalographic (EEG) signals, Samadani et al. (2021) was able to observe signiﬁcant child-parent interbrain synchrony over the time course of a music therapy session. These findings signal the potential for music therapy to support the development of interpersonal relationships between caregivers and non-speaking children with severe physical impairments.

Barrett & McKenzie (2022), local Music Therapist and Speech Language Therapist respectively, describe how they work with children with complex special needs to enable their participation in a school choir using Augmentative and Alternative Communication (AAC) (assistive technology). Children can express themselves, co-create music spontaneously and in the moment, with others, while working on their individual goals within the structure of the activity. Thus, they are given “opportunities to change and challenge both personhood and selfhood. They can be seen, and see themselves, as performers, active participants, and individuals” (Barrett & McKenzie, 2022, p. 10).

Recent research focusing on auditory skills, speech, and language development has also showed promising results. Twenty-nine intellectually disabled children who took part in an Orff Music Therapy programme, for a period of six weeks, had reduced scores on a Total Listening Inventory (TLI) after Orff Music Therapy, suggesting the children had improved auditory processing skills (Senkal and Muhtar 2021). Jones and Odell-Miller (2023) presented findings from multiple case study research with six children who experienced selective mutism, an anxiety disorder which results in children unable to speak in the classroom despite having confident speech at home. The authors present the contrasting approaches of the music therapy clinicians in a theoretical framework, before concluding that the skills the music therapists bring to the establishment of musical communication can be powerful in alleviating selective mutism. Their findings reinforce those of Keen et al. (2008) who argue that music therapy should be included on multi-modal, multi-agency pathways for selective mutism (Keen et al., 2008). Findings from a literature review to uncover the influence of music education and therapy in early childhood settings (Houde & Narendran, 2018) support the inclusion of music therapy for promoting language development in young children with learning disabilities. Houde & Narendran, (2018) argue that given that young infants’ brains are susceptible to permanent structural change, there is very good potential for music education and therapy programmes to have a positive lasting impact on children’s ongoing development.

Music therapy to support children and adolescents with social and emotional challenges

The ability to demonstrate socially acceptable behaviour is crucial for the development of peer relationships, and to adapt to the demands of daily life. Children need to be able to observe and listen, and to interpret and respond appropriately to people and events in their environment. Various challenges, such as sensory, motor, language, or emotional difficulties, interfere with typical social development.

Following their systematic review measuring the effect of music therapy on youths with ASD, intellectual disability (ID), communication disorder (CD), developmental coordination disorder (DCD), specific learning disorder, and attention/deficit hyperactivity disorder (ADHD), Mayer-Benarous et al., (2021) found a positive effect of improvisational music therapy in most controlled studies particularly in terms of social functioning; and concluded that improvisational music therapy in children with neurodevelopmental disorders appears relevant for individuals with both ASD and ID. However, they note that music therapy interventions are extremely heterogeneous making cross-study comparisons difficult and meta-analysis calculations invalid (Mayer-Benarous et al., 2021).

Pasiali and Clark (2018) note that children living in low-resource communities are at risk for poorer socio-emotional development and academic performance. They engaged 20 school-aged children who were attending an afterschool programme and who came from low-income families and/or had a disability, in eight 50-minute music therapy sessions. The music therapy sessions included active and receptive experiences including movement to music, active music-making, Orff-based musical exercises, improvisation, songwriting, role-play, music performance, and music-assisted relaxation (Pasiali & Clark, 2018, p. 292-293). The study involved a single group pre- and post-test design, and standardised measures of 1) social competence and antisocial behaviour and 2) social skills, problem behaviours, and academic competence. Results indicated that music therapy has the potential to be effective in supporting social competence of school-aged children with limited resources, particularly in improving communication and reducing low-performance/high-risk behaviours such as hyperactivity.

Blanky-Voronov & Gilboa (2022) facilitated music therapy for 24 children, in four groups, for a year. All children needed support developing social skills, but their challenges originated from varying contexts. Sessions were videotaped, and twelve were selected from across the year for observational analysis. Measures of twelve typical socially oriented behaviours, before and after the process, indicated that children in all four groups improved in nine out of the twelve measures (initiating contact with a friend, answering a friend, initiating contact with the therapist, sharing, participating in group activities, making and maintaining eye contact, sharing emotions with others, being considerate of a friend, helping a friend, reaching a compromise, providing solutions to different social problems, and the ability to delay gratification). Qualitative interviews with 24 mothers and 23 kindergarten teachers confirmed that skills generalised to the home and kindergarten environments respectively. While results are positive, researchers employed a quasi-experimental design (no control group) and did not used a standardized tool to assess children’s social behaviours.

Pérez-Eizaguirre et al. (2022) compared music therapy outcomes for a group young people who were at social risk (n=11) and those who had committed child to parent violence (n=11). Each group participated in eight sessions. While there were differences between groups on measures of ‘state’ or ‘trait’ anxiety, the authors conclude that music therapy can be effective in reducing anxiety levels among socially vulnerable groups. Similarly, Theurer (2019) found that music therapy can be helpful for children experiencing school anxiety.

Music therapy to support children and young people’s mental health

Systematic reviews of the literature have concluded that music therapy can be an eﬀective intervention in the treatment of children and adolescents with general psychopathology, i.e., for children presenting with internalising or externalising symptoms (Geipel, 2018; Gold, 2004). Geipel’s (2018) review focused more specifically on studies which reported findings from music-based interventions to reduce internalising symptoms (commonly presenting as depression and/or anxiety). While they found that the quality and methodological rigor of existing studies is low for this type of analysis, they suggest that music-based interventions may be beneﬁcial in the treatment of youth with internalizing symptoms and conclude with encouragement for clinicians to provide music-based interventions as an adjunct therapy for children and adolescents with internalizing symptoms.

Klyve & Rolvsjord (2022) explored the music therapy experiences of seven children, aged 8-12 years, who were receiving mental health care in a hospital setting. Using multiple case study design, the researchers engaged in participant observations as well as conducting semi-structured interviews with the children. All children conveyed that they experienced ‘fun’ during music therapy sessions, but “not as mere entertainment, but as something of existential importance and with great therapeutic potentials” (Klyve & Rolvsjord, 2022, p. 1).

While music therapists work with children who have experienced abuse and/or trauma, in a variety of contexts including hospitals and schools, Fairchild & Hadley (2018) report increasing employment in contexts specific to child welfare, including foster care, sexual abuse, residential care, domestic and family violence, homelessness, and child protection. A special edition of Voices music therapy journal highlighted work with young people who have experienced family violence; with first time, young sex offenders; young people in under-resourced communities; and foster families (Fairchild & Hadley, 2018). Music therapy with children who experience mental health challenges typically focus’ on interaction and communication through music, thus highlighting and utilising the children’s existing resources (Klyve & Rolvsjord, 2022).

Moreover, music therapy is a powerful tool to enhance neuroplasticity in the brain (Stegemöller, 2014, p. 211). Reporting of a single case of music therapy with a nine-year-old child who was experiencing trauma, Wentling & Behrens (2018) argued that music can be used to create safe, predictable, motivating interactions that have the potential to help children develop higher-order processing, and self-regulatory behaviours. “The use of predictable rhythmic music cues, especially in 6/8 meter; repetitive, bilateral arm movements when playing instruments; bell-like instruments within sensory-based experiences; trading instruments; and unique vocal-guitar accompaniments and repetitive melodic motifs provided emotional connections for the client to increase responses within the three identified goal areas (self-regulation, verbalizations, and interactions with others).

From their work with adolescents who were referred to group music therapy for aggression, dos Santos & Wagner (2018) argue that the use of musical elicitation methods can put participants at ease, lyrics of popular songs can become a springboard for discussion, and the increasingly familiar therapy space can become “their expressive territory” (p. 7). “Opportunities emerge to interact in new ways […] and for many this offers a rare interpersonal experience […] provides a template for how warm and mutually respectful interactions with an adult and with their peers are possible” (dos Santos, 2019, p.21). dos Santos’ claims reinforce those of Uhlig, Jansen & Scherder (2018) who found that youth with poor self-regulation used rap and singing in the safety of the music environment to collaborate with others and to identify sensitive personal and peer themes, which would in turn support them to develop skills and enhance their well-being.

Drumpower is a specific group music therapy programme for the prevention of violence in school. In contrast to previously described methods, facilitators intentionally avoid popular genres such as metal and hip hop and instead focus on more archaic ways of making music, such as improvisation with drums, sounds and voice (Wölfl, 2016, p.67). Eighty students took part in a quasi-experimental study (41 in treatment, and 39 controls) which aimed to examine the impact of Drumpower. While the results were highly heterogeneous, significant effects demonstrate that the programme can result in reduction of destructive behaviour and aggression and an increase in empathy, positive social behaviour, assertiveness, and performance (Wölfl, 2019).

Music therapy to support children in medical contexts

In addition to the infant-directed singing mentioned above in relation to attachment outcomes, family-centred music therapy is used in Neonatal Intensive Care Units (NICUs) to counteract the negative impact of various acoustic, environmental, and emotional stressors (Menke et al., 2021). Findings from a randomised controlled trial with very low and extremely low birth weight infants (born <30+0 weeks of gestation) and their parents (Menke et al., 2021) suggests that a live-improvised interactive music therapy intervention for such infants and their parents may reduce their time in hospital.

Bower et al. (2021) notes that while there is a growing body of evidence to support the use of music interventions to maximise arousal and awareness in adults who present with disorders of consciousness, the knowledge is not transferable to paediatric populations. They therefore engaged in a narrative synthesis of 46 articles that utilised brain imaging data relating to the neural processing of music in children aged 0-18 years, to develop a theoretical basis for music interventions with children presenting with a disorder of consciousness following acquired brain injury. Results suggest that while infants and children process music more slowly using different cortical areas than adults, their capacity for processing basic music elements can be harnessed in the early days and weeks following ABI to hasten emerging consciousness and maximize functional recovery.

Children who have cystic fibrosis require daily airway clearance therapy (ACT), which demands substantial commitment of time and energy from the children and their carers (Montero-Ruiz et al., 2020). Finding ways to make the task more enjoyable is likely to increase compliance and engender a positive response. Montero-Ruiz et al., compared the effects of specifically composed and recorded music, music that the patient liked, and no music, during usual ACT routines. Findings from questionnaires showed that enjoyment increased significantly with specifically composed music, and the perception of time spent in therapy was significantly less than actual time spent. This, along with estimated potential cost savings related to respiratory exacerbations, led the researchers to conclude that specifically composed, played, and compiled instrumental recorded music as an effective and efficient option adjunct to ACT; and that providing enjoyable and stimulating strategies can be an important tool for increasing the participation of the population in health-oriented activities (Montero-Ruiz et al., 2020).

Music therapists often work in children’s palliative care. One aspect of the work is described as pre-loss care, which involves creating opportunities for the children and/or their families or close friends to engage in activities support their experience of bereavement (Walden et al., 2021). One such activity involves harnessing the child’s heartbeat recordings and synchronising the rhythm into a favourite song. Walden et al. (2020) examined the use of heartbeat recordings in therapy with eleven parents and found that the process assisted in meaning-making, validated children’s lives, and supported parents’ expression of grief and their ability to cope (p. 1029).

Music therapy in school settings

Music therapy is often delivered in school settings, increasingly with the goal to promote the inclusion of children with disabilities with their peers (Esperson Pecoraro et al., 2020). Esperson and colleagues argue that involving the whole class in music therapy programmes can promote inclusive attitudes, enhance the social and learning environment, and support the development of emotional wellbeing and inclusion for all children. Margetts et al. (2021) describe how a music therapy consultation programme at a Belarusian Development Centre, supported staff participants to establish effective communication with the children who had complex needs, and to find new ways of getting to know them.

Uhlig, Jansen & Scherder (2018) initiated a randomised controlled trial to investigate the impact of a specific sing and rap programme which aimed to support adolescents’ self-regulation and reduce bullying behaviours. One-hundred-and-ninety adolescents took part in the study, with half assigned to a control group and the others taking part in the music therapy six times per week for four months. Teacher report on standardised measures uncovered significant differences between groups, with the treatment improving on total scores across behavioural, emotional, and social domains. Similarly, while results across classes were varied, Wölfl (2019) found that a music therapy violence prevention can result in a highly signiﬁcant decrease in the category of aggressive acts in schools, in some circumstances

Methods

Music therapists engage their participants using ‘receptive’ methods (where the participants listen to pre-recorded or live music) or ‘active’ methods (where participants create music). When using active methods, participants (and music therapists) might be singing or playing pre-composed music, adapting familiar music, improvising, or composing. The participants’ favourite music and/or instruments, preferred mode of communication (such as Alternative and Augmentative Communication and sign language), and any specific learning programmes they might be currently engaged with (such as Social StoriesTM, or DIRFloortimeTM), are incorporated into sessions as possible. “In doing so, music therapists provide meaningful ways of engaging clients in communicative interaction, honouring their voices in ways that promote agency and autonomy” (Devlin & Meadows, 2021, p. 25).

Music therapists support the music making of their participants not only by providing resources and opportunities for musical engagement, but by making music *with* them and using the affordances of music to support and guide their participation. The therapist’s intuitive and continuous adaptation during the session, variously following and guiding, connecting with, and challenging the child in the musical interaction, is an important part of the therapy process (Pater, Graff & Yperen, 2019); and the music-therapeutic relationship is an important predictor of outcomes (Mössler et al., 2019). Partial descriptions of music therapists supporting 1) a child during physical therapy (Kobus et al. 2022) and 2) an autistic child to develop communication, self-expression, and play (Rickson, 2022) exemplify some of the ways they might match their music with their participants physiological or mood states to build and maintain relationships, and to support their wellbeing.

*“Depending on the infant’s condition, the improvised playing was adapted to the children’s breathing and reactions […] The tempo was adjusted according to breathing and heart rates […] During breaks in therapy, deep and slow tones were played to create a calm atmosphere (and) […] where a lot of strength was required by the child, the music therapist played a little bit faster, and the melody moved upwards” (Kobus et al., 2022, p.3).*

*Mary is providing musical structure in the form of clear steady rhythmic pulse and a familiar melodic line. James is still not looking at her, but his playing eventually becomes more organised and structured. They share a musical pulse and begin taking turns to lead and follow each other, connected in the music. […] When Mary plays two repeated dominant chords James seems to recognise a potential ending. He closes with a cymbal crash, while Mary embellishes the music with a glissando (sliding up and down the piano keys). They are synchronised in their actions, sounds, and emotional states as they end together with a flourish, smiling at each other. (Rickson, 2022, p. 144).*

Other techniques include communicating important messages through composed or adapted lyrics and/or discussing with children or young people the meanings of their favourite lyrics or songs.

*Music is a complex resource that affords researchers both benefits and challenges. Its success as a research tool depends on the choice of activity, the skill of the researcher, and the orientation of the participants. As Daykin (2008) explained, the meanings of music data need to be examined reflexively in grounded studies that consider the properties of the music, the role of mediating discourses, and the listener’s situated responses*. (dos Santos & Wagner, 2018, p. 2)

Conclusion

Music therapy practice in child development is a broad field. Experimental research, especially randomised trials, which have traditionally been required to produce “proof” of effectiveness or efficacy, are extremely difficult to initiate given the breath of practice, the individualised nature of programmes, and the heterogeneity of music, therapist, and music therapy participants (Mayer-Benarous et al., 2021).

Nevertheless, sufficient positivist research has been available to determine that music therapy can enhance social communication skills for children and young people on the autism spectrum (Broadstock, 2021). Moreover, this current scoping review has demonstrated that music therapy music therapy processes can support bonding and attachment and the development of relationships (Houde & Narendran, 2018; Samadani et al 2021); attention (Geist and Geist, 2012; Jacob, Pllay & Oyefeso, 2021; Sholeh & Supena, 2021; Thorell, Holst & Sjöwall); auditory processing skills (Senkal and Muhtar 2021); language development (Houde & Narendran, 2018); the alleviation of selective mutism (Jones and Odell-Miller, 2023); movement skills for children with cerebral palsy (Kobus et al., 2022; López‐Ortiz et al. 2019; Vinolo-Gil et al. 2021); the development social skills (Blanky-Voronov & Gilboa, 2022; Pasiali & Clark, 2018); the reduction of anxiety (Geipel, 2018; Pérez-Eizaguirre et al., 2022; Theurer, 2019) and increase empathy, positive social behaviour, assertiveness, and performance (Wölfl, 2019).

In medical environments music therapy has potential to support children to tolerate invasive treatment and reduce treatment cost (Montero-Ruiz et al., 2020; reduce time in hospital for low-birth-weight infants and their parents (Menke et al., 2021); and support children and parents in bereavement processes (Walden et al., 2021). In school settings, music therapy can support the inclusion of children with different needs (Esperson Pecoraro et al., 2020; Margetts et al., 2021) and contribute to the reduction of bullying and violence (Uhlig, Jansen & Scherder, 2018; Wölfl, 2019). Music therapy in early childhood has a positive impact on child development (Birch & Thompson, 2023; Houde & Narendran, 2018) potentially reducing the need for more costly remedial intervention in the future” (Houde & Narendra, p. 28). Moreover, children and young people experience music therapy as a safe and predictable space where they can have ‘fun’ (Field et al., 2021; Klyve & Rolvsjord, 2022; Rickson, 2022) and express themselves (dos Santos & Wagner, 2018; Uhlig, Jansen, & Scherder, 2018).

Changes in social policies and definitions of disability have led health practitioners away from deficit models which focus on fixing children’s problems to social models which focus on the accommodation of children’s needs (Birch & Thompson, 2023; Rickson, 2022). New Zealand music therapists frequently employ Music-centred (Aigen, 2014), Resource-oriented (Rolvsjord, 2010), and Community Music Therapy (Stige & Aaro, 2012) approaches that turn the lens towards maximising health and well-being through the mobilisation of the children’s strengths and resources. Music therapy therefore leads to a wide range of benefits for children with various needs across a range of contexts which would not necessarily be captured through experimental research and behavioural analyses.

Moreover, parents, carers, and other team members, are increasingly involved in their children’s music therapy in a range of ways, not only supporting and/or observing, but also as direct participants (Annesley, McKeown & Curtis-Tyler, 2020; Hernandez-Ruiz & Lehrer, 2022; Strange, 2021). “A different dynamic is created when the third person in a child’s music therapy session is a caregiver. Such a significant other is not simply a collaborator, but rather a key figure in the child’s therapy and a uniquely qualified informant helping the therapist understand the child” (Strange, 2021, p. 44), who ultimately supports the child to generalise skills developed in therapy (Pater, Graaf & Yper, 2019). Further, music therapists acknowledge that teamwork is crucial in maximising outcomes for clients (Twyford, 2016), describing effective collaborations with physiotherapists (Kobus et al., 2022; Vinolo-Gil et al., 2021; Montero-Ruiz et al., 2020) dance and movement therapists (López‐Ortiz et al., 2019; McConnell, Pureti & Rickson, 2023) and speech and language therapists (Barrett & McKenzie, 2022; Garcia-Docampo et al. 2022). Such crucial collaborations reduce the potential to attribute change directly to music therapy.

Randomised trials will continue to be important in some, particularly medical, contexts. Houde & Narendran (2018) note, for example, that new brain imaging technologies and advances in music cognition and neurological research present exciting prospects for research with young children. On the other hand, rather than focusing on behavioural change, music therapists are increasingly interested in whether children and others close to them are satisfied with the music therapy process, whether it has some benefit in the children’s lives, and whether the institutions, agencies, and communities they engage with can also see those benefits (Aigen, 2015; Rickson et al., 2016; Rickson, 2022). People who witness music therapy develop significant understanding and appreciation of the practice, and new perspectives of what children can achieve (Annesley, McKeown & Curtis-Tyler, 2020; Rickson et al., 2016; Rickson, 2022; Warwick, 2019).

As this review has demonstrated, music therapists are increasingly learning about the impact of music therapy by drawing on the perspectives of music therapy participants or others close to them. This is important and valid, given the New Zealand governments commitment to Enabling Good Lives (Ministries of Health, Education, & Social Development, 2021) which aims to support disabled people by offering “greater choice and control over the supports they receive, so that they can plan for the lives they want.” (<https://www.enablinggoodlives.co.nz/about-egl/>) .

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APPENDIX 2

# APPENDIX 2: LITERATURE REVIEW – RMTC EVALUATION RESEARCH

This review has been reproduced, with permission of the authors, from:

Field, A., Butler, R., Were, L., & Lowery, O. (2020). *"From closed to flowering": An evaluation of services provided by Raukatauri Music Therapy Trust*. Creative Commons.

The review was originally printed on pp 19-26 of the full report, which can be found at <http://www.communityresearch.org.nz/research/from-closed-to-flowering>.

## Overview of outcomes

Music therapy outcomes can vary, depending on the nature of the client group. However, at a broad level it has been shown to have positive effects on communication skills; psychosocial health; social functioning; mental health disorders; cognitive skills; and motor skills development. An overview of each of these outcomes is provided below.

## Communication skills

A key reported outcome of music therapy is an improvement in both verbal and non-verbal communication (Chiang 2008, Geretsegger et al 2014, Nicholson et al 2008). This includes encouraging communicative behaviour amongst children who struggle with verbal language, as well as the enhancement of expressive language skills via activities such as filling the gaps in a song (Boxill & Chase 2007, Chiang 2008). Research has also highlighted improvements in vocalisation, timing, and rhythm of speech amongst children who received music therapy (Kong & Karahalios 2016).

One study of children with special needs identified that music therapy resulted in the development of a wider range of vocal sounds, and an increased ability to speak longer sentences or utter spoken words. Interestingly, additional outcomes were highlighted as a result of this, including increased motivation to communicate within social interactions, and a strengthening of the carer-child relationship (Chiang 2008). Other studies involving pre-school aged children with Autism Spectrum Disorder (ASD) have reported major improvements in speech and language production and non-verbal social communication (Su Maw & Haga 2018).

## Psycho-social health

Music therapy has been shown to be effective in meeting children’s psychosocial needs (Chiang 2008, Kennelly & Brien-Elliott 2001, Kong & Karahalios 2016). For example, a survey of parents whose children were engaged in music therapy identified a number of changes in multiple development areas, the majority of which were emotional; these included emotional stability and enhanced emotional expressiveness (Kong & Karahalios 2016). Others have highlighted its role in providing opportunities for children to express feelings and improve communication, resulting in a stronger sense of self-worth and improved self-esteem (Chiang 2008, Kennelly & Brien-Elliott 2001).

## Social functioning

It has been claimed that the promotion of social skills is a fundamental goal of music therapy (Chiang 2008). As a result, a wide range of social functioning outcomes are linked to music therapy, including improved relationships and social interactions, and an increased participation in everyday life (Chung & Woods-Giscombe 2016, Solli et al 2013, Yinger & Gooding 2014). In research with school students, it has been linked with improved social skills, such as assertiveness, self-control, and increased cooperation (Chong & Kim 2010).

Music therapy can help engage children in social interactions, with peer relations enhanced through activities such as taking turns to play an instrument or passing an object around in a group setting (Chiang 2008, Wigram & Gold 2006). Moreover, music therapy approaches focused on the relational qualities of music, and the participants’ individual interests and motivations, can facilitate basic skills involved in social communication, such as eye contact or initiating interaction (Geretsegger et al 2014).

An updated Cochrane review of the evidence on music therapy for people with ASD compared the effects of this form of therapy with ‘standard care’ and ‘placebo’ therapy. Key results indicated that music therapy may help to improve skills in a number of outcome areas, including social interaction, social-emotional reciprocity, and social adaptation (Geretsegger et al 2014). Other research has identified that outcomes of music therapy for children with autism include improvements in social behaviours, although the small number of studies in this field has been highlighted (Yinger & Gooding 2014).

The impacts of music therapy on social connections and relationships is widely reported in the literature, particularly its ability to enhance parent-child relationships (Chiang 2008, Geretsegger et al 2014, LaGasse 2017, Nicholson et al 2008, Su Maw & Haga 2018). A 10-week group music therapy programme for ‘marginalised’ parents and children aged under five years involved activities designed to promote positive parent-child relationships, whilst also fostering children’s developmental skills; an evaluation of the initiative found significant improvements in parenting behaviours (Nicholson et al 2008). Other research has identified that music therapy undertaken with children with ASD may contribute to the quality of the parent-child relationship (Geretsegger et al 2014, Su Maw & Haga 2018).

## Mental health disorders

Several reviews of the evidence relating to music therapy and mental health disorders, have found promising results regarding outcomes, although it has been reported that the quality of studies is mixed (Geipel et al 2018, Gold et al 2009, Maratos et al 2008, Yinger & Gooding 2014). One systematic review focussed on adult mental health identified that music therapy, when combined with standard care, has significant effects on a range of domains, including level of general symptoms, global state, negative symptoms, depression, and anxiety. Importantly, the authors note that effects are not dependent on type of diagnosis, cementing music therapy’s broad application (Gold et al 2009). Other music therapy outcomes for people with mental health disorders include improved general mental state, mood and level of functioning (Chung & Woods-Giscombe 2016, Edwards 2006, Gold et al 2009, Maratos et al 2008).

A qualitative meta-synthesis of service users’ experiences of music therapy in mental healthcare found that it produced positive outcomes in relation to their personal and social recovery process (Solli et al 2013). This incorporated four key areas:

* Having a good time: well-being and positive experiences through engagement in music which contributed to increased motivation and hope for a future life.
* Being together: making social connections, experiencing a sense of belonging, and increased social participation in everyday life.
* Feeling: positive effects connected to emotional experiences, including awareness, expression, and regulation of emotions
* Being someone: a stronger sense of identity, increased self-confidence and self-esteem, and the reintegration of music into people’s lives.

The use of music therapy has produced positive outcomes among individuals with schizophrenia (Chung & Woods-Giscombe 2016). A review of the evidence identified that, depending on a range of factors (e.g., dosage and music therapy format /type), music therapy resulted in improved psychotic symptom management, as well as depression and anxiety management. In addition, participants experienced improvements in social and cognitive functioning, behaviour, and quality of life (Chung & Woods-Giscombe 2016).

Group work tends to be the main delivery model for music therapy within mental health settings and can be effectively undertaken in both community-based and inpatient settings (Yinger & Gooding 2014). Research has shown that this format can promote group cohesion and interaction, as well as emotional expression – and is particularly effective with people considered to be ‘poor candidates’ for verbal group therapies (Yinger & Gooding 2014). Other research studies have identified that music therapy has helped individuals who did not benefit from verbal psychotherapy alone (Gold et al 2009).

## Cognitive skills development

Music therapy has been linked with the development of cognitive skills and an increase in on-task behaviour and cognitive processing (Chung & Woods-Giscombe 2016, Gooding 2011, Kong & Karahalios 2016). There is evidence of this across different client groups and therapeutic settings, including:

* Within the context of paediatric rehabilitation, music therapy has been shown to be important in relation to addressing behavioural/cognitive skills (Kennelly & Brien-Elliott 2001)
* Music therapy can help develop and sustain attention amongst children and adolescents with ASD (Wigram & Gold 2006)
* Music therapy has been linked with improved cognitive functioning of people with schizophrenia (Chung & Woods-Giscombe 2016)
* Amongst children with special needs, it can facilitate cognitive development, particularly when undertaken alongside communication development goals (Boxill & Chase 2007, Chiang 2008)
* Preadolescents with emotional and other disorders showed significant improvements in attention and motivation following engagement with music therapy (Montello & Coons 1998).

## Motor skills development

Music therapy has been linked with improvements in both fine or gross motor skills (Chiang 2008, Kennelly & Brien-Elliott 2001). This can be attributed to the structure and motivation provided for exercise routines, with different instruments encouraging use of various muscles (e.g., fine motor skills can be enhanced via playing the keyboard) or exposure to different kinds of physical movements (Chiang 2008, Kennelly & Brien-Elliott 2001). In addition, repetitious movements undertaken when playing an instrument can improve motor control and coordination (Boxill & Chase 2007).

## Parental experiences of music therapy

Given the importance of whānau within RMTT’s model of service delivery, it is worth highlighting some of the music therapy outcomes linked to parents, both as participants themselves and in relation to their child’s engagement in music therapy.

Music therapy has been shown to reduce parental stress and result in improved mental health for parents and carers (Chiang 2008, Williams et al 2012). An evaluation of an Australian music therapy programme which engaged parents of children with a disability reported that it resulted in significant improvements in parent-child interactions, and that parents were observed by clinicians as having improved parenting behaviours (Williams et al 2012).

One study found that when music therapy consisted of ‘fun and meaningful’ activities it was more likely to facilitate carers participating and interacting with their child. This was highlighted as an important outcome, particularly in light of the potential stress experienced by parents caring for a child with special needs (Chiang 2008). Others have noted that music-based parenting programmes may be more effective in attracting participants who would not normally attend traditional parenting interventions due to the non-threatening and ‘enjoyable’ context that these programmes offer (Nicholson et al 2008).

## Mechanisms of change

In their review of the evidence relating to people experiencing serious mental illness, Gold et al (2009) highlight that music therapy has been effective in the area of negative symptoms (e.g., poor social relationships, low motivation) for people with psychotic diagnoses. They posit that this provides some insight into the mechanisms of change for music therapy, including that:

* As a medium for emotional expression, music can assist patients to improve their expressive range.
* The social aspects of making music together which involves forming relationships with others may help people overcome shortfalls in this area.
* The opportunity to make music within therapy may be a motivating factor which is then generalised to other settings or contexts (Gold et al 2009).

Others have claimed that, while the means by which music therapy processes effect change for people with mental illness or distress are not fully known, it may be due to the way in which music processing accesses sub-cortical pathways that bypass other areas of cognitive function, as well as the capacity for music to allow different levels of participation (Edwards 2006).

When considering outcomes for children with developmental or behavioural conditions, the potential for music therapy (particularly active music making) to help children focus and sustain attention has been highlighted as an important factor. In addition, the non-judgemental setting that music therapy occurs in, where children are ‘set up to succeed’ is seen to play a key role (Gold et al 2004). Others have argued that the mechanism by which music therapy is effective in relation to children and adolescents is not fully understood, and therefore more research is required in this area (Yinger & Gooding 2014).

## What factors can influence outcomes?

There are a range of reported factors that may either produce improved outcomes, or negatively impact on the effectiveness of music therapy. Some of these include:

* A trained professional (music therapist) to effectively deliver treatment. Without this, the employment of music in mental health treatment, for example, may have a negative effect on patients (Yinger & Gooding 2014).
* A team-based approach, with the music therapist working alongside or as part of a wider team, has been highlighted as important and beneficial to client progress (Chiang 2008, Kennelly & Brien-Elliott 2001). This includes, for example, sharing expertise across a multidisciplinary team (Chiang 2008).
* When working with children with ASD, a more flexible, child-led approach (Geretsegger et al 2014).
* Neuroimaging research has shown that active musical participation engages more areas of the brain than passive music listening. This, alongside the social aspect of music making in a group, enhances mood to a greater degree than individual music making (Yinger & Gooding 2014).
* Ensuring that the client’s musical preferences are incorporated into the design of the therapy (Schmid & Ostermann 2010, Yinger & Gooding 2014).
* Within mental health settings, music therapy is more likely to be effective with a longer course of therapy or more frequent sessions (Chung & Woods-Giscombe 2016, Gold et al 2009, Yinger & Gooding 2014). For example, a review of the evidence on the impact of music therapy for individuals with schizophrenia found that dosage (i.e. total minutes of intervention exposure) had a greater effect than the type and format of music therapy (Chung & Woods-Giscombe 2016). In the case of music therapy targeting parents and children, it has been claimed that a minimum of six sessions is required for a therapeutic effect (Nicholson et al 2008, Williams et al 2012).
* Where music therapy is experienced as a fun activity and associated with pleasurable emotions, it is more likely to increase clients’ motivation to take part. This has been noted as important, given that activities are more easily repeated, thus fostering increased learning and development (Chiang 2008).
* ‘Eclectic approaches’ to music therapy (i.e., the mixing of techniques from different models or theories) are more effective. This also suggests that therapists are required to have a flexible and open attitude to what their clients bring to the therapy session (Gold et al 2004).
* This includes active musical interactions such as playing musical instruments, and is differentiated from ‘receptive,’ which mainly consists of listening to music (Chung et al, 2016).
* Group size may influence effectiveness and efficiency. For example, overly large groups may restrict the ability of clinicians to respond to individual needs (Nicholson et al 2008).

## Indigenous and other cultural perspectives on music therapy

### Interweaving of music therapy and indigenous culture

The relationship between music and well-being – including mental and spiritual – and its role in maintaining culture for indigenous populations, is acknowledged within indigenous sources of knowledge and in the literature (Hodgson 2018, Kahui 2008, Rollo 2013, Williams & Abad 2008). For example, drawing on the Te Whare Tapa Whā model of health (Durie 1998) Hodgson (2018) highlights that the mana of individuals may be enhanced via their contribution to musical activities within a group setting (notably an approach that some staff at RMTT have adopted). The role of karakia as Māori rituals for healing the sick, or taonga pūoro (traditional Māori instruments) for sound healing, have also been discussed (Rollo 2013).

A brief scan of the international literature identified limited examples of music therapy being practiced within an indigenous framework, although there were a wider range of publications that referred more broadly to a need for programmes to be ‘culturally appropriate’ (this is discussed further below).

Within New Zealand, there is some evidence of an indigenous grounding of music therapy, although this does not appear to be extensive within the literature. Examples identified include the employment of tikanga Māori within a mix of music therapy settings, the use of taonga pūoro and traditional Māori activities, adoption of kaupapa Māori models of health, and a collaborative approach to working (Fletcher et al 2014, Hodgson 2018, Kahui 2008, Rollo 2013). Within RMTT itself, the naming of the Trust comes from the legend of Raukatauri, the Goddess of Flutes and the personification of music, as discussed in section 2. This legend also underpins the Raukatauri model of music therapy – like the casemoth becoming independent from its mate, therapists work towards clients achieving autonomy and the confidence to express themselves creatively (O Lowery 2019, personal communication, 20 June).

Individual and group music therapy sessions run within an acute mental health unit for rangatahi (adolescents) involved a broad range of activities, including singing, improvisation, and playing instruments (Hodgson 2018). A waiata titi torea8 was highlighted as particularly successful at engaging rangatahi, and symbolic of the connection between Māori practice and music therapy. It was also effective at incorporating all four dimensions of Te Whare Tapa Whā: a whānau atmosphere was emphasised as staff and rangatahi sat and worked together; participants drew on their hinengaro (mind) to memorise the words while also coordinating their tinana (physical body) to perform the actions in correct sequence; and their wairua (spirit, soul) was supported though engagement with others and via self-expression. An analysis of the impacts of this music therapy programme also identified that the mana of the young people involved was positively affected, and that some were moved from a state of mauri moe (inactivity that is detrimental to health) to mauri ora (vitality) following their involvement in group sessions (Hodgson 2018).

Other research from New Zealand which explored a culturally appropriate approach to music therapy for rangatahi highlighted the importance of consultation with kaumatua9, and the need for non-Māori music therapists to learn about Māori culture in order to confidently introduce cultural elements to their work (Kahui 2008). Similar to Hodgson (2018), the study found that the Te Whare Tapa Whā health model works well as a music therapy assessment tool; in addition, there is some alignment between general protocols of music therapy and those of Māori culture (e.g., hello and goodbye songs at the start and end of sessions) (Kahui 2008).

There is the opportunity to learn from international initiatives undertaken within this space. A music therapy programme which sought to engage indigenous families in Australia was developed on a premise that early intervention services delivered in a ‘culturally sensitive’ manner were required to address some of the disadvantages faced by indigenous populations (Williams & Abad 2008). Of note, it was believed that a strength-based music therapy family programme was an appropriate model to support children and parents. The project was therefore initially developed as a series of group sessions delivered over 9 weeks, aimed at the broad family unit, and promoted over an indigenous radio station and via agencies working with this population.

However, the programme attracted very few participants, and a subsequent review identified that it was unsuccessful for a number of reasons. These included the inappropriate physical location and layout of the facility where sessions were held, a lack of transport to assist families in attending, and the high number of helpers (e.g., indigenous volunteers and workers) relative to participants. In addition, there was minimal evidence of relationships or trust having been built over the course of the programme, and it was delivered via an individualised approach rather than a more culturally appropriate group strategy.

A second programme was developed to address some of the problems identified, which resulted in better attendance by families, and improved outcomes. Analysis of this identified learning in four key areas:

1. Trust and rapport: this included the need to develop relationships with the community prior to the commencement of an intervention, with families given a choice as to how they engage.
2. Physical space: the location for music therapy programmes should be ‘light and airy’ and include culturally appropriate posters and reading matter, with transport options for accessing sessions.
3. Staff support: time needs to be allocated to ensure music therapy staff build connections with indigenous workers and are provided with adequate information about the programme.
4. Cultural issues: recommendations included working with a ‘cultural consultant’ who would help families to attend regularly and facilitate a group rather than individual setting (Williams & Abad 2008).

### Culturally centred music therapy practice

Music therapists are increasingly working with diverse cultural populations in a range of client settings (Behrens 2012, Brown 2002, Chase 2003). This requires them to examine their own world view and cultural identity, alongside those of the people they work with (Chase 2003, Morris 2010).

Research has shown that, despite having a strong interest in providing multi-cultural music therapy, many therapists in this field feel that undergraduate training programmes do not prepare them well for this (Chase 2003). As a result, cultural awareness and skills are often gained via clinical experience (Chase 2003). Interestingly, it has been claimed by some that a culturally centred music therapy practice should follow naturally from music therapists practicing with empathy and sensitivity; others, however, would argue that generic empathy is not sufficient, and ‘cultural empathy’ should be a goal of all therapists (Brown 2002).

Brown (2002) highlights a range of considerations for music therapists working with culturally diverse clients, including that they should have awareness and knowledge of:

* Their own cultural identity.
* The significance of music in non-western cultures.
* The role of music in clients’ personal life and culture.
* Music’s association with religious or healing rituals.
* The advantages of incorporating musical ideas with other forms of the arts within cultural traditions, where possible.
* The use of culturally diverse recorded music in relaxation and visualisation techniques.
* Similarly, Chase (2003) presents five clinical considerations that will assist music therapists in their work with culturally diverse clients:
* Know yourself: therapists should take time to explore their own cultural values, attitudes, and biases.
* Engage in new cultural experiences: this includes exploring other cultures via books and music, or through meeting people from minority cultures.
* Treat each person as an individual: it is important to get to know a client’s personal history prior to making assumptions based on their ethnic or cultural background.
* Be musically flexible: therapists should investigate the music and instruments – and the role that they play – of diverse cultures.
* Ask for help if you need it: there can be challenges in the delivery of multicultural music therapy, and networking with therapists (e.g., via conferences or peer supervision) working in this space may be helpful.

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APPENDIX 3

# APPENDIX 3: LITERATURE REVIEW - MUSIC THERAPY WITH TAMARIKI TAKIWĀTANGA

This review has been reproduced, with author permission, from Rickson, D. (2022). Music therapy with tamariki takiwātanga. Chapter 3 In Music therapy with autistic children in New Zealand: Haumanu ā-puoro mā ngā tamariki takiwātanga i Aotearoa (pp. 35-61). Palgrave Macmillan. Please refer to original publication when quoting from this chapter.

# Part 1: Music Therapy Research

Therapies that support engagement and creativity are important for children on the autism spectrum (Marquez-Garcia et al., 2021), and music therapy is a popular option (Brondino et al., 2015; Dharan, 2015; Kasilingam et al., 2019). The evidence base comprises many case reports and smaller studies (Accordino et al., 2007; Bergmann, 2016) as well as a growing number of systematic reviews and meta-analyses. With the former, a researcher answers research questions by collecting and summarising all the relevant empirical evidence, and with the latter the researcher uses statistical methods to summarise the results of these studies.

For example, Geretsegger et al.’s (2014) meta-analysis of 10 clinical trials, focusing specifically on research into music therapy for autistic people, found moderate-to-large effects of music therapy on interpersonal skills including social interaction, non-verbal communication, social-emotional reciprocity, and parent–child relationship. These authors were able to conclude that music therapy may help children with ASD to improve skills related to the core of the condition (Geretsegger et al., 2014). Specifically, the analyses suggested music therapy can improve initiating behaviours and verbal communication within sessions, and social interaction within and beyond the therapy context. Similarly, following her meta-analysis, which included 12 studies with a total of 170 participants, Whipple (2018) was able to claim that music therapy is effective for individuals on the autism spectrum across the lifespan, but particularly during early years. Improvements were noted in communication, interpersonal relationships, personal responsibility, and play skills in young children diagnosed with ASD (Whipple, 2018).

Likewise, systematic reviews have suggested music therapy has positive impacts, particularly in supporting social interaction and verbal and non-verbal communication (James et al., 2015; Marquez-Garcia et al., 2021). James et al.’s (2015) review included twelve studies with a total of 147 participants: eight involving pre-schoolers, three involving older children, and one involving adults. The music therapy approaches included improvisation as well as songs with lyrics to target specific skills, and were focused on decreasing undesirable behaviour, promoting social interaction, improving independent functioning, enhancing understanding of emotions, and increasing communication (p. 39). The authors found positive outcomes in 58% of the studies, mixed outcomes in a further 42%, and no negative outcomes. Similarly, Marquez-Garcia et al. (2021) engaged in a systematic review of 36 articles focusing on improvisation or listening to or singing songs, published between 2008 and 2018. Like James et al., (2015) these authors concluded that the results are encouraging.

Broader reviews also found positive outcomes related to music therapy. For example, Su Maw and Haga (2018) conducted a meta-analysis to determine the effectiveness of a range of cognitive, developmental, and behavioural interventions for preschool children on the autism spectrum. Of fourteen included studies, the three that focused on music therapy (Kim et al., 2008; Lim & Draper, 2011; Thompson et al., 2013) were found to provide the greatest outcome effects – even though one was of short duration and low intensity. While suggesting more evidence-based trials are needed, the authors were able to conclude that music therapy appears to be effective for improving social interaction with young children on the autism spectrum.

Vaiouli and Andreou (2018) identified eleven studies (ten published since 2010), focusing specifically on music to promote language development in young children on the autism spectrum. Six were contextualised as music education interventions, while five were music therapy. These authors concluded that music and music therapy can provide helpful contexts for developing young children’s preverbal and verbal communication.

Simpson and Keen (2011) published a narrative review of the literature relating to the use of music as an intervention, or to facilitate an intervention, with children diagnosed with autism. A total of 20 experimental controlled studies were included. Dependent variables were primarily communication, socialisation, and behavioural skills (Kaplan & Steele, 2005; Simpson & Keen, 2011), while independent variables ranged from improvised music to highly structured activities. The researchers found some limited evidence to suggest that music interventions were helpful for developing social, communicative, and behavioural skills in young tamariki takiwātanga although small sample sizes, a wide range of methods and applications, and the use of multiple interventions impacted the review findings (Simpson & Keen, 2011).

Finally, a review of complementary and alternative medicines (CAMs), suggests that music therapy represents a popular therapeutic option for this population (Brondino et al., 2015). While they found no conclusive evidence supporting the efficacy of CAM therapies for autism generally, these researchers detected promising results for music therapy primarily based on findings from the Cochrane Review conducted by Geretsegger et al. (2014) described above.

Simpson and Keen (2011) found most studies relating to music interventions with individuals on the spectrum focused on young children (3–11 years), and very few on young people aged between 12 and 18 years. Perhaps this is unsurprising given the generalised belief that early intervention is important whenever a child is experiencing a developmental delay. Lang et al. (2016) note however, that while some studies suggest that outcomes for children on the spectrum tend to be better the earlier an intervention is initiated, others suggest that the child’s age may not be of importance. This may be due to the heterogeneity of autism, varieties of research designs, research contexts, and outcome measures used (Lang et al. 2016). With that in mind, even though this book focuses predominantly on older children, the following sections include examples of music therapy research with very young children, as well as adolescents and adults. It is important to note that some of these studies would have been included in the reviews described above, and that only studies published since 2000 have been included here.

## Music Therapy Research Focusing on Very Young Children

Studies with very young children have focused on improving peer inter- actions, the management of activities of daily living and school routines, interpersonal skills, and speech and language. Dependent variables have predominantly included individualised songs with original or familiar tunes. This is possibly because while the way in which songs may be delivered can vary, they are easier to implement consistently than impro- vised music therapy. However, music therapists have also been able to undertake experimental research involving improvised approaches with mixed results.

### The Use of Song with Young Children

Kern and Aldridge (2006) investigated whether music therapy might support four preschool-aged boys diagnosed with autism to improve peer interactions and engage in meaningful play in the playground. An outdoor music centre was created, the therapist composed original songs for each participant, and teachers collaborated in the implementation of the intervention. The combination of environmental adaptations and individualised interventions led to the boys’ increased involvement with peers, and teachers were able to successfully facilitate the interventions in the playground.

In another project involving staff collaboration, Kern, Wakeford, and Aldridge (2007) explored whether music therapists, occupational therapists, and classroom teachers could support a three-year-old boy diagnosed with autism to develop independence with basic self-care tasks such as hand washing, toileting, and cleaning up. Spoken words or lyrics sung to familiar or original tunes provided prompts for each step in the tasks, and both strategies were successful in increasing his independence. In a similar study, Kern et al. (2007) were able to demonstrate that therapist composed songs, using lyrics to convey the demands of a morning routine, assisted two boys to enter their classroom, greet their teacher and peers, and to begin engaging in play.

Finnigan and Starr (2010) explored whether music therapy might increase the social responsiveness of a three-year-old girl. The therapist engaged her in turn-taking play with three toys, without and with music. In the music condition the therapist interacted through singing songs accompanied by guitar. Improvements in eye contact, imitation, and turn-taking were noted. Avoidant behaviours became infrequent and only occurred in baseline or no-music conditions. A longer period of music therapy would have been necessary to determine whether the child had maintained her gains.

Lim (2010) investigated the impact of music training, speech training, and no-training on the verbal production of fifty children diagnosed with autism aged between three and five years. Those in the music training group watched a music video which contained songs and pictures of targeted words, while those in the speech training group watched a video with stories and pictures of the targeted words. The children increased their acquisition of target words in both music and speech training conditions, with children considered to have lower abilities making greater gains in the music condition. The authors conclude that children diagnosed with autism gain important linguistic information from patterns embedded in music.

In a further study, Lim and Draper (2011) compared the impact of sung instructions and songs composed by the music therapist with the same texts delivered in spoken form via Applied Behavioural Analysis (ABA). The researchers found that both music and speech training significantly improved the verbal production of children diagnosed with autism compared to control conditions. Janzen & Thaut (2018) argue that singing may provide an important approach to learning for this population because it can be non-reciprocal, structured and ritualized, slower than speech, and lyrics carry associated meaning. In another example, Simpson, Keen, & Lamb, (2013) attempted to improve engagement and learning outcomes for children diagnosed with ASD by focusing on their receptive labelling skills, using a computer-based communication programme. In this study no significant differences were found between infant-directed song interventions or infant-directed speech intervention.

### The Use of Music Therapy Improvisation with Young Children

Kim, Wigram, and Gold (2008) conducted a randomised trial to investigate the effects of improvisational music therapy on joint attention, of ten preschool boys on the autism spectrum, by comparing improvisational music therapy and play sessions with toys (30 min per week over 12 weeks). The music therapy and play sessions were carried out by two different therapists, and a semi-flexible treatment manual was used to ensure the intervention was consistent and reliable. In each session the therapist supported and developed the child’s play, before gently introducing modelling and turn-taking activities within the child’s focus of attention and range of interest.

Music therapy was found to be significantly more effective than play sessions in addressing joint attention skills, with children offering longer periods of eye contact and turn-taking during music therapy than in play. Moreover, participants engaged in longer turn-taking during the more directive second half of the session, in both conditions. The authors suggest turn-taking may occur spontaneously in freer play, but for longer when the therapists were working to direct the children. In summary, this research suggests that child-centred improvised music therapy can promote social engagement and holds important therapeutic potential for children on the autism spectrum.

In a further report on the same study, Kim et al., (2009) argued that when children were engaged in improvisational music therapy, they experienced longer periods of joy and emotional synchronicity, and initiated engagement and responded positively to the therapist’s interpersonal demands more readily. The authors were able to produce important evidence that music therapy supports tamariki takiwātanga’s social, emotional, and motivational development.

## Music Therapy Research Focusing on Children

The relatively recent large-scale international TIME-A study aimed to overcome the methodological limitations of previous studies by using a larger sample size and examining the effects over longer periods of time. Between 2011 and 2015 three hundred and sixty-four children aged between four and seven years, and their parents, were involved in this study. Each family received five months of enhanced standard care (ESC), involving three 60-min sessions of advice and support in addition to usual treatment. In addition, families were randomly assigned to one of three groups to receive 1) one session of improvised music therapy per week, 2) three sessions of improvised music therapy per week, or 3) to receive the enhanced standard care only. No significant differences were found between treatment and usual care groups, on measures of symptom severity, or between low-intensity and high-intensity music therapy treatment groups compared with usual care, according to the Autism Diagnostic Observation Schedule (ADOS) (Bieleninik et al., 2017; Crawford et al., 2017). However, further exploratory post hoc analyses revealed a significant improvement in the music therapy group on the social motivation subscale (SRS) of the ADOS, and improved scores on the social affect subscale.

Bieleninik and colleagues (2017) suggest the inconsistent findings may be explained by variations in local contexts involving just one or few therapists; the implementation of improvisational interventions; the duration of intervention or inconsistent attendance; methodological differences such as the choice of proximal vs distal outcome; and the ADOS as a measurement tool. Nevertheless, improvisational music therapy seemed very “well accepted by parents, children, and staff ” (p. 532). In a qualitative study connected to the trial, parents reported that children enjoyed and benefited from the therapy and their own involvement was positive (Bieleninik et al., 2017). These authors note that some commentators are arguing for a shift towards outcomes such as well-being and adaptive functioning and suggest that “being able to engage in learning, participate successfully in school through childhood and adolescence, and work and have meaningful relationships as adults […] may matter more to people with ASD than symptom severity” (Bieleninik et al., 2017, p. 533).

### Listening Vs Interactive Music Therapy

Rabeyron and colleagues (2020) conducted a randomised controlled trial comparing music therapy and music listening for thirty-six children on the autism spectrum, aged from 4 to 7 years. The children were randomly assigned to listening or music therapy groups and were involved in 25 sessions over an eight-month period. Changes were measured using the Clinical Global Impression (CGI) scale, the Childhood Autism Rating Scale (CARS) and the Aberrant Behavior Checklist (ABC). The researchers were able to conclude that music therapy results in greater clinical improvement for children on the autism spectrum, than simply listening to music.

### Music Therapy to Enhance Social Communication

In Canada, 51 children on the autism spectrum, aged six to twelve years, participated in a study to determine whether improvised music therapy (using song and rhythm) might improve their social communication, family quality of life, and functional brain connectivity (Sharda et al., 2018). Results show that compared to controls, the children in the music therapy group improved their social communication (including semantics, appropriate initiations, social relations, and interests), and family-related quality of life. Moreover, their MRI scans revealed that connectivity increased between auditory and motor regions and decreased between auditory and visual-association regions following music (Sharda et al., 2018).

Gattino et al. (2011) conducted a randomised controlled trial to examine the effects of Relational Music Therapy (RMT) on the verbal, non-verbal, and social communication of children diagnosed with autism, in a hospital setting. Twenty-four boys aged between 7 and 12 years were involved in the study, which compared music therapy (plus clinical routine activities) with standard treatment (clinical routine activities). The 30-min music therapy sessions held over a period of seven months, involved a variety of activities including singing, impro- vising, composing, and playing musical games. No significant outcomes were found using the “social communication” domain of the Child- hood Autism Rating Scale (Brazilian version) (CARS-BR) so results were deemed to be inconclusive.

### Joint Attention

LaGasse (2014) compared the developing social skills of 17 children diagnosed with ASD, aged 6–9 years. The children participated in ten 50-min music therapy or social skills group sessions over a period of five weeks. Findings were mixed, including no significant differences between groups in terms of children’s initiations or response communications, and/or withdrawals from the interaction. However, children in the music therapy group made greater gains in joint attention with peers, and eye gaze towards others. Results suggest music therapy social groups might support the development of joint attention for children diagnosed with ASD.

### Communication and Interaction

Porter et al.’s (2017) randomised controlled trial involving 251 children (aged 8–16), who experienced social, emotional, behavioural and developmental difficulties, included a subgroup of 18 children on the autism spectrum. The researchers found no significant differences between “music therapy plus usual care” groups, or “usual care” groups in terms of the children’s communication and interaction skills. It is important to note however, that while children continued to participate in music therapy, there were high rates of dropout from the research. The low numbers of research participants limited the potential to observe significant differences between groups.

### Social Stories

Social Stories ™ (Gray & Garand, 1993) are a well-established treatment option for children diagnosed with autism or ASD. Carefully crafted stories are used to model and teach the children how to understand and respond to specific social situations, including how to initiate, reciprocate, maintain, and terminate social interactions. Given the attraction that these children have to music, it is not surprising that many practitioners are interested in whether singing social stories may be more helpful than reading them. However, research in this field has brought mixed results.

Brownell (2002) conducted a study with four children on the autism spectrum and found that singing was better than reading in all cases, but differences were only significant in one case. Despite the small sample size, the author concluded that musically adapted social stories are an effective and viable option for children on the autism spectrum. More recent studies have produced mixed results, however. Pasiali (2004) focused on the use of “prescriptive therapeutic songs” to promote the development of social skills in three young children, while Schwartzberg and Silverman (2013) conducted a larger study involving 30 children. Results were inconclusive in both studies. On the other hand, Pasiali (2004) noted that parents of the children in her study were pleased with the results and believed that their child’s participation was beneficial; and Schwartzberg and Silverman (2013) argued that children and staff seemed to enjoy the songs and repeated them throughout the day suggesting sung social stories may support the storage and recall of information.

## Music Therapy Research Focusing on Adolescents and Adults

Two studies (Boso et al., 2007; Hillier et al., 2011) focus specifically on music therapy with adolescents or young adults diagnosed with autism, while Pasiali, LaGasse & Penn (2014) worked with a group of adolescents who were described as having broader diagnoses of neurodevelopmental delay. In a contrasting study, Low (2021) engaged in participatory action research with four autistic adults to explicate the meaning of their lived experiences in Nordoff-Robbins Music Therapy.

Boso et al. (2007) focused on the effects of long-term music therapy with eight young adults who were described as having severe autism. The young people took part in 52 hour-long interactive music therapy sessions, which included singing, playing piano, and drumming. The study was small, and no control group was used, so it is not possible to generalise findings. Nevertheless, the authors suggest that active music therapy could improve autistic symptoms, as well as personal musical skills in young adults with severe autism.

In contrast, Hillier et al.’s (2011) study involved twenty-two “high functioning” adolescents and young adults on the autism spectrum (aged between 13–29 years). During the music therapy sessions, participants were engaged in a variety of music making activities including listening to and discussing different types of music, exploring, and improvising on various musical instruments, and composing, with a view to producing a short movie and soundtrack using GarageBand. Findings indicate that participants experienced improved self-esteem, reduced anxiety, and an increase in their positive attitudes towards peers.

Pasiali, LaGasse, & Penn (2014) found significant improvements in the selective attention and rapid shifting of attention in adolescents with neurodevelopmental delays, including autism, after eight sessions of Musical Attention Control Training (MACT). Musical Attention Control Training involves “perceptual and structured musical exercises built on rhythmic, melodic and harmonic patterns to train sustained, selective, divided, focused, and shifting attention” (Janzen & Thaut, 2018, p. 9).

To participate in Low’s (2021) the autistic adults needed to be able to communicate verbally or with assistive technology, and purposeful sampling was used to recruit participants who could yield the richest data. The four men highlighted the importance of music therapy for the development of their musicianship and personal selves; meaningful relationships with their peers, music therapists, and music; and the valuing of the socio-cultural identities.

## Improvisational Music Therapy

Researchers have found improvisational music therapy to be a promising intervention to improve the social communication skills, and the self- awareness, emotional expression, and understanding of children diagnosed with ASD (Geretsegger et al., 2014; James et al., 2015; Janzen & Thaut, 2018; Marquez-Garcia et al., 2021). Kim et al.’s, (2008) investigation of the effects of improvisational music therapy on the joint attention skills of children with ASD found significant improvement in music compared to control conditions. A subsequent microanalysis of the video data from this study (Kim et al., 2009), also suggested that children demonstrated increased emotion in the music condition compared to the toy play. LaGasse’s (2014) study, comparing the effects of music therapy and non-musical social skills intervention on the cooperative play and communication of children diagnosed with ASD found significant improvement in joint attention with peers, and eye gaze towards other people, compared to the control group.

On the other hand, the more recent large-scale multicentre randomised clinical trial (RCT) described above, involving 364 children aged between 4 and 7 years, did not support these results (Bieleninik et al., 2017). Moreover, Gattino et al., (2011) found no significant differences between improvisational music therapy and standard care in improving the verbal, non-verbal, and social communication skills of children diagnosed with autism, PDDNOS, and Asperger’s Syndrome; although a subgroup analysis suggested that for those diagnosed with autism only there was a significant increase in non-verbal communication following the music condition.

It is important to examine the reasons behind contradictory results because RCTs and meta-analyses are considered the most rigorous forms of positivist research (Broder-Fingert et al., 2017). Variations in local contexts; the ways interventions are implemented; inconsistent attendance of participants; and the measurement tools that are used can all have an impact on results (Bieleninik et al., 2017; Marquez-Garcia et al., 2021). When flexible improvisational approaches are used, and results are averaged across heterogeneous populations, the potential to demonstrate differences is reduced. Diagnostic measures such as the Autism Diagnostic Observation Schedule (ADOS) do not appear to be sensitive enough to capture the change that occurs in music therapy (Bieleninik et al., 2017; Marquez-Garcia et al., 2021). A combination of assessment methods, such as parent/self-reports, psychometric measures, coded analysis of video recordings, and before and after neurophysiological measures might be needed.

Following their systematic review of music therapy involving improvisation or listening to or singing songs (Marquez-Garcia et al., 2021) agreed that “studying music therapy through a scientific lens can be problematic due to the multiple theoretical approaches and techniques employed and individual differences in patient populations and cultures” (Marquez-Garcia et al., 2021). Building on Sharda et al.’s (2018) finding that music therapy may be able to improve brain function in children on the autism spectrum, Marquez-Garcia et al. (2021) recommend music therapy researchers include neuroimaging techniques to gain a more objective understanding of the effect of music therapy on individuals with the diagnosis of ASD.

# Part 2: Music Therapy Practice

## Theoretical Underpinnings

Music therapy approaches used with people diagnosed with autism or ASD have been grounded in various behavioural, developmental, educational, relational, creative, psychoanalytic, and neurological theories (Bergmann, 2016; Carpente & LaGasse, 2015; Geretsegger et al., 2015; Wigram & Gold, 2006) and have become well established (Bergman, 2016). Berger (2002), for example, argues that difficulties with sensory integration play a prominent role in autistic processing and therefore in the way children respond to environmental stimuli. She promotes a multi- dimensional physiologic perspective of music therapy which focuses on ways music can interact with and alter sensory responses in children diagnosed with autism. She describes how fun and creative musical activities can support children’s internal rhythmic organisation, and the ways in which playing instruments and moving to music can improve sensory integration and coordination. Ultimately these outcomes are assumed to transfer to other areas of learning.

Other neurological approaches also focus on rhythmic organisation, or “entrainment”. For example, a neurological approach which aims to support a child diagnosed with ASD to develop speech might involve the introduction of rhythmic exercises to stimulate initiation, gradually moving to rhythmic tapping on their body, or rhythmic body movement (Carpente & LaGasse, 2015). Music therapists using a Neurologic Music Therapy technique called “Developmental Speech and Language training through Music (DSLM)” (Thaut et al., 2014) would engage children in activities involving singing, chanting, playing musical instruments, and a combination of music, speech, and movement (Janzen & Thaut, 2018). It seems that the relationship difficulties that children on the autism spectrum may experience, including difficulties with facial expressions, gesture, prosody, and turn-taking, might also be explained by challenges with timing, or temporal synchrony (Wimpory & Gwilym, 2019). Situating the origins of autism in systems that programme time, serial coordination, and prospective control of movements, as well as regulate affective evaluations of experiences, might explain why improvisational music therapy seems to be effective with this population (Trevarthen & Delafield-Butt, 2013). Improvisational music therapy (IMT) involves therapist and participants using the spontaneous creation of music as a primary therapeutic experience for social engagement and expres- sion of emotions (Bruscia, 2014; Geretsegger et al., 2015). Therapists respond to the child’s impulses or motivations, consciously and sensi- tively attuning to their movements, feelings, and intentions (Geretsegger et al., 2015). In this way, just as sensitive carers do, they support the child’s communication attempts, and co-regulate arousal (Hardy & Lagasse, 2013).

Improvisational music therapy can be incorporated into other music-centred, child-centred, and psychodynamic approaches. The music- and child-centred “Creative Music Therapy” approach (Nordoff & Robbins, 1971) is one such example. Creative Music Therapists believe that all human beings are musical, and that music can therefore reach and affect all children, including those who experience severe developmental challenges. Their ideas have been reinforced by more recent “communicative musicality” theories (Malloch & Trevarthen, 2009; Trevarthen, 2002; Trevarthen & Malloch, 2017; Trevarthen & Malloch, 2000) which demonstrate how the “natural growth of a musical self in relation- ship” begins with intimate imitative dialogues and proto conversations (sensitively timed conversational turn-taking) between infants and carers (Trevarthan & Malloch, 2017, p. 2). Using vocalising or movement, new-born babies can synchronise precisely with their carer’s communica- tive gestures (Trevarthen & Aitken, 2001).

Similarly, relationship-based approaches to music therapy assessment and intervention are grounded in the child’s ability to attend, adapt, and engage with their own and others’ musical play (Carpente & LaGasse, 2015). The core features of autism spectrum disorder, relating and communicating, can be managed through a collaborative music making process. Fundamental elements of the Creative Music Therapy approach have continued to underpin the work of many contemporary music therapists, including practitioners in New Zealand.

## Methods and Goals

Previous paragraphs summarising music therapy research, demonstrate that music therapists employ a wide range of methods and techniques in their work with children on the autism spectrum including interactive playing or learning of instruments; vocalisation and singing; song writing and composition; movement and dance; and improvisation. Education tools such as the SCERTS (Prizant et al., 2006), Social Stories™ (Gray & Garand, 1993); and Floortime (Greenspan & Wieder, 2006) models, have been employed by music therapists working within interdisciplinary and multimodal approaches.

Most music therapy practices primarily focus on supporting children to improve their communication, social interaction, emotional skills (Bergmann, 2016; Carpente & LaGasse, 2015; Geretsegger et al., 2015; Janzen & Thaut, 2018; Kern et al., 2013; Wigram & Gold, 2006) motor functioning, and cognitive functioning (Carpente & LaGasse, 2015). In addition to rehabilitative goals, music therapy has also been used to support children’s well-being, self-expression, creativity, and “psychological enrichment” (Reschke-Hernandez, 2011); and might focus on music-centred goals such as musical relatedness or musical interrelatedness (Aigen, 2014a). Music therapists might also support parents to create music experiences that enhance their interaction with the child (Thompson et al., 2013), or support other professionals to use music with clinical intent and purpose within their scope of practice (Carpente & LaGasse, 2015; Rickson, 2012). Early intervention can lead to better outcomes for children, so it is natural that music therapists would put significant focus on music therapy for young children and their families (Kern & Humpal, 2012; Nugent, 2019; Thompson, 2012, 2017; Thompson & McFerran, 2015).

With some exceptions, early pioneers of music therapy tended to utilise the predictability inherent in music, by engaging children in structured activities such as singing groups, folk dancing, and rhythm activities (Reschke-Hernandez, 2011). However, following the leads of Alvin (1978) and Nordoff & Robbins’ (Nordoff & Robbins, 1971) child- centred improvisational music therapy has become the primary means to promote expression, communication, and interaction (Geretsegger et al., 2015; Janzen & Thaut, 2018; Kim et al., 2009; Wigram & Gold, 2006; Wigram et al., 2002). Receptive, precomposed music, and/or song- writing methods are still used (Carpente & LaGasse, 2015; Oldfield et al., 2019) with music therapy practitioners working in the USA utilising singing, vocalising, instrument play, and dance more frequently than child-centred improvisation (Kern, 2018). Kern (2018) also reports that practitioners in the USA are more likely to employ behavioural approaches in their work.

Nevertheless, the utilisation of improvisation techniques in the large multicentre randomised clinical trial (RCT) TIME-A study with children aged 4–7 years, reinforces the suggestion that improvisation is widely used internationally. In improvisational music therapy music therapists establish a meaningful relationship with a child through a shared music making process (Kim et al., 2009). They create unique opportunities for children to engage in safe musical encounters, leading to relation- ships of trust. Some children diagnosed with ASD might find it easier, initially at least, to respond to “music” or “instruments” rather than to people. The music therapist follows the child, creating empathic and supportive musical structures that respond to their emotional state and synchronise with their sounds and movement, while also introducing elements of anticipation and surprise. As the dyad becomes attuned, a sense of togetherness is created, the child’s communication increases and becomes more flexible, and social reciprocity develops (Carpente, 2017; Geretsegger et al., 2015; Kim et al., 2009; Simpson & Keen, 2011; Wigram, 1992, 1993, 2004; Wigram & Elefant, 2009).

Music therapy therefore offers a unique interaction setting for children diagnosed with ASD to develop communication skills (Walworth, 2007). For example, the utilisation of “babbling” vocal exchanges which typically occur between carers and infants, and the incorporation of children’s vocalisations and musical sounds into interactive improvised musical exchanges, can lead to speech development (Oldfield, 2020, p. 110). Drawing on decades of experience working with this population, Oldfield (2006) suggests that music therapy is powerful because it is motivating; children are supported by the structure inherent in music making as well as in the music therapy sessions; it provides opportunities for following and initiating; involves basic non-verbal exchanges; and enables children to be in control in a constructive way. It combines movement with music; can involve integration of playfulness, drama, and music; and can include joint work with parents (Oldfield, 2006, p. 90). Epstein, Elefant & Thompson (2020) suggest music therapists working with verbal children might be more likely to utilise their intellectual and language skills by focusing on vocalisation and songs, to develop mutual play and expand play routines. Thompson (2018) for example, describes a process of building on a young child’s actions and verbal stories, making meaning of their contributions, and interpreting and representing the communication musically. This process relied on Thompson attuning to the child, as well as enhancing the emotional content of the story. The work supported the child to spontaneously share real-life events within their storytelling, rather than repeating scripts learnt from movies and television programmes. Songs can be improvised in response to the children’s spontaneous verbal expressions; precomposed songs or adapted songs might be used to facilitate further improvisation; and/or children’s stories or non-verbal gestures might be incorporated into an improvised story or song (Baker et al., 2009).

Music therapy practice has become increasingly diverse as music therapists have begun to view autism through the socio-cultural lens. Many people who live with autism would prefer to receive support to manage or remove the challenges they face in their everyday lives rather than looking for treatment or a “cure” for their autistic symptoms (Bakan, 2018). It is in this context that Music-centred (Aigen, 2014a, 2014b), Resource-oriented (Rolvsjord, 2010), and Community Music Therapy (Stige & Aaro, 2012) approaches that focus on providing access to musicking and turn the lens towards maximising health and well-being through the mobilisation of the children’s strengths and resources, become highly relevant. Music therapists recognise that within an autism-friendly environment, such as a music space, children can sometimes function at a higher level than their neurotypical peers (Baron-Cohen, 2017). Yet they, and their communities, often continue to need support beyond the music therapy room to ensure they can comfortably engage in musicking in other contexts.

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