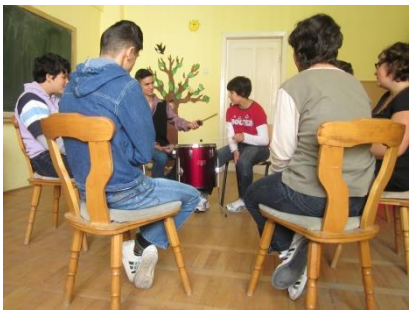
WHAT IS MUSIC THERAPY?

HOW DOES IT WORK AND WHAT EVIDENCE DO WE HAVE?



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INTRODUCTION

This resource has been compiled on behalf of the British charity *Music as Therapy International*. This is in response to requests from people pioneering the use of music therapy in countries where it is not a widely recognised or established form of intervention.

Our aim was to provide an overview of what music therapy is and the research and evidence which demonstrates its value to people facing a range of challenges throughout life. We hope this resource will help answer the questions: What is Music Therapy? How does it work and what evidence do we have?

There are many different approaches to music therapy worldwide and we have not attempted to compare the efficacy or impact of particular approaches. We have included research relating to music therapy and 'music interventions' in their broadest sense.

We have approached this by reviewing over 1000 papers, articles, presentations, theses and books. We have sought to include research which represents international music therapy practice. We have not knowingly excluded nor emphasised particular research methods. Where there is debate about findings we have included research which represents differing views. We have omitted research where findings were inconclusive due to issues relating to methodology.

Our starting point is to establish how music therapy is defined, with reference to the British Association of Music Therapy and the World Federation of Music Therapy. 'Considering Research' discusses how music therapy research has evolved and some of the questions remaining about its rigour and the approaches favoured. The subsequent summaries reflect areas of particular interest (and often funding). Just because one client group has less research to support statements defining the potential benefits of music therapy, doesn't mean music therapy is not impactful. It simply highlights areas where more research is needed to explore the impact that practitioners and clinicians see on a daily basis.

What helps to support music therapy practice in these less explored fields, is some of the wider research into why music helps and the neurological evidence we have as to how humans respond to music and the processes which affect people's minds and bodies. This is explored in Section 4.

Sections 5-9 provide summary pages relating to different client groups. These have been translated into the different languages of the local practitioners and music therapy pioneers who have requested this resource. Every statement is supported with references to the key pieces of research which have been cited as evidence of the scope and impact of music therapy.

The abstracts for these key pieces of research are then provided in a series of Appendices, alongside additional relevant research (including areas of debate, individual case studies or research which focuses on very specific conditions etc.) and wider reading. These Appendices are available in English only.

WHAT IS MUSIC THERAPY?

In many countries, music therapy is a recognised clinical discipline with well-evidenced benefits to people with disabilities, emotional difficulties, mental health difficulties and a wide variety of special needs[1].

Music therapy is now a truly international practice, with developments in South America, Africa, Asia and Australia are as vital as those in the United States and Europe: There are now 61 music therapy associations across Europe, some more focused on professionalization than others, sometimes more than one in any particular country.

Nordoff-Robbins Music Therapy, Analytical Music Therapy, Benenzon Music Therapy, The Bonny Method of Guided Imagery and Music, and Behavioural Music Therapy represent the "Five International Models of Music Therapy Practice," which were defined and presented at the 1999 World Congress in Washington D.C. To contemporise this list we could add Neurologic Music Therapy[2] and Community Music Therapy[3].

There is great variety within these different ways of working with regard to the emphasis placed on active participation, receptive (listening) techniques and improvisation, as well as differences in the music therapist's role. What they do all have in common is the underlying belief in the power of music to affect us on a deep level, regardless of illness or disability[4]. So we cannot attempt to answer the question "What is music therapy?" and embrace the variety of approaches in use worldwide. Instead we offer two music therapy bodies' responses:

The World Federation of Music Therapy:

> *"Music therapy is the professional use of music and its elements as an intervention in medical, educational, and everyday environments with individuals, groups, families, or communities who seek to optimize their quality of life and improve their physical, social, communicative, emotional, intellectual, and spiritual health and wellbeing. Research, practice, education, and clinical training in music therapy are based on professional standards according to cultural, social, and political contexts."*[5]

The British Association of Music Therapy

> "*As human beings, music plays a fundamental role in our identity, culture, heritage and spiritual beliefs. It is a powerful medium that can affect us all deeply. In music therapy, music therapists draw upon the innate qualities of music to support people of all ages and abilities and at all stages of life; from helping new born babies develop healthy bonds with their parents, to offering vital, sensitive and compassionate palliative care at the end of life.*
>
> *Everyone has the ability to respond to music, and music therapy uses this connection to facilitate positive changes in emotional wellbeing and communication through the engagement in live musical interaction between client and therapist. It can help develop and facilitate communication skills, improve self-confidence and independence, enhance self-awareness and awareness of others, improve concentration and attention skills.*
>
> *Central to how music therapy works is the therapeutic relationship that is established and developed, through engagement in live musical interaction and play between a therapist and client. A wide range of musical styles and instruments can be used, including the voice, and the music is often improvised.*

[1] Dileo Maranto (1993)
[2] Hurt-Thaut & Johnson (2015)
[3] Stige et al. (2010)
[4] Dasgupta & Majumdar (2014); Aigen (2014); Baker & Wigram (2004)
[5] World Federation of Music Therapy (2016)

Using music in this way enables clients to create their own unique musical language in which to explore and connect with the world and express themselves.

Music therapy is an established clinical intervention… to help people whose lives have been affected by injury, illness or disability through supporting their psychological, emotional, cognitive, physical, communicative and social needs.

Music Therapists work across a range of health, social care and educational settings, including:

- *Hospitals (NHS and private)*
- *Mainstream schools, special schools and pupil referral units*
- *Child Development Centres Children's Centres*
- *Day centres*
- *Hospices*
- *Residential settings including care homes*
- *Prisons and forensic settings*
- *Acute and post acute rehabilitation centres*
- *Specialist music therapy centres*
- *Community spaces*
- *In people's homes*" [6]

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[6] British Association of Music Therapy (2016)

CONSIDERING RESEARCH

Research has been a key factor enabling the growth of the music therapy profession and its statutory recognition, and is essential to its survival as a healthcare discipline[7]. Existent research demonstrates the effectiveness of music therapy in many areas including:

- Effect on mood and affect
- Emotional support for clients and their families
- Psychosocial growth
- Physiological responses (e.g. heart rate, respiration)
- Neurophysiological functioning
- Pain perception
- Physical rehabilitation
- Speech, language and communication
- Movement[8]

Collections of accounts of clinical case material constitute a body of anecdotal evidence. Additionally there is a wealth of quantitative and qualitative research. McFerran and Rickson define these two approaches, both of which use rigorous scientific methods:

> "*Quantitative research in music therapy aims to control a range of variables in order to demonstrate the relationship between the music therapy intervention and the outcome, thus proving its benefit. In contrast, qualitative research attempts to capture the richness of the client's experience and to value an individual's experiences*." [9]

Early music therapy research was predominantly quantitative and drew heavily on behavioural principles, observing measurable change in response to musical interventions. However, towards the end of the 20th century music therapists had begun to recognise considerable limitations in using quantitative research methods to explore psychotherapeutically based work[10]. Psychodynamic changes, such as sense of identity, self-esteem and expression of emotions such as frustration, anger, loss and fear, have proved difficult to capture with quantitative designs. In contrast, qualitative research has proved effective for capturing both spoken descriptions and musical material offered by clients, and the musical dialogues between the therapist and the clients.

The next research challenge is to respond to the increasing demand for evidence based approaches[11]. Wigram highlighted the difficulties in finding a tool that meets the rigorous demands of evidence based practice and yet accounts for the flexibility of the creative processes in music therapy[12]. However, contemporary research demonstrates music therapists are finding ways to meet the demands of Random Controlled Trials without losing therapeutic integrity and ways to synthesise findings from qualitative research. Questions remain regarding whether we should develop our own hierarchical model of evidence-based music therapy or should we get away from the idea of hierarchy of evidence all together? Whilst evidence-based practice fits the *treatment* model of music therapy, how relevant is it to other models?[13] Whilst research approaches continue

[7] Darnley-Smith & Patey (2003)
[8] World Federation of Music Therapy (2016)
[9] McFerran & Rickson (2007)
[10] Wigram (1993)
[11] Ansdell, Pavlicevic & Procter (2004)
[12] Wigram (1999) in Casey et al. (2011)
[13] Bradt (2008)

to evolve, it seems that multiple perspectives continue to bring the most rigorous approach to investigation into music therapy[14].

The resource strives to consolidate these multiple perspectives and to consolidate a wide range of music therapy research findings.

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[14] Lincoln (2005)

WHY MUSIC?

This section of the resource focuses on the research within music psychology, music education and neuroscience. There is overlap with findings from clinical music therapy and other music interventions, but primary consideration has been given to how music has been found to be beneficial by researchers beyond the field of music therapy.

Music plays in a key role in people's lives[15]. Our bodies respond to music in conscious and unconscious ways[16]. While we may take the influence of music for granted, there are complex interactions occurring in our brains and bodies that impact our physical movement, thoughts, and feelings[17]. When we listen to music, our bodies respond automatically[18].

But what are the key areas it affects and what processes are involved?

SPEECH AND LANGUAGE

There is now considerable accumulated evidence that active engagement with music in childhood produces structural changes in the brain which are related to the processing of sound[19] and language development[20]. When we listen to music or speech we process an enormous amount of information rapidly without our conscious awareness[21]. Extensive active engagement with music induces cortical re-organisation producing functional changes in how the brain processes information. If this occurs early in development the alterations may produce permanent changes in the way information is processed[22]. It is therefore not surprising that musical training sharpens the brain's early encoding of sound leading to enhanced performance on a range of skills associated with language (for example: listening skills[23] improving the ability to distinguish between rapidly changing sounds[24] and enhancing auditory discrimination[25]) with a positive resultant impact on the cortical processing of linguistic pitch patterns[26].

COGNITIVE DEVELOPMENT

- Musical training can enhance some elements of executive functioning[27].
  Executive functions are related to working memory and also involve the conscious control of action, thoughts, emotions and general abilities such as planning, the capacity to ignore irrelevant information, to inhibit incorrect automatic responses and to solve problems. Executive functions also include cognitive flexibility - the ability to adjust to novel or changing task demands - sustained attention and goal-directed behaviour[28].
- Active engagement with music impacts on children's IQ scores, particularly on elements related to spatial reasoning[29].
- There are positive correlations between musical skills and various skills related to literacy including verbal and auditory working memory[30]
- There is a growing body of evidence that musical training stimulates aural memory[31].

[15] Sloboda et al. (2009)
[16] Clark et al. (2016)
[17] Altenmüller & Schlaug (2012); Koelsch et al. (2006); Clark & Tamplin (2016)
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[24] Gaab et al. (2005)
[25] Schlaug et al. (2005)
[26] Magne et al. (2006); Schon et al. (2004)
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[31] Aleman et al. (2000); Fujioka et al. (2004); Kilgour et al. (2000); Chan et al. (1998)

- Music participation can enhance creative skills[32].
- Engagement with music can relate to positive attitudes towards school and better attendance[33].

SOCIAL, EMOTIONAL AND PSYCHOLOGICAL WELL-BEING

- Music, itself, can generate feelings of wellbeing and can facilitate working through difficult emotions[34].
- Music activates the limbic system, releasing endorphins that can make us feel better[35]
- Music is widely used for exploring and regulating emotions and moods[36].
- Music can be effective in inducing positive affective state[37] and achieving desirable moods[38] in both children and adults[39].
- Music is increasingly being recognised for its beneficial effects on psychological well-being, from reducing anxiety and depression[40] to increasing self-worth[41], self-esteem and self-confidence[42].
- Listening to particular kinds of music can have a particular role in the reduction of stress and anxiety, with significant reductions in cortisol levels[43] .
- Music can also be a valuable medium for coping with negative moods and emotions[44]. The most common activity for mood regulation is listening to music[45].
- Music makes a major contribution to the development of self-identity, particularly in adolescence[46].
- Music can be used to pass time, alleviate boredom, relieve tension, and distract from worries[47].
- Music can be viewed as a source of support when someone is feeling troubled or lonely, acting as a mood regulator, helping to maintain a sense of belonging and community[48].
- Group music making has been shown to contribute to feelings of social inclusion[49].
- Collective music making supports co-operation, pro-social behaviour[50], belongingness[51], relationships[52], social advancement[53] and teamwork[54].
- Participation in formal music lessons is linked with better self-regulation skills in infants and pre-school children[55] and older adults[56].

[32] Kalmar (1982); Hamann et al. (1990)
[33] Davalos et al. (1999); Eccles & Barber (1999); Taetle (1999); Miksza (2010)
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[35] Beaulieu-Boire et al. (2013)
[36]Juslin & Laukka (2004); North et al. (2004); Saarikallio (2011); Shifriss & Bodner (2014); DeNora (2000)
[37] North et al. (2004)
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[55] Winsler et al. (2011), Brown & Sax (2013)
[56] Clift et al. (2008); Hanna-Pladdy & MacKay (2011); Bugos et al. (2007)

- Music offers opportunities for social bonding[57], with particular importance for infants and their caregivers[58].
- Participation in active music making may increase empathy and emotional sensitivity in children[59].

    Members of musical groups have to pay attention to the actions and intentions of the other players and their physical and emotional states[60]. Understanding the emotional state of others is key to developing empathy.
- Active engagement with music benefits psychological well-being across the lifespan[61]
- The impact of music on psychological wellbeing and subsequently good health is largely, although not exclusively, through the emotions it evokes[62].

    Music seems to elicit emotions and change moods through its stimulation of the autonomic nervous system. Bodily responses related to emotion include changes in dopamine, serotonin, cortisol, endorphin, and oxytocin levels[63].

PHYSICAL WELL-BEING

- Music stimulation can benefit premature or underweight babies by reducing inconsolable crying and leading to improvement in physiological measures including heart rate, respiration rate, oxygen saturation and mean arterial pressure[64].
- Listening to music has a wide range of physiological effects on the human body including changes in heart rate, respiration, blood pressure, skin conductivity, skin temperature, muscle tension, and biochemical responses[65].
- Listening to music can be related to the reduction of pain and the strengthening of the immune system[66].
- Music making can reduce or remove the need for sedation[67] and pain relief[68].
- Participating in making music can benefit older people with reduced mortality rates[69] and a lack of deterioration in physical health with fewer visits to the doctor and less use of medication[70].
- Extensive instrumental music training affects the anatomy of the brain with greater grey matter volumes in motor-related areas[71].
- Rhythmic accompaniment to support physical education programmes can improve performance[72].
- Learning to play an instrument improves fine motor skills particularly when training commences before the age of seven[73].

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See Appendix 1 for featured research details, additional papers and wider reading.

WORKING WITH YOUNG CHILDREN

Music therapy has an important role to play in early intervention programmes for young children. It can:

- Promote the development of verbal communication
- Promote the development of non-verbal communication skills (such as: Turn taking, eye contact, anticipation and listening)
- Develop attention and concentration
- Develop a young child's awareness of themselves and others
- Develop cognitive skills
- Boost self-esteem and confidence
- Build resilience[74].

The Evidence Base

Even before birth, babies are part of a social world. Hearing the sound of the mother's voice, and those of people around her, gives the baby direct access to the social world into which she will be born[75]. This power of hearing *in utero* is evidenced by, among much other research, research into the cries of newborn babies which showed the influence of the rise and fall in the tonality of language they hear in the womb: The cries of German infants had a falling tonality, whereas the cries of French infants had a rising tonality[76]. Research also tells us that newborns can distinguish elements of rhythm, pitch and melody[77], knowledge which, over time, the infants use to learn about the world around them and to acquire language[78].

The baby is also aware of her mother's heartbeat and the rhythms of her movement. These experiences have in common with music, the elements of melody, rhythm and harmony; and this leads us to think that every human born, has within them innate musicality[79]. All music therapy practice is based on this understanding and music therapy literature has drawn significantly from child developmental studies, which emphasise the musicality of the pre-verbal exchanges between a mother and a newborn infant. These exchanges establish non-verbal interaction and underpin their early relationship[80]. Mothers and babies negotiate and share a flexible musical pulse between them: constantly adapting their tempi, intensity, motion, shape and contour of their sounds, movements and gestures in order to synchronise their non-verbal communication and emotional states[81].

Music Therapy with young children builds directly on the children's predisposition to be social and drawing out the innate musicality with which we are all born[82]. It promotes the socio-emotional

[74] Quin (2013)
[75] Murray & Andrews (2000)
[76] Mampe et al. (2009)
[77] Papousek (1996)
[78] Vosoughi et al. (2010)
[79] Hadley (2010) in Quin (2013); Shoemark (2016)
[80] Aldridge (1996); Bunt (1994); Hughes (1995); Pavlicevic (1990; 1991; 1995); Ruud (1998); Trehub (2001); Shoemark (2016)
[81] Beebe (1982); Papousek & Papousek (1989); Stern (1985); Trevarthen & Malloch (2008); Pavlicevic (2000); Malloch (1999); Trehub (2001)
[82] Quin (2013); Shoemark (2016)

well-being of a young child by replicating the primary attachment relationship, usually held between the mother and infant, offering secure and responsive and interactions through music-making.

Bjørkvold (1992) argues that the spontaneous musicality that occurs within child culture is much closer in form and function to the concept of developmental play than to the traditional adult concept of music[83]. Such play affords a child the opportunity to explore, to engage, to act out, to share and to experiment with emotions, expressions, communication[84]. Through play, a child can start to discover *themselves*:

> "It is in playing and only in playing that the individual child or adult is able to be creative and to use the whole personality, and it is only in being creative that the individual discovers the self." (Winnicott, 1971)

The following research-based examples demonstrate the value of music therapy for young children:

- Music therapy for young children together with their parents can strengthen bonds, meet psychosocial needs of both the parent and the child, and promote positive parenting[85].
- Music therapy (in groups or individually) offers effective early intervention to address the needs of young children with additional needs[86].
- Music therapy can nurture social development[87], interaction[88] and communication skills[89].
- Music therapy can stimulate cognitive functioning[90], including literacy and numeracy skills[91].
- Music therapy can encourage creative and spontaneous play[92].
- Music therapy can develop concentration and attention[93].
- Music therapy can boost self-esteem and confidence[94].
- Music therapy can aid self-regulation in young children[95].
- Music therapy can help young children build resilience[96].
- Music therapy with young children can foster secure attachment relationships, valuable to relationships in later life[97].
- Music therapy can support the emotional development of young children[98].
- Music therapy can promote physical development[99].

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[87] Walworth (2009); Wetherick (2009)
[88] Thompson et al. (2013); Young (2006); Burrell (2011)
[89] Braithwaite & Sigafoos (1999); Forrester (2009); Hallam (2010); Humpal (1991); Jacobsen et al. (2014); Kennedy (2008); Kin et al. (2008); Nicholson et al. (2008); North (2014); Pasiali (2013); Woodward (2004); Burrell (2011)
[90] Forrester (2009); Standley; Hughes (1996); Wetherick (2009); Burrell (2011)
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[92] Hallam (2010); Hibben (1992); Nicholson et al. (2008); Oldfield et al. (2012); Pasiali (2013); Walworth (2009)
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[97] Pasiali (2013); Bunt (2002); Vlismas et al. (2013); Maselko et al. (2010); Maclean (2016); Shoemark (2016)
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See Appendix 2 for featured research details, additional papers and wider reading.

WORKING WITH PEOPLE ON THE AUTISTIC SPECTRUM

Music therapy can be very helpful for those with autistic spectrum disorders. Involvement in music making can both stimulate and relax a person leading to very positive changes, including:

- Listening
- spontaneous play
- motivation to communicate
- strengthening muscles and improving co-ordination
- building relationships
- concentration
- self-expression
- language development
- imagination and creativity

The Evidence Base

Over the past seven decades numerous anecdotal case studies[100], narrative reviews[101] and systemic reviews[102] describe the benefits of music therapy for individuals with Autistic Spectrum Disorders. These are now widely recognised[103].

The following research-based examples demonstrate the value of music therapy for those with Autistic Spectrum Disorders:

- The impact of music therapy interventions for people with autistic spectrum disorders builds on a preserved neural capacity to process and respond to music[104].
- Music therapy interventions are informed by research evidence and incorporate many of the identified ASD-specific evidence-based practices in each session[105].
- Music therapy services for children with Autistic Spectrum Disorders are very effective for improving communication[106], interpersonal skills[107], personal responsibility, and play[108].
- Music therapy interventions can elicit joint attention[109]; enhance auditory processing, other sensory-motor, perceptual/motor, or gross/fine motor skills [110]; and help identify and appropriately express emotions[111].
- Music Therapy can reduce anxiety for people with autistic spectrum disorders[112]
- Music therapy interventions based on family-centred practice can increase social engagement in the home environment and community[113].

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[104] De Bruyn et al. (2012); Lai et al. (2012); Heaton et al. (1999)
[105] Kern et al (2013)
[106] Edgerton (1994); Gattino et al. (2011); Kim et al. (2008); Thompson (2012)
[107] Dezfoolian et al. (2013); Kim (2006)
[108] Whipple (2012); Kaplan & Steele (2005); Kern (2004)
[109] Kalas (2012); Arezina (2011); Kim et al. (2008)
[110] LaGasse & Hardy (2013)
[111] Katagiri (2009); Brown (1994)
[112] Hillier et al. (2012)
[113] Thompson & McFerran (2013); Thompson (2012); Kaplan & Steele (2005); Oldfield et al (2012)

- Music therapy interventions using musically adapted social stories can modify target behaviour and teach new skills[114].

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See Appendix 3 for featured research details, additional papers and wider reading.

WORKING WITH PEOPLE WITH LEARNING DISABILITIES

Music therapy can be very helpful for those with learning disabilities and often focuses on the use of music as a means of communication, self-expression and interaction. It can lead to very positive changes, including:

- Listening
- Motivation
- Empowerment
- Building relationships
- Reduced isolation
- Concentration
- Self-expression
- Enhanced communication
- Physical movement and co-ordination
- Imagination, creativity and play

The Evidence Base

A great deal has been written about the value of music therapy for children who have disabilities[115] . The information gathered in a music therapy session can provide a different picture from that seen in other settings[116]. Children often show enhanced responses in a music therapy environment[117]. Despite seeming to have significant disability or neurological trauma, they respond to music[118]. Jellison's (2000) comprehensive review of music research with disabled children and youth identified that when comparisons were made there was often no significant difference in the musical abilities of children deemed to have disabilities and those who were not.

Wigram's analysis of the content of American and British journals of music therapy (1987-1991), found a total of four hundred and fifty-three (453) articles that focused on fields of special education and described children with developmental disability (291), autism and psychiatric issues (72) and sensory and physical disability (90) [119]. Two hundred and forty-seven (247) of these articles focused on clinical work, one hundred and seventy-six (176) on research, and thirty (30) were general papers.

It is of note that the majority of research studies have been undertaken within special education or considering the role of music therapy with children with learning disabilities. Whilst research into the role of music therapy for adults with learning disabilities does exist, this population is under represented in the current evidence. This is likely to be for many reasons, but the issues regarding the challenges of gaining informed consent from and the full participation of adults with learning disabilities could be contributing factors[120].

[115] Aldridge et al. (1995); Boxhill (1984); Bunt (1994); Bunt & Hoskyns (2002); Chester et al. (1999); Daveson & Edwards (1998); Jellison (2000); Ockelford et al. (2002); Wilson (1991)
[116] Bunt (1994); Gantt (2000); Loewy (2000); Wigram (2000)
[117] Gold et al. (2004)
[118] Gantt (2000); Nordoff & Robbins (1977); Sacks (1995)
[119] Wigram (1993)
[120] Stalker (1998)

Despite these limitations, the following research-based examples demonstrate the value of music therapy for those with learning disabilities:

- Music therapy for people with learning disabilities is effective for developing communication and social skills[121], interpersonal skills[122] and building relationships[123].
- Music therapy interventions can support the emotional development and self-expression of a person with a learning disability[124].
- Music therapy offers a non-verbal medium which addresses isolation by encouraging interaction and diffusing stress associated with interacting[125].
- Music therapy can reduce anxiety and agitation[126].
- Music therapy can increase self-confidence and self-esteem, acceptance and success[127].
- Music therapy can facilitate the expression of preferences and promote choice-making[128].
- Music therapy interventions can enhance hand-eye co-ordination[129] and gross/fine motor skills[130].

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See Appendix 4 for featured research details, additional papers and wider reading.

WORKING WITH PEOPLE WITH MENTAL ILLNESS

Music therapy is recognised as an effective psychological intervention in the care of children and adults with mental illness. It can play a valuable role in helping minimise the trauma and disruption often associated with hospitalisation, and can have a positive impact on negative symptoms experienced with a mental health illness, such as motivation, social withdrawal and diminished affective experience and responsiveness. Music therapy can:

- Encourage clients to express themselves creatively
- Help clients feel more motivated
- Develop social and communication skills
- Build awareness of self and of self in relation to others
- Build and strengthen self-esteem and self worth
- Empower the client to becoming more confident in making choices and decisions in their daily lives
- Provide a secure and accepting environment, where positive change can take place

The Evidence Base

It is well-established that music is capable of evoking exceptionally strong emotions and of reliably affecting the mood of individuals[131]. Music Therapy is known to be an effective tool in helping people with a range of emotional disorders and mental health illnesses and can expedite positive change[132]. Approaches can be active or receptive: active techniques might be used when participants cannot articulate difficult feelings. Here the therapist uses clinical techniques to connect with the patient in an improvised dialogue, which can then act as a springboard to emotional awareness. Receptive techniques involve the use of pre-composed music for relaxation, reflection, guided reminiscence and change of mood state[133]. Group work can be beneficial as a means of exploring relationships, reducing social isolation and facilitating a greater self-understanding.

Research evidences that Music Therapy can:

- Provide an accessible form of therapeutic intervention with which people with severe mental illnesses will engage[134].
- Improve the global state, mental state and/or social functioning in people living with mental illness (including schizophrenia)[135]
- Increase social motivation[136]
- Offer opportunties for safe and successful emotional expression and release[137]
- Enhance interpersonal relationships[138]

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[137] Bodner (2007); Edwards (2014); Grocke et al. (2009); Montello & Coons (1998)
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- Improve self-image and increased self-esteem.[139]
- Be effective in suppressing and combating the symptoms of psychosis[140]
- Relieve depressive symptoms[141]
- Improve relaxation (self-perception and/or externally perceived)[142]
- Improve mood/emotion (self-perception and/or externally perceived)[143]
- Improve thought/insight (self-perception and/or externally perceived)[144] and coping skills[145]
- Reduce anxiety[146]
- Build upon client strengths and capacities in mental health recovery[147]

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See Appendix 5 for featured research details, additional papers and wider reading.

WORKING WITH PEOPLE LIVING WITH DEMENTIA

Music therapy can be very helpful for people living with dementia and often focuses on the use of music as a means to alleviate behavioural symptoms (such as agitation and anxiety), emotional well-being and the reduction of depressive symptoms. It can lead to very positive changes, including:

- Improved mood and psychological well-being
- Motivation
- Reduced behavioural and psychological symptoms of dementia
- Expression of intense feelings such as anger, frustration, sadness
- Exploration of memory recall and access to reminiscence
- Greater sense of self through improvised music-making
- Greater sense of control over life through successful experiences
- Greater social interaction such as turn-taking, eye-contact and language skills
- Reduced social isolation
- Unity and intimacy for families
- Nonpharmacological management of pain and discomfort

The Evidence Base

In the UK music therapy has been recommended as a psychosocial intervention in the National Dementia Strategy[148]. There is also much neurological research which supports the value of music therapy to people living with dementia:

- Research on music and emotion shows involvement of the nucleus accumbens and amygdala as well as orbito-frontal activation, which triggers dopamine release supporting attention and memory[149].
- A common observation with dementia clients is that certain songs seem to reactivate memory and cognitive function, especially those songs with strong emotional connections[150].
- MRI evidence from semantic dementia indicates that the right temporal pole is correlated with remembrance of songs and the grade of deterioration. This indicates a definite neuroanatomical correlate between deterioration and the degree of musical knowledge[151].
- Choir singing induces neurotransmitter-balance and a good ratio of release and re-uptake, possibly indicating symptom prevention[152].
- Making music trains audio-motor coupling and assists channel agitation in clients with dementia[153] and helps to maintain healthy levels of motor function[154].

And supporting all of the above is the wealth of clinical and therapeutic evidence, which demonstrates the value of music therapy for older people:

[148] Department of Health (2009)
[149] Salimpoor et al. (2011); Koelsch (2012)
[150] Cuddy & Duffin (2005)
[151] Hsieh et al. (2011); Hailstone et al. (2009)
[152] Kreutz (2004)
[153] Ridder et al. (2013)
[154] Altenmueller (2014)

- Music therapy can reduce depression among older adults[155].
- Music therapy can reduce anxiety among older adults[156].
- Music therapy can decrease agitated and aggressive behaviours for people living with dementia[157].
- Music therapy can reduce the use of medication[158].
- Music experiences can enhance socio-emotional experiences for people living with dementia[159].
- Music therapy can elicit positive changes in mood and emotional states[160].
- Music therapy can contribute to, maintain or rehabilitate functional cognitive and sensory abilities[161].
- Music therapy can aid recall[162].
- Music therapy can improve speech and language skills[163].
- Music therapy can improve cognitive functioning[164].
- Music therapy can increase motivation and stimulate interest in activities[165].
- Music therapy can provide meaningful and enjoyable time spent together in a positive, creative way[166].

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[156] Fachner et al. (2012); Guétin et al. (2009); Sung et al. (2008; 2012); Svansdottir et al. (2013)

[157] Brotons & Pickett-Cooper (1996); Choi et al. (2009); Clark et al. (1998); Devereaux (1997); Gerdner (2000); Janata (2012); Ledger & Baker (2007); Lin et al. (2011); Park & Pringle-Specht (2009); Ragneskog et al. (2001); Ridder et al. (2013); Sung et al. (2006a&b); Raglio et al. (2010; 2008); Reuer et al. (2011); Särkämö et al. (2012); Sung & Chang (2005); Svansdottir & Snaedal (2006)

[158] Hulme et al. (2009); Ridder et al. (2013)

[159] Brotons & Marti (2003); Brotons (2000); Brotons et al. (1997); Cooke et al.(2010); Creech et al. (2013); Guetin et al. (2013); Resano et al. (2011); Sun (2012)

[160] Gold (2013); Guetin et al. (2013); Han et al. (2010); Hanser & Thompson (1994); Hsu et al. (2015); Kumar et al. (1999); Lord & Garner (1993); Raglio et al. (2008); Särkämö et al. (2012)

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[162] Chou & Lin (2012); Chu et al. (2014); Lord & Garner (1993)

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[164] Bruer et al. (2007); Brotons et al. (1997); Ceccato et al. (2012); Chou & Lin (2012); Chu et al. (2014); Hong & Choi (2011); Lipe (1995); Moussard et al. (2012)

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See Appendix 6 for featured research details, additional papers and wider reading.

APPENDICES

APPENDIX 1

WHY MUSIC?

Featured Research Details

Aleman, A., Nieuwenstein, M.R., Böcker, K.B.E. & de Haan , E.H.F. (2000). Music training and mental imagery ability. Neuropsychologia, 38, 1664–1668.

Neuroimaging studies have suggested that the auditory cortex is involved in music processing as well as in auditory imagery. We hypothesized that music training may be associated with improved auditory imagery ability. In this study, performance of musically trained and musically naive subjects was compared on: (1) a musical mental imagery task (in which subjects had to mentally compare pitches of notes corresponding to lyrics taken from familiar songs); (2) a non-musical auditory imagery task (in which subjects had to mentally compare the acoustic characteristics of everyday sounds); and (3) a comparable measure of visual imagery (in which subjects had to mentally compare visual forms of objects). The musically trained group did not only perform better on the musical imagery task, but also outperformed musically naive subjects on the non-musical auditory imagery task. In contrast, the two groups did not differ on the visual imagery task. This finding is discussed in relation to theoretical proposals about music processing and brain activity.

Anderson, K. & Overy, K. (2010). Engaging Scottish young offenders in education through music and art. International Journal of Community Music, 3(1), 47-74.

This study examined music and art classes as a way to engage young offenders in education, and to see if such engagement had an effect on their further participation in education, self-esteem, self-control, behaviour and literacy skills. The arts are often discussed as being an inviting and safe method of entry for young offenders who may have had negative experiences with previous education in their formative years. Fourteen young offenders at Her Majesty's Young Offender Institution (HM YOI) Polmont in Scotland voluntarily participated in this ten-week study. Participants were divided into three groups: music, art and a control education group. They completed pre- and post-interviews and measures that examined their emotions, self-esteem, self-control and literacy skills. Behavioural reports and enrollment in education courses were reviewed for three months before and after the project. Results indicated increased engagement with education during and after the project for individuals in the music and art groups.

Anshel, M. & Marisi, D. (1978). Effect of music and rhythm on physical performance. Research Quarterly, 49, 109-13.

The effect of synchronized and asynchronized movement to music on the ability to endure a physical task was examined. The relative work loads for 32 male and female subjects (ranging in age from 19 to 22 years) on the PWC_{170} test (physical work capacity, 170 bpm) were calculated and used as the criterion for exercise intensity. Subjects were then assigned in counterbalanced order to each of three conditions: synchronous movement to music, asynchronous movement to music, and a control condition. A Sex by Conditions repeated-measures ANOVA indicated that music, particularly if synchronized to physical movement, had a positive effect on the ability to endure the task and that male subjects endured longer than female subjects.

Bailey, B.A. & Davidson, J.W. (2002). Adaptive characteristics of group singing: Perceptions form members of a choir for homeless men. Musicae Scientiae, 6, 221-256.

There is considerable evidence to suggest that music has adaptive characteristics. Individuals use recorded music to transform the emotional landscape to coincide with transitory needs and desires.

Also, music has frequently been reported to provoke uncommon emotional and physical reactions often referred to as peak experiences. In many cultures, that have limited industrial and technological development, active participation in musical activities is pervasive and all individuals are considered musical. In contrast, the musical elitism that has evolved in the Western world intimates that musical ability is specific to a talented minority. The elitist notion of musicality restricts the majority to procurers of rather than producers of music. However, experimental and theoretical sources indicate that music is an innate and universal ability and, therefore, active participation in music may have adaptive characteristics at many levels of proficiency. Positive life transformations that occurred for members of a choir for homeless men, since joining the choir, provided an opportunity to determine if group singing was a factor in promoting adaptive behaviour. A phenomenological approach utilizing a semi-structured interview wasemployed to explore the choristers' group singing experience. Analysis of the interviews indicated that group singing appears positively to influence emotional, social and cognitive processes. The choristers' perceptions of the adaptive characteristics of group singing fell within four principal categories: clinical-type benefits, benefits derived from audience-choir reciprocity, benefits associated with group process and benefits related tomental engagement. Active participation in singing may act to alleviate depression, increase self-esteem, improve social interaction skills and induce cognitive stimulation. The themes adhere to the tenets of flow theory which advocate the importance of mental stimulation and social interaction in increased life satisfaction. The emergent themes provide a preliminary basis for the development of a theory of the adaptive characteristics of group singing and also provide a framework for further investigation in this area.

Bailey, B.A. & Davidson, J. W. (2003). Amateur group singing as a therapeutic agent. Nordic Journal of Music Therapy, 12, 18-32.

This article presents a study of a choir of homeless men who experienced positive life transformations since joining the choir. In view of holistic health constructs which propose that overall health and life satisfaction are rooted in cultural practices, it was considered that involvement in group singing, in a community setting germane to the lifestyle of the participants, may have contributed to the positive outcomes. The results of an interpretative phenomenological analysis of in–depth semi–structured interviews indicated that group singing appeared to promote therapeutic effects which precipitated from emotional, social and mental engagement. The themes are discussed in reference to Ruud's (1997) music therapeutic theory which promotes the importance of culturally relevant musical activities in enhancing quality of life. The similarities between Ruud's themes and those which evolved with the homeless singers emphasize the therapeutic role of commonplace, community–based musical activities.

Bailey, B.A. & Davidson, J.W. (2005). Effects of group singing and performance for marginalised and middle-class singers. Psychology of Music, 33, 269-303.

In western society music performance is generally considered from the perspective of the elite performer, and the performance literature within the psychology of music has been representative of this preoccupation. But, in spite of much attention being directed to the 'how' of creating exceptional performances, little attention has been given to the 'why' of performance. Results of an investigation with members of a choir for homeless men indicated that group singing and performance, at the most amateur levels of musicality, yielded considerable emotional, social and cognitive benefits. The present article further explores the effects of group singing and performance with (a) a second choir formed for homeless and other marginalized individuals who had little or no music training or group singing experience, and (b) middle-class singers with low to high levels of music training and choral singing experience. Results indicate that the emotional effects of participation in group singing are similar regardless of training or socioeconomic status, but the interpersonal and cognitive components of the choral experience have different meanings for the marginalized and middle-class singers.

Whereas the marginalized individuals appear to embrace all aspects of the group singing experience, the middle-class choristers are inhibited by prevalent social expectations of musicianship. The outcomes may be of relevance to music educators, therapists and choral conductors who wish to create a choral environment in which the benefits of singing and performance override elitist concerns.

Beaulieu-Boire, G., Bourque, S., Chagnon, F., Chouinard, L., Gallo-Payet, N. & Lesur, O. (2013). Music and biological stress dampening in mechanically-ventilated patients at the intensive care unit ward: A prospective interventional randomized crossover trial. Journal of Critical Care, 28(4), 442–50.

This research aimed to evaluate the impact of slow-tempo music listening periods in mechanically ventilated intensive care unit patients. A randomized crossover study was performed in a 16-bed, adult critical care unit at a tertiary care hospital. Still-sedated patients, mandating at least 3 more days of mechanical ventilation, were included. The intervention consisted in two 1-hour daily periods of music-vs-sham-MP3 listening which were performed on Day 1 or 3 post-inclusion, with a Day 2 wash-out. "Before-after" collection of vital signs, recording of daily sedative drug consumption and measurement of stress and inflammatory blood markers were performed.

Of 55 randomized patients, 49 were included in the final analyses. Along with music listening, (i) vital signs did not consistently change, whereas narcotic consumption tended to decrease to a similar sedation (P = .06 vs sham-MP3); (ii) cortisol and prolactin blood concentrations decreased, whereas Adreno Cortico Trophic Hormone (ACTH)/cortisol ratio increased (P = .02; P = .038; and P = .015 vs sham-MP3, respectively), (iii) cortisol responders exhibited reversed associated changes in blood mehionine (MET)-enkephalin content (P = .01).

In the present trial, music listening is a more sensitive stress-reliever in terms of biological vs clinical response. The hypothalamus-pituitary adrenal axis stress axis is a quick sensor of music listening in responding mechanically ventilated intensive care unit patients, through a rapid reduction in blood cortisol.

Beck, R., Cesario, T., Yousefi, S. & Enamoto, H. (2000). Choral singing, performance perception and immune system changes in salivary immunoglobulin and cortisol. Music Perception, 18(1), 87-106.

In a naturalistic pre-post design, samples of saliva were collected from the members of a professional chorale during an early rehearsal (n = 31), a late rehearsal (n = 34) and a public performance (n = 32) of Beethoven's Missa Solemnis. As measures of immune system response, mean levels of secretory immunoglobulin A increased significantly, as a proportion of whole protein, 150% during rehearsals and 240% during the performance. Cortisol concentrations decreased significantly an average of 30% during rehearsals and increased 37% during performance. As measured through performance perception rating scales, a group of emotions and other experiential states that singers associated with professional singing were highly predictive of changes in level of secretory immunoglobulin A during the performance condition, but the results for the rehearsal conditions were not significant. The best multiple regression model for performance level of immunoglobulin A ($p < .0015$) included seven emotional, cognitive, and evaluative variables generally associated with choral singing, including levels of mood before and during singing, stress, relaxation, feeling "high," detachment/engagement, and specific satisfaction with the immediate performance.

Beck, R.J., Gottfried, T.L., Hall, D.J., Cisler, C.A. & Bozeman, K.W. (2006). Supporting the health of college solo singers: the relationship of positive emotions and stress to changes in the salivary IgA and cortisol during singing. Journal of Learning through the Arts: A research Journal on Arts Integration in Schools and Communities, 2(1), article 19.

Singers appear to experience health benefits from singing, but their art makes physical demands that may leave them prone to health problems. The study sought to measure singers' immunocompetence under practice and performance conditions. Salivary IgA and cortisol measurements were assayed

from multiple pre-post saliva samples obtained from 10 solo singers as they rehearsed and performed repertory in a college conservatory during a 10-week period. Confirming previous research on choirs, there was a significant increase in S-IgA after singing, and the effect was mediated by positive emotions of well being and feeling "high." The extent to which singers reported that they were usually stressed while singing was significantly correlated with decreases in S-IgA. Satisfaction with performance correlated significantly with a decrease of cortisol after singing. In a regression analysis, the best predictive model for upward change in S-IgA included two significant variables from the questionnaire: feelings of well being and relative lack of concern with artistic identity ($p < .018$). These findings suggest that preserving solo singers' positive emotions during singing may not only maintain their enjoyment of singing, but may also improve their immunocompetence in response to health risks.

Beisman, G. (1967). Effect of rhythmic accompaniment upon learning of fundamental motor skills. Research Quarterly, 38, 172-6.

This study investigated the effect of rhythmic accompaniment upon the learning of the fundamental motor skills of throwing, catching, climbing, balancing, jumping, leaping, dodging, bouncing, and striking. Boys and girls (N = 607) in grades 1–6 were the subjects. Pre- and post-tests which were both qualitative and quantitative were administered. The period of treatment was 10 weeks. Analysis of the data supported the conclusion that rhythmic accompaniment, employed as a teaching technique for both boys and girls, can be expected to produce more improvement in performance during the development of fundamental motor skills at the elementary grade level than can teaching and practice without rhythmic accompaniment.

Bittman, B., Dickson, L. & Coddington, K. (2009). Creative musical expression as a catalyst for quality-of-life improvement in inner-city adolescents placed in a court-referred residential treatment program. Advances in Mind-Body Medicine, 24(1), 8-19.

Obstacles to effectively rehabilitate inner-city adolescents in staff-secure residential treatment centers should not be underestimated. Effective evidence-based protocols are lacking to help juveniles who are often angry, detached, frustrated, and in direct conflict with their peers. Facing a myriad of issues ranging from youth delinquency offenses to trauma, abuse, drug/alcohol use, peer pressure/gang-related activities, lack of structure in home environments, mental health diagnoses, and cognitive functioning difficulties, these adolescents present extraordinary challenges to an over-stressed juvenile justice system.

This randomized controlled crossover study comprehensively evaluates the effectiveness of a novel creative musical expression protocol as a catalyst for nonverbal and verbal disclosure leading to improvements in quality of life for inner-city youth in a court-referred residential treatment program. A total of 52 (30 females and 22 males) African-American, Asian, Caucasian, and Puerto Rican subjects ranging in age from 12 to 18 (mean age 14.5) completed the study.

Dependent variable measures included the Child and Adolescent Functional Assessment Scale (CAFAS), the Adolescent Psychopathology Scale (APS), the Adolescent Anger Rating Scale (AARS), the Reynolds Adolescent Depression Scale, 2nd edition (RADS 2), and the Adolescent Visual-Analog Recreational Music Making Assessment (A-VARMMA). Statistically significant (experimental vs control) improvements in multiple parameters include school/work role performance, total depression, anhedonia/negative affect, negative self-evaluation, and instrumental anger. In addition, extended impact (experimental vs control) is characterized by statistically significant improvements 6 weeks after completion of the protocol, for school/work role performance, behavior toward others, anhedonia/negative affect, total anger, instrumental anger, anger, and interpersonal problems.

Bonneville-Roussy, A., Rentfrow., P, Xu, M.K. & Potter, J. (2013). Music through the ages: Trends in musical engagement and preferences from adolescence through middle adulthood. Journal of Personality and Social Psychology, 105(4), 703-717.

Are there developmental trends in how individuals experience and engage with music? Data from 2 large cross-sectional studies involving more than a quarter of a million individuals were used to investigate age differences in musical attitudes and preferences from adolescence through middle age. Study 1 investigated age trends in musical engagement. Results indicated that (a) the degree of importance attributed to music declines with age but that adults still consider music important, (b) young people listen to music significantly more often than do middle-aged adults, and (c) young people listen to music in a wide variety of contexts, whereas adults listen to music primarily in private contexts. Study 2 examined age trends in musical preferences. Results indicated that (a) musical preferences can be conceptualized in terms of a 5-dimensional age-invariant model, (b) certain music-preference dimensions decrease with age (e.g., Intense, Contemporary), whereas preferences for other music dimensions increase with age (e.g., Unpretentious, Sophisticated), and (c) age trends in musical preferences are closely associated with personality. Normative age trends in musical preferences corresponded with developmental changes in psychosocial development, personality, and auditory perception. Overall, the findings suggest that musical preferences are subject to a variety of developmental influences throughout the life span.

Bosacki, S.L. & O'Neill, S.A. (2013). Early adolescents' emotional perceptions and engagement with popular music in everyday life. International Journal of Adolescence and Youth.

This study explored young female and male adolescents' engagement with everyday activities involving popular music and their corresponding emotional perceptions. Sixty-six Grade 8 students (37 females, 29 males), aged 13–14 years from mostly White, English-speaking middle-class families near an urban centre in Western Canada completed a list of daily activities that involved popular music and corresponding personal meanings. Responses were coded according to emergent themes including emotional/value, physical, social/cultural, cognitive/competence and moral/spiritual experiences. Content analyses of personal music definitions showed that for all adolescents, a greater number of youth referred to popular music as an emotional or spiritual experience as compared to a cognitive/competence and physical experiences. Implications for gender-inclusive and developmentally appropriate education are discussed.

Brown, E.D. & Sax, K.L. (2013). Arts enrichment and preschool emotions for low-income children at risk. Early Childhood Research Quarterly, 28, 337-346.

No studies to date examine the impact of arts-integrated preschool programming on the emotional functioning of low-income children at risk for school problems. The present study examines observed emotion expression and teacher-rated emotion regulation for low-income children attending Settlement Music School's Kaleidoscope Preschool Arts Enrichment Program. At a level of $p < .001$, results indicate the following. First, within Kaleidoscope, children showed greater observed positive emotions such as interest, happiness, and pride, in music, dance, and visual arts classes, as compared to traditional early learning classes. Second, children at Kaleidoscope showed greater observed positive emotions than peers attending a comparison preschool that did not include full integration of the arts. Third, across the school year, children at Kaleidoscope showed greater growth in teacher-rated levels of positive and negative emotion regulation. The implication is that arts enrichment may promote social–emotional readiness to learn for low-income children at risk for school problems.

Bugos, J.A., Perlstein, W.M., McCrae, C.S., Brophy, T.S. & Bedenbaugh, P.H. (2007). Individualized piano instruction enhances executive functioning and working memory in older adults. Aging and Mental Health, 11, 464-471.

This study evaluates transfer from domain-specific, sensorimotor training to cognitive abilities associated with executive function. We examined Individualized Piano Instruction (IPI) as a potential cognitive intervention to mitigate normal age-related cognitive decline in older adults. Thirty-one musically naïve community-dwelling older adults (ages 60–85) were randomly assigned to either the experimental group (n = 16) or control group (n = 15). Neuropsychological assessments were administered at three time points: pre-training, following six months of intervention, and following a three-month delay. The experimental group significantly improved performance on the Trail Making Test and Digit Symbol measures as compared to healthy controls. Results of this study suggest that IPI may serve as an effective cognitive intervention for age-related cognitive decline.

Burger, B., Thompson, M. R., Luck, G., Saarikallio, S. & Toiviainen, P. (2013). Influences of rhythm- and timbre-related musical features on characteristics of music-induced movement. Frontiers in Psychology, 4, 183.

Music makes us move. Several factors can affect the characteristics of such movements, including individual factors or musical features. For this study, we investigated the effect of rhythm- and timbre-related musical features as well as tempo on movement characteristics. Sixty participants were presented with 30 musical stimuli representing different styles of popular music, and instructed to move along with the music. Optical motion capture was used to record participants' movements. Subsequently, eight movement features and four rhythm- and timbre-related musical features were computationally extracted from the data, while the tempo was assessed in a perceptual experiment. A subsequent correlational analysis revealed that, for instance, clear pulses seemed to be embodied with the whole body, i.e., by using various movement types of different body parts, whereas spectral flux and percussiveness were found to be more distinctly related to certain body parts, such as head and hand movement. A series of ANOVAs with the stimuli being divided into three groups of five stimuli each based on the tempo revealed no significant differences between the groups, suggesting that the tempo of our stimuli set failed to have an effect on the movement features. In general, the results can be linked to the framework of embodied music cognition, as they show that body movements are used to reflect, imitate, and predict musical characteristics.

Byrgen, L.O. Konlaan, B.K. & Johansson, S-E (1996). Attendance at cultural events, reading books or periodicals and making music or singing in a choir as determinants for survival: Swedish interview survey of living conditions. British Medical Journal, 313, 1577-1580.

OBJECTIVES: To investigate the possible influence of attendance at cultural events, reading books or periodicals, making music or singing in a choir as determinants for survival. DESIGN: A simple random sample was drawn of 15,198 individuals aged 16-74 years. Of these, 85% (12,982) were interviewed by trained non-medical interviewers between 1982 and 1983 about cultural activities. They were followed up with respect to survival until 31 December 1991. SETTING: Swedish interview survey of living conditions comprising a random sample of the adult Swedish population. SUBJECTS: 12,675 people interviewed between 1982 and 1983. MAIN OUTCOME MEASURES: Survival of subjects after controlling for eight confounding variables: age, sex, education level, income, long term disease, social network, smoking, and physical exercise. RESULTS: 6,301 men and 6,374 women were followed up; 533 men and 314 women died during this period. The control variables influenced survival in the expected directions except for social network for men; a significant negative effective was found when the analysis was made separately for men and women. We found an influence on mortality when the eight control variables were controlled for in people who rarely attended events compared with those attending most often, the relative risk being 1.57 (95% confidence interval 1.18 to 2.09). CONCLUSION: Attendance at cultural events may have a positive influence on survival. Long term follow up of large samples with confounders that are well controlled for and with the cultural stimulation more highly specified should be used to try to falsify the hypothesis before experiments start.

Caine, J. (1991). The effects of music on the selected stress behaviours, weight, caloric and formula intake and length of hospital stay of premature and low birth weight neonates in a newborn intensive care unit. Journal of Music Therapy, 28(4), 180-192.

The purpose of this study was to examine the effects of music on selected stress behaviors, weight, caloric and formula intake, and length of hospital stay. Subjects were 52 preterm and low birth weight newborns in a newborn intensive care unit (NBICU) who were in stable condition and restricted to isolettes. Subjects in the experimental and control groups were matched for equivalency based on sex, birth weight, and diagnostic criticality. Eleven males and 15 females were assigned to the control group and received routine auditory stimulation. The experimental group of 11 males and 15 females received music stimulation, which consisted of approximately 60 minutes of tape recorded vocal music, including lullabies and children's music, and routine auditory stimulation. Thirty-minute segments of the recording were played alternatively with 30 minutes of routine auditory stimulation three times daily. Exposure to music stimulation occurred only during the infants' stay in the NBICU. Results suggest music stimulation may have significantly reduced initial weight loss, increased daily average weight, increased formula and caloric intake, significantly reduced length of the NBICU and total hospital stays, and significantly reduced the daily group mean of stress behaviors for the experimental group. Data analyses suggest the length of hospital stay may be correlated with the amount of stress experienced by the neonate and not with weight gains. Theoretical and practical aspects of these results are discussed.

Cassidy, J.W. & Standley, J.M. (1995). The effect of music listening on physiological responses of premature infants in the MCU. Journal of Music Therapy, 32(4), 208-227.

In this study 20 low birthweight infants of 24–30 weeks gestation age, who were being oxygenated in a Neonatal Intensive Care Unit (NICU), served as subjects during their first week of life. Ten infants listened to lullabies through Bio-logic insert earphones with ALGO Ear Couplers™ and 10 infants served as control subjects. All subjects passed an auditory brainstem response (ABR) procedure to insure that audiological responses were consistent with normal hearing. Experimental treatment occurred across 3 days and was conducted in an ABABABABA design, with data collected during five segments of four minutes each of silence alterna ting with four segments of four minutes each of music. Oxygen saturation levels, heart rate, respiratory rate, and number of apnea/bradycardia episodes were recorded once per minute for the duration of baseline and treatment conditions (36 minutes). Results indicated that music was not contraindicated in the first week of life for these very low birthweight infants for whom sensory stimulation is usually restricted. In fact, music had noticeably positive effects on oxygen saturation levels, heart rate, and respiratory rate. No increase in apnea/bradycardia episodes following music treatment were observed.

Chan A.S., Ho Y.C. & Cheung M.C. (1998). Music training improves verbal memory. Nature, 396, 128.

Magnetic resonance imaging has shown that the left planum temporale region of the brain is larger in musicians than in non-musicians1. If this results from a change in cortical organization2,3, the left temporal area in musicians might have a better developed cognitive function than the right temporal lobe. Because verbal memory is mediated mainly by the left temporal lobe, and visual memory by the right4,5, adults with music training should have better verbal, but not visual, memory than adults without such training. Here we show that adults who received music training before the age of 12 have a better memory for spoken words than those who did not. Music training in childhood may therefore have long-term positive effects on verbal memory.

Chlan, L. (1998). Effectiveness of a music therapy intervention on relaxation and anxiety for patients receiving ventilatory assistance. Heart & Lung: The Journal of Acute and Critical Care, Volume 27, Issue 3, May–June 1998, 169-176.

OBJECTIVE: To test the effects of music therapy on relaxation and anxiety reduction for patients receiving ventilatory assistance.

DESIGN: Two-group, pretest-posttest experimental design with repeated measures. Subjects randomized to either a 30-minute music condition or a rest period.

SETTING: Four urban midwestern intensive care units.

SUBJECTS: Fifty-four alert, nonsedated patients receiving mechanical ventilation.

OUTCOME MEASURES: State anxiety (pretest and posttest), heart rate, and respiratory rate obtained every 5 minutes for 30 minutes.

RESULTS: Subjects who received music therapy reported significantly less anxiety posttest (10.1) than those subjects in the control group (16.2). Heart rate and respiratory rate decreased over time for those subjects in the music group as compared with the control group subjects.

CONCLUSIONS: A single music therapy session was found to be effective for decreasing anxiety and promoting relaxation, as indicated by decreases in heart rate and respiratory rate over the intervention period with this sample of patients receiving ventilatory assistance.

Clark, I. N., Baker, F. A. & Taylor, N. F. (2016). The modulating effects of music listening on health-related exercise and physical activity in adults: A systematic review and narrative synthesis. Nordic Journal of Music Therapy, 25, 76-104.

A systematic review and narrative synthesis of theories was conducted to examine the modulating effects of music listening on health-related exercise and physical activity. Searches were conducted on multiple bibliographic databases from the earliest available date until April 2013 using the key terms of music, physical activity and theory and related synonyms. Two reviewers independently screened retrieved texts using the inclusion and exclusion criteria. The quality of included texts was appraised using a checklist, and key concepts were recorded and synthesised using inductive thematic analysis. The narrative synthesis comprised 23 theoretical texts representing three contexts: therapeutic outcomes, sports and exercise performance, and auditory-motor processing. The quality appraisal demonstrated some limitations in the reporting of evidence informing theories. Analysis across all texts identified a main theme, cortical and subcortical stimulation and response, and two sub-themes, physiological arousal and subjective experience. These themes contributed to a common hypothesis that music could promote behavioural change with increased exercise adherence and participation. A meta-theory is presented, offering a framework for clinical practice and research. Music therapists might use the meta-theory to inform music listening interventions in programmes that aim to increase levels of physical activity.

Cohen, G.D., Perlstein, S., Chapline, J., Kelly, J., Firth, K.M. & Simmens, S. (2006). The impact of professionally conducted cultural programs on the physical health, mental health, and social functioning of older adults. The Gerontologist, 46(6),726–34.

The aim of this study was to measure the impact of professionally conducted community-based cultural programs on the physical health, mental health, and social activities of individuals aged 65 and older.Participants in the study were 166 healthy, ambulatory older adults from the Washington, DC, area. We assigned them to either an intervention (chorale) or comparison (usual activity) group and assessed them at baseline and after 12 months.

Results obtained from utilizing established assessment questionnaires and self-reported measures, controlling for any baseline differences, revealed positive findings for the effectiveness of the intervention such that the intervention group reported a higher overall rating of physical health, fewer

doctor visits, less medication use, fewer instances of falls, and fewer other health problems than the comparison group. The intervention group also evidenced better morale and less loneliness than the comparison group. In terms of activity level, the comparison group evidenced a significant decline in total number of activities, whereas the intervention group reported a trend toward increased activity.

The positive impact of participatory art programs for older adults in this study on overall health, doctor visits, medication use, falls, loneliness, morale, and activities reflects important health promotion and prevention effects and a reduction of risk factors driving the need for long-term care.

Conrad, C., Niess, H., Jauch, K.W., Bruns, C.J., Hartl, W. & Welker, L. (2007). Overture for growth hormone: requiem for interleukin–6? Critical Care Medicine, 35(12), 2709–13.

Music has been used for therapeutic purposes since the beginning of cultural history. However, despite numerous descriptions of beneficial effects, the precise mechanisms by which music may improve human well-being remain unclear.

We conducted a randomized study in ten critically ill patients to identify mechanisms of music-induced relaxation using a special selection of slow movements of Mozart's piano sonatas. These sonatas were analyzed for compositional elements of relaxation. We measured circulatory variables, brain electrical activity, serum levels of stress hormones and cytokines, requirements for sedative drugs, and level of sedation before and at the end of a 1-hr therapeutic session.

Compared with controls, we found that music application significantly reduced the amount of sedative drugs needed to achieve a comparable degree of sedation. Simultaneously, among those receiving the music intervention, plasma concentrations of growth hormone increased, whereas those of interleukin-6 and epinephrine decreased. The reduction in systemic stress hormone levels was associated with a significantly lower blood pressure and heart rate.

Based on the effects of slow movements of Mozart's piano sonatas, we propose a neurohumoral pathway by which music might exert its sedative action. This model includes an interaction of the hypothalamic-pituitary axis with the adrenal medulla via mediators of the unspecific immune system.

Creech, A., Hallam, S., Varvarigou & McQueen, H. (2014). Active ageing with music: Supporting well-being in the Third and Fourth ages. London: IOE Press.

Active Ageing with Music explores the powerful potential for active music-making to support wellbeing among older people. While major demographic transitions are currently underway, significant problems of social isolation, depression, and chronic disease among older people have been noted, requiring cost-effective and compassionate responses. This book demonstrates that engagement in active music-making offers just such a response.

Supported by strong evidence, Active Ageing with Music balances research with practice, including:

- *Practical issues of accessibility and resources*
- *Potential barriers to participation – structural, intrapersonal, social – alongside case-studies of potential solutions*
- *Supporting principles and practices for facilitating groups of older people, especially musical groups*

In parallel, this book uses the participants' own stories to underpin the argument that musical development is possible across a lifetime, and that older people can and do progress as musicians.

The book will be of interest to all academics and practitioners interested in music psychology, the impact of music on wellbeing, and leading musical activities with older people, as well as occupational therapists and community musicians. Most importantly, Active Ageing with Music will be of interest to

people who want to preserve and sustain their cognitive, social, and emotional wellbeing throughout the latter stages of their lives.

Davalos, D.B., Chavez, E.L. & Guardiola (1999). The Effects of Extracurricular Activity, Ethnic Identification, and Perception of School on Student Dropout Rates. Hispanic Journal of Behavioural Sciences, 21(1), 61-73.

The purpose of this study was to examine the relation between participation extracurricular activities and school dropout. Social and classroom engagement were analyzed as possible mediating factors in the relation. Longitudinal data from a study conducted by French, Conrad, and Turner (1995) was used in the analysis, along with extracurricular data collected from school yearbooks. Hierarchal binary logistic regressions were used to assess the effect ofparticipation in five types of extracurricular activities (athletics, fine arts, academic clubs, interest groups, and leadership positions) on school dropout rates as well as to assess the role of engagement in the relation. Participation in athletics emerged as the only significant predictor of school dropout. Social and classroom engagement were found to have significant effects in the relation between participation in athletics and school dropout, but the effect of participation in athletics remained significant also, indicating that participation in athletics has a unique effect on school dropout, independent of engagement.

Eccles, J.S. & Barber, B.L. (1999). Student council, volunteering, basketball, or marching band: What kind of extracurricular involvement matters? Journal of Adolescent Research, 14, 10-43.

We examined the potential benefits and risks associated with participation in five types of activities: prosocial (church and volunteer activities), team sports, school involvement, performing arts, and academic clubs. Our sample included 1,259 mostly European American adolescents (approximately equal numbers of males and females). First, we explore the link between involvement in these activities and our indicators of positive and negative development. Involvement in prosocial activities was linked to positive educational trajectories and low rates of involvement in risky behaviors. In contrast, participation in team sports was linked to positive educational trajectories and to high rates of involvement in one risky behavior, drinking alcohol. Then, we explore two possible mediators of these associations: peer associations and activity-based identity formation. The evidence supported our hypothesis that group differences in peer associations and activity-based identities help explain activity group differences.

Fujioka, T., Trainor, L.J., Ross, B., Kakigi, R. & Pantev, C. (2004). Musical training enhances automatic encoding of melodic contour and interval structure. Journal of Cognitive Neuroscience, 16(6), 1010–1021.

In music, melodic information is thought to be encoded in two forms, a contour code (up/down pattern of pitch changes) and an interval code (pitch distances between successive notes). A recent study recording the mismatch negativity (MMN) evoked by pitch contour and interval deviations in simple melodies demonstrated that people with no formal music education process both contour and interval information in the auditory cortex automatically. However, it is still unclear whether musical experience enhances both strategies of melodic encoding. We designed stimuli to examine contour and interval information separately. In the contour condition there were eight different standard melodies (presented on 80% of trials), each consisting of five notes all ascending in pitch, and the corresponding deviant melodies (20%) were altered to descending on their final note. The interval condition used one five-note standard melody transposed to eight keys from trial to trial, and on deviant trials the last note was raised by one whole tone without changing the pitch contour. There was also a control condition, in which a standard tone (990.7 Hz) and a deviant tone (1111.0 Hz) were presented. The magnetic counterpart of the MMN (MMNm) from musicians and nonmusicians was obtained as the difference between the dipole moment in response to the standard and deviant trials recorded by magnetoencephalography. Significantly larger MMNm was present in musicians in both contour and interval conditions than in nonmusicians, whereas MMNm in the control condition was similar for both groups. The interval MMNm was larger than the contour MMNm in musicians. No

hemispheric difference was found in either group. The results suggest that musical training enhances the ability to automatically register abstract changes in the relative pitch structure of melodies.

Fukui, H. & Yamashita, M. (2003). The effects of music and visual stress on testosterone and cortisol in men and women. Neuroendocrinology Letters, 24(3/4), 173–80.

The aims of the present study were to examine sex-related differences in testosterone (T) and cortisol (C) changes with music listening and visual stress.

Saliva T and C concentrations were measured in 88 healthy college students (44 males and 44 females). These subjects were placed in one of 4 different conditions: (1) 30 min of listening to music, (2) 30 min of listening to music with visual stress (documentary film without sound including violent scenes), (3) 30 min of visual stress without music, and (4) 30 min of silence.

All subjects provided two saliva samples, one collected before intervention and the other after intervention. T and C levels were assessed by radio immuno assay (RIA).

There was a significant difference between the sexes in the way music affected T. Music decreased T in males, whereas it increased T in females. As for C, no sex-related differences were found under any of the conditions studied. C decreased with music and increased under other conditions. Our data suggests that the effects of music and stress on T differ between males and females.

Further investigation is necessary to evaluate the relationships between music and other substances, the effect of degree of preference and hormonal changes not only during music listening but also during music plays and creation.

Gaab, N, Tallal, P., Lakshminarayanan, K., Archie, J.J., Glover, G.H. & Gabriel, J.D.E (2005). Neural correlates of rapid spectrotemporal processing in musicians and nonmusicians. Annals of the New York Academy of Sciences, 1060, 82-88.

Our results suggest that musical training alters the functional anatomy of rapid spectrotemporal processing, resulting in improved behavioral performance along with a more efficient functional network primarily involving traditional language regions. This finding may have important implications for improving language/reading skills, especially in children struggling with dyslexia.

Greasley, A.E. & Lamont, A. (2011). Exploring engagement with music in everyday life using experience sampling methodology. Music Scientiae, 15(1), 45-71.

Recent qualitative research has highlighted differences in people's music-listening behaviour according to their level of involvement with and interest in music, yet these findings are mainly based on retrospective accounts of patterns of behaviour (Greasley, 2008; Greasley & Lamont, 2006; Lonie, 2009). Experience sampling methodology (ESM) is a valuable tool for studying music in everyday contexts, and it has been shown to increase people's conscious awareness of the role of music in their lives (Sloboda, O'Neill & Ivaldi, 2001). Using ESM, the present study explored differences in people's everyday engagement with music by recruiting three different types of listener: those identified as having low, moderate, or high engagement with music. Over seven days, quantitative and qualitative data were collected from 25 young adults (aged 18–30) on what they were doing while hearing music (e.g., activities) and the functions/effects of music (e.g., reasons influencing choices). Post-study interviews with 23 participants then generated retrospective accounts about specific musical experiences. Analysis revealed two broad types of listener: the less engaged, who listened for fewer hours a week (min = 3 hours, mean = 12 hours), were less likely to be hearing self-chosen music, and were more likely to listen to music to pass time, out of habit or to help them feel less alone; and the highly engaged, who listened for a greater number of hours per week (mean = 21 hours, max = 40 hours), were more likely to be hearing self-chosen music, and were more likely to use music to evoke

specific moods, create an atmosphere, or enhance an activity. The study confirmed the usefulness of ESM for investigating the complex (and interacting) factors involved in people's daily musical choices, and highlighted ways in which music can fulfil different functions concurrently. Findings show that future research on everyday musical behaviour should continue to account for the context of music listening in shaping responses to and uses of music; and account for individual differences in people's levels of engagement with music.

Gromko, J. & Poorman, A. (1998). The effect of music training on preschoolers' spatial-temporal task performance. Journal of Research in Music Education, 46, 173-181.

The purpose of this study was to investigate the effect of music training on preschoolers' Performance IQ (Wechsler Preschool and Primary Intelligence Scale-Revised, 1989). Preschoolers in the treatment group (N = 15) met weekly from October 1996 through April 1997. A Mann-Whitney test on Performance IQ (scaled) gain scores by group yielded U = 67, p =.059; a Mann-Whitney test on Performance IQ (raw) gain scores by group yielded U = 65, p =.049. Regressions of IQ gain scores on age showed significantly less gain for older children in the control group (N = 15). A regression analysis showed that the relationship of Performance IQ to age was not significant for the treatment group. Slopes intersected at age 3. For 3-year-olds in this study, an intellectually stimulating environment, per se, results in a gain in the ability to perform spatial-temporal tasks.

Hallam, S., Creech, A., Varvarigou, M., McQueen, H. & Gaunt, H. (2014). Does active engagement in community music support the wellbeing of older people? Arts and Health, 6(2), 101-116.

There is considerable evidence that participating in music making can have benefits for children and young people. This research explored how participation in making music might support the social, emotional and cognitive well-being of older people. Comparisons were made between older people participating in a wide range of musical and other activities in relation to their responses to questionnaires and psychological needs scales (the CASP-12 and the Basic Needs Satisfaction Scale; Deci & Ryan, 2000). Comparisons were also made between those older people participating in the musical activities who were in the third and fourth ages. Factor analysis of responses revealed three factors: purpose (having a positive outlook on life); autonomy and control; and social affirmation (positive social relationships, competence and a sense of recognised accomplishment). Comparisons between those participating in the music groups and those participating in other activities revealed statistically significant differences on all three factors with the music groups giving more positive responses. There was also no deterioration in responses in the music groups between those in the third and fourth ages as might have been expected except in relation to purpose. Actively participating in making music has beneficial effects on the well-being of older people. Further research is needed to identify the mechanisms through which music is able to achieve these effects.

Hanna-Pladdy, B. & MacKay, A. (2011). The relation between instrumental musical activity and cognitive aging. Neuropsychology, 25, 378-386.

Intensive repetitive musical practice can lead to bilateral cortical reorganization. However, whether musical sensorimotor and cognitive abilities transfer to nonmusical cognitive abilities that are maintained throughout the life span is unclear. In an attempt to identify modifiable lifestyle factors that may potentially enhance successful aging, we evaluated the association between musical instrumental participation and cognitive aging. Method: Seventy older healthy adults (ages 60–83) varying in musical activity completed a comprehensive neuropsychological battery. The groups (nonmusicians, low and high activity musicians) were matched on age, education, history of physical exercise, while musicians were matched on age of instrumental acquisition and formal years of musical training. Musicians were classified in the low (1–9 years) or high (>10 years) activity group based on years of musical experience throughout their life span. Results: The results of this preliminary study revealed that participants with at least 10 years of musical experience (high activity musicians)

had better performance in nonverbal memory (η2 = .106), naming (η2 = .103), and executive processes (η2 = .131) in advanced age relative to nonmusicians. Several regression analyses evaluated how years of musical activity, age of acquisition, type of musical training, and other variables predicted cognitive performance. Conclusions: These correlational results suggest a strong predictive effect of high musical activity throughout the life span on preserved cognitive functioning in advanced age. A discussion of how musical participation may enhance cognitive aging is provided along with other alternative explanations.

Hays, T. & Minichiello, V. (2005). The meaning of music in the lives of older people: A qualitative study. Psychology of Music, 33, 437-451.

This qualitative study describes the experience of music and focuses on the emotional, social, intellectual and spiritual well-being roles that music plays in the lives of older people. In-depth interviews were used to explore the meaning, importance and function of music for 52 older Australians living in the community aged 60 years and older. The findings revealed that music provides people with ways of understanding and developing their self-identity; connecting with others; maintaining well-being; and experiencing and expressing spirituality. The results show how music contributes to positive ageing by providing ways for people to maintain positive self-esteem, feel competent, independent, and avoid feelings of isolation or loneliness. The study highlights the need to be better informed about how music can facilitate and sustain older people's well-being.

Henley, J., Caulfield, L.S., Wilson, D. & Wilkinson, D.J. (2012). Good Vibrations: positive change through social music making. Music Education Research, 14(4), 499-520.

Good Vibrations is a charity that runs gamelan projects with offenders in prison and on probation. A recent Birmingham City University study investigating the short-, medium- and long-term impact of the project found that participation in a Good Vibrations project acted as a catalyst for positive change. The research found that not only did participants feel more able to communicate with other offenders within the project, they found confidence in their own voice so as to continue to develop their communication and coping skills within prison and as ex-offenders in the community. Furthermore, the project contributed to the development of anger management skills and provided an outlet for self-expression leading to a feeling of 'being normal'. This article presents the findings of the study, and considers why Good Vibrations inspires positive change. Using a three-dimensional model of Activity Theory, the concept of learning through social music-making is explored in terms of how the individual interacts with the social environment in order to develop skills and how participation in a musical learning activity can lead to a positive change of identity.

Hillman, S. (2002). Participatory singing for older people: A perception of benefit. Health Education, 102(4), 163–71.

A questionnaire survey was carried out in the Glasgow area in Scotland amongst people over the UK age of statutory retirement participating in the community arts project Call That Singing?, with a return rate of 75 per cent. The results demonstrate that participatory singing was perceived as providing worthwhile physical, emotional, social and cultural benefits. Participants reported no overall deterioration in their perception of health over the 12-year period since the project started: this is despite the high recorded incidence of illness and bereavement during the same period to be expected of people of this age. Participants perceived statistically significant improvements to their general quality of life, emotional wellbeing (including a marginally significant shift in self-confidence) and understanding of singing. They also reported improvements to their social well-being, although these were not statistically significant. The research shows that participatory singing is making a contribution to the cultural economy and fabric of the city of Glasgow, illustrated by the increased number of visits to theatres, shows and museums and the increased level of active participation in cultural life.

Houston D. M., McKee K. J., Carroll L. & Marsh H. (1998). Using humour to promote psychological wellbeing in residential homes for older people. Aging and Mental Health, 2, 328-332.

The impact of a structured humorous activity on the psychological wellbeing of older people in residential settings was assessed. Residents who participated in the humorous activity were found to have significantly reduced levels of anxiety, as measured by the General Health Questionnaire, and significantly reduced levels of anxiety and depression, as measured by the Hospital Anxiety and Depression Scale, when compared to residents who received no intervention.

Hove, M.J. & Risen, J.L. (2009). It's all in the timing: Interpersonal synchrony increases affiliation. Social Cognition, 27(6), 949-960.

The tendency to mimic and synchronize with others is well established. Although mimicry has been shown to lead to affiliation between co-actors, the effect of interpersonal synchrony on affiliation remains an open question. The authors investigated the relationship by having participants match finger movements with a visual moving metronome. In Experiment 1, affiliation ratings were examined based on the extent to which participants tapped in synchrony with the experimenter. In Experiment 2, synchrony was manipulated. Affiliation ratings were compared for an experimenter who either (a) tapped to a metronome that was synchronous to the participant's metronome, (b) tapped to a metronome that was asynchronous, or (c) did not tap. As hypothesized, in both studies, the degree of synchrony predicted subsequent affiliation ratings. Experiment 3 found that the affiliative effects were unique to interpersonal synchrony.

Hutchinson, S., Lee, L.H., Gaab, N. & Schlaug, G. (2003). Cerebellar volume of musicians. Cerebral Cortex, 13, 943-49.

There is evidence that the cerebellum is involved in motor learning and cognitive function in humans. Animal experiments have found structural changes in the cerebellum in response to long-term motor skill activity. We investigated whether professional keyboard players, who learn specialized motor skills early in life and practice them intensely throughout life, have larger cerebellar volumes than matched non-musicians by analyzing high-resolution T(1)-weighted MR images from a large prospectively acquired database (n = 120). Significantly greater absolute (P = 0.018) and relative (P = 0.006) cerebellar volume but not total brain volume was found in male musicians compared to male non-musicians. Lifelong intensity of practice correlated with relative cerebellar volume in the male musician group (r = 0.595, P = 0.001). In the female group, there was no significant difference noted in volume measurements between musicians and non-musicians. The significant main effect for gender on relative cerebellar volume (F = 10.41, P < 0.01), with females having a larger relative cerebellar volume, may mask the effect of musicianship in the female group. We propose that the significantly greater cerebellar volume in male musicians and the positive correlation between relative cerebellar volume and lifelong intensity of practice represents structural adaptation to long-term motor and cognitive functional demands in the human cerebellum.

Hyde, K.L., Lerch, J., Norton, A., Forgread, M., Winner, E., Evans, A.C. et al. (2009). Musical training shapes structural brain development. The Journal of Neuroscience, 29(10), 3019-25.

The human brain has the remarkable capacity to alter in response to environmental demands. Training-induced structural brain changes have been demonstrated in the healthy adult human brain. However, no study has yet directly related structural brain changes to behavioral changes in the developing brain, addressing the question of whether structural brain differences seen in adults (comparing experts with matched controls) are a product of "nature" (via biological brain predispositions) or "nurture" (via early training). Long-term instrumental music training is an intense, multisensory, and motor experience and offers an ideal opportunity to study structural brain plasticity in the developing brain in correlation with behavioral changes induced by training. Here we demonstrate structural brain changes after only 15 months of musical training in early childhood,

which were correlated with improvements in musically relevant motor and auditory skills. These findings shed light on brain plasticity and suggest that structural brain differences in adult experts (whether musicians or experts in other areas) are likely due to training-induced brain plasticity.

Hyppa, M.T. & Maki, J. (2001). Individual-level relationships between social capital and self-rated health in a bilingual community. Preventative medicine, 32, 148-155.

Previous register studies have shown that mortality rates and disability pension statistics favor Swedish-speakers when compared to their Finnish-speaking neighbors in the same bilingual region in Finland. The purpose of the present questionnaire survey was to determine whether the Swedish-speaking community has more social capital and if the social capital is associated with health at the individual level.

The study population consisted of randomly selected samples of Finnish-speakers (N 1,000, response rate 66%) and Swedish-speakers (N 1,000, response rate 63%) representing all adults living in bilingual Ostrobothnian municipalities (75,000 Finnish-speakers and 78,000 Swedish-speakers). To inquire into social capital and health indicators, a bilingual questionnaire was composed to cover variables and indicators of sociodemography, health status, health behavior, and social capital (interpersonal trust and civic engagement). Data were analyzed with multiple logistic regression for two binary outcome variables: language group (Finnish vs Swedish) and self-rated health (good vs almost good/fair/poor/bad).

When health-related variables (urban residence, migration, age, BMI, household income, smoking, singing in a choir, membership in any voluntary association, participation in community events, and long-term diseases) were controlled for, the Finnish-speakers were more often migrated (P = 0.0001) and mistrusting (P = 0.0001) and less active in community events (P = 0.0016) and in singing in a choir (P = 0.02) than the Swedish-speakers. After controlling for language and the above-mentioned health-related variables, the number of auxiliary (willing to help) friends (P = 0.001), mistrust (P = 0.037), and membership in any religious association (P = 0.0096) were significantly and independently associated with good self-rated health in the whole sample.

The Swedish-speaking community seems to hold a fair quantity of social capital, which is associated with good health. Since the ecological and socioeconomic circumstances are equal for both language communities, a great deal of health inequality can be explained by differences in social capital.

Johansson, S.E., Konlaan, B.B. & Bygren, L.O. (2001). Sustaining habits of attending cultural events and maintenance of health: a longitudinal study. Health Promotion International, 16(3), 229-234.

The purpose of this study was to assess how changes in the habit of attending cultural events in the community might predict self-reported health. This study made use of data based on two interviews, 8 years apart, with 3793 adults aged 25–74 years from a simple random sample of the Swedish population. The subjects were interviewed in 1982–1983 and re-interviewed using the same questionnaire in 1990–1991. The setting was a Swedish interview survey of living conditions comprising a random sample of the adult population. Self-reported health status was the main outcome measure. The variables used for control purposes were baseline health status according to the survey of 1982–1983, age (at baseline), type of residence, geographical region of domicile, and socio-economic status (level of education). A correlation was found between perceived poor health and all the independent variables, as well as an influence in the expected direction for all of them; poor education, increasing age and a low degree of urbanization all predicted poorer perceived health. In the full model (including all nine independent variables), those who became culturally less active between the first and second occasion, or those who were culturally inactive on both occasions, ran a 65% excess risk of impaired perceived health compared with those who were culturally active on both occasions. Furthermore, those who changed from being culturally less active to being more active had

about the same level of perceived risk as those active on both occasions. These results could be in agreement with a causal influence of stimulation and suggest that cultural stimulation is a 'perishable commodity'. While recruiting new consumers would in that case promote health, continued frequent replenishment of the cultural stimulation may be just as important.

Juslin, P.N. & Laukka, P. (2004). Expression, perception and induction of musical emotions: a review and a questionnaire study of everyday listening. Journal of New Music Research, 33(3), 217-238.

In this article, we provide an up-to-date overview of theory and research concerning expression, perception, and induction of emotion in music. We also provide a critique of this research, noting that previous studies have tended to neglect the social context of music listening. The most likely reason for this neglect, we argue, is that that most research on musical emotion has, implicitly or explicitly, taken the perspective of the musician in understanding responses to music. In contrast, we argue that a promising avenue toward a better understanding of emotional responses to music involves diary and questionnaire studies of how ordinary listeners actually use music in everyday life contexts. Accordingly, we present findings from an exploratory questionnaire study featuring 141 music listeners (between 17 and 74 years of age) that offers some novel insights. The results provide preliminary estimates of the occurrence of various emotions in listening to music, as well as clues to how music is used by listeners in a number of different emotional ways in various life contexts. These results confirm that emotion is strongly related to most people's primary motives for listening to music.

Juslin, P. and Sloboda, J. (Eds.) (2001). Music and emotion: Theory and research. Series in affective science. New York, NY, US: Oxford University Press Music.

This volume presents an integrative review of the relationship between music and emotions. The first section reflects the various interdisciplinary perspectives, taking on board views from philosophy, psychology, musicology, biology, anthropology, and sociology. The second section addresses the role of our emotions in the composition of music, the ways that emotions can be communicated via musical structure, and the use of music to express emotions within the cinema. The third section looks at the emotions of the performer--how they communicate emotion, how their emotional state affects their performance. The final section looks at the ways in which our emotions are guided and influenced while listening to music, whether actively or passively.

Kalmar, M. (1982). The effects of music education based on Kodaly's directives in nursery school children. Psychology of Music, Special Issue, 63-68.

Examined the effects of the Kodaly method of singing instruction—which involves the accompaniment of music with rhythmic movements and the verbal or physical representation of songs—on the development of young children. 20 3-yr-olds were pretested and assigned to either the experimental group, which received twice-weekly special singing lessons based on the Kodaly method over 3 yrs, or the control group, which attended only regular nursery school programs. The experimental group showed greater improvement than the control group on measures of motor development, particularly dynamic coordination; abstract conceptual thinking; and play improvisation and originality. On an adaptation of the Torrance Tests of Creative Thinking, the experimental group showed superior performance on subtests requiring verbal responses but not on those involving drawing. No between-group differences in IQ were found.

Keith, D.R., Russell, K. & Weaver, B.S. (2009). The effects of music listening on inconsolable crying in premature infants. Journal of Music Therapy, 46(3), 191-203.

Over the decades, medical staff have developed strategies to manage crying episodes of the critically ill and convalescing premature infant. These episodes of crying occur frequently after infants are removed from ventilation, but before they are able to receive nutrition orally. Not only are these episodes stressful to infants and upsetting to parents, but they are also stressful and time consuming for the staff that take care of these patients. Although the literature supports the benefits of music

therapy in regard to physiological and certain behavioral measures with premature infants, no research exists that explores the use of music therapy with inconsolability related to the "nothing by mouth" status. This study explored the effects of music therapy on the crying behaviors of critically ill infants classified as inconsolable. Twenty-four premature infants with gestational age 32–40 weeks received a developmentally appropriate music listening intervention, alternating with days on which no intervention was provided. The results revealed a significant reduction in the frequency and duration of episodes of inconsolable crying as a result of the music intervention, as well as improved physiological measures including heart rate, respiration rate, oxygen saturation, and mean arterial pressure. Findings suggest the viability of using recorded music in the absence of a music therapist or the maternal voice to console infants when standard nursing interventions are not effective.

Kilgour, A.R., Jakobson, L.S. & Cuddy, L.L. (2000). Music training and rate of presentation as mediators of text and song recall. Memory & Cognition, 28, 700-710.

The present research addresses whether music training acts as a mediator of the recall of spoken and sung lyrics and whether presentation rate is the essential variable, rather than the inclusion of melody. In Experiment 1, 78 undergraduates, half with music training and half without, heard spoken or sung lyrics. Recall for sung lyrics was superior to that for spoken lyrics for both groups. In Experiments 2 and 3, presentation rate was manipulated so that the durations of the spoken and the sung materials were equal. With presentation rate equated, there was no advantage for sung over spoken lyrics. In all the experiments, those participants with music training outperformed those without training in all the conditions. The results suggest that music training leads to enhanced memory for verbal material. Previous findings of melody's aiding text recall may be attributed to presentation rate.

Kirschner, S. & Tomasello, M. (2009). Joint drumming: Social context facilitates synchronization in preschool children. Journal of Experimental Child Psychology, 102(3), 299-314.

The human capacity to synchronize body movements to an external acoustic beat enables uniquely human behaviors such as music making and dancing. By hypothesis, these first evolved in human cultures as fundamentally social activities. We therefore hypothesized that children would spontaneously synchronize their body movements to an external beat at earlier ages and with higher accuracy if the stimulus was presented in a social context. A total of 36 children in three age groups (2.5, 3.5, and 4.5 years) were invited to drum along with either a human partner, a drumming machine, or a drum sound coming from a speaker. When drumming with a social partner, children as young as 2.5 years adjusted their drumming tempo to a beat outside the range of their spontaneous motor tempo. Moreover, children of all ages synchronized their drumming with higher accuracy in the social condition. We argue that drumming together with a social partner creates a shared representation of the joint action task and/or elicits a specific human motivation to synchronize movements during joint rhythmic activity.

Kirschner, S. & Tomasello, M. (2010). Joint music making promotes prosocial behaviour in 4 year old children. Evolution and Human Behaviour, 31(5), 354-364.

Humans are the only primates that make music. But the evolutionary origins and functions of music are unclear. Given that in traditional cultures music making and dancing are often integral parts of important group ceremonies such as initiation rites, weddings or preparations for battle, one hypothesis is that music evolved into a tool that fosters social bonding and group cohesion, ultimately increasing prosocial in-group behavior and cooperation. Here we provide support for this hypothesis by showing that joint music making among 4-year-old children increases subsequent spontaneous cooperative and helpful behavior, relative to a carefully matched control condition with the same level of social and linguistic interaction but no music. Among other functional mechanisms, we propose that music making, including joint singing and dancing, encourages the participants to keep a constant audiovisual representation of the collective intention and shared goal of vocalizing and moving

together in time — thereby effectively satisfying the intrinsic human desire to share emotions, experiences and activities with others.

Koelsch, S., Fritz, T., Cramon, Y., Müller, K. & Friederici, A. D. (2006). Investigating emotion with music: An fMRI study. Human Brain Mapping, 27, 239-250.

The present study used pleasant and unpleasant music to evoke emotion and functional magnetic resonance imaging (fMRI) to determine neural correlates of emotion processing. Unpleasant (permanently dissonant) music contrasted with pleasant (consonant) music showed activations of amygdala, hippocampus, parahippocampal gyrus, and temporal poles. These structures have previously been implicated in the emotional processing of stimuli with (negative) emotional valence; the present data show that a cerebral network comprising these structures can be activated during the perception of auditory (musical) information. Pleasant (contrasted to unpleasant) music showed activations of the inferior frontal gyrus (IFG, inferior Brodmann's area (BA) 44, BA 45, and BA 46), the anterior superior insula, the ventral striatum, Heschl's gyrus, and the Rolandic operculum. IFG activations appear to reflect processes of music–syntactic analysis and working memory operations. Activations of Rolandic opercular areas possibly reflect the activation of mirror-function mechanisms during the perception of the pleasant tunes. Rolandic operculum, anterior superior insula, and ventral striatum may form a motor-related circuitry that serves the formation of (premotor) representations for vocal sound production during the perception of pleasant auditory information. In all of the mentioned structures, except the hippocampus, activations increased over time during the presentation of the musical stimuli, indicating that the effects of emotion processing have temporal dynamics; the temporal dynamics of emotion have so far mainly been neglected in the functional imaging literature.

Kokotsaki, D. & Hallam, S. (2007). Higher Education music students' perceptions of the benefits of participative music making. Music Education Research, 9(1), 93-109.

This study aimed to assess the perceived impact of music students' active engagement in music making. Seventy-eight music students were asked to report on the impact that their participation in music making had on their lives. The data were analysed using Atlas.ti software. The findings fell within three categories: music making as a musical act, which allowed participants to deepen their musical knowledge and understanding; music making as a social act, where students felt that they were active contributors to a group outcome, developed a strong sense of belonging, gained popularity and made friends with 'like-minded' people, enhancing their social skills, and building up a strong sense of self-esteem and satisfaction; and music making influencing the self in terms of personal skill development facilitating the students' personal identity and encouraging the development of self-achievement, self-confidence and intrinsic motivation.

Kokotsaki, D. & Hallam, S. (2011). The perceived benefits of pa rticipative music making for non-music university students: a comparison with music students. Music Education Research, 13(2), 149-172.

This study aimed to assess the perceived impact of young people's active engagement in ensemble music making. Sixty-two non-music university students were asked to report on the impact that their participation in music making had on their lives. The data were analysed using Atlas.ti software. There was a reported positive impact on social, musical and personal skills. Students' comments on the social benefits they gained from music making were mostly associated with their enjoyment of interacting with like-minded people in a friendly and relaxing environment. The development of musical skills was particularly valued as a significant benefit of making music in groups. The most important finding was the perceived impact of music making in students' personal lives in both the short term and long term. Alongside those perceived benefits, some challenges to ensemble music making were expressed. These are presented and discussed in terms of their practical implications. The case of a single mother that presented particular interest regarding her experiences in a popular band is also reported in a

separate sub-section. A comparison is finally drawn with music students' perceptions of participative music making.

Konlaan, B.B., Bygren, L.O. & Johansson, S-E. (2000). Visiting the cinema, concerts, museums or art exhibitions as determinant of survival: a Swedish fourteen-year cohort follow-up study. Scandinavian Journal of Public Health, 28(3), 174-8.

The aim of this study was to ascertain the possible influence of attending various kinds of cultural events or visiting cultural institutions as a determinant of survival. A cohort of individuals aged 25-74 years from a random sample were interviewed by trained non-medical interviewers in 1982 and 1983. The interviews covered standard-of-living variables. Our independent variables covered visiting cultural institutions and attendance at cultural events, reading books or periodicals, and music making. The non-response rate was about 25%. The cohort was followed with respect to survival for 14 years up to 31st December 1996. The background covariates that were used for control purposes were age, sex, cash buffer, educational standard, long-term disease, smoking, and physical exercise. Our setting was the Swedish survey of living conditions among the adult Swedish population aged 25-74 years. About 10,609 individuals were interviewed in 1982 and 1983. The outcome measure was survival until 31st December 1996. In all, 916 men and 600 women died during this period. We found a higher mortality risk for those people who rarely visited the cinema, concerts, museums, or art exhibitions compared with those visiting them most often. The significant relative risks ranging between RR 1.14 (95% CI. 1.01-1.31) of attending art exhibitions, and RR 1.42 (CI. 1.25-1.60) of attending museums, when adjusting for the nine other variables. Visits to the cinema and concerts gave significant RR in between. We could not discern any beneficial effect of attending the theatre, church service or sports event as a spectator or any effect of reading or music making. Our conclusion is that attendance at certain kinds of cultural events may have a beneficial effect on longevity.

Kreutz, G., Bongard, S, Rohrmann, S., Grebe, D., Bastian, H.G. & Hodapp, V. (2004). Effects of choir singing or listening on secretory immunoglobulin A, cortisol and emotional state. Journal of Behavioural Medicine, 27(6), 623-635.

The present study investigates the effects of choir music on secretory immunoglobulin A (S-IgA), cortisol, and emotional states in members of a mixed amateur choir. Subjects participated in two conditions during two rehearsals 1 week apart, namely singing versus listening to choral music. Saliva samples and subjective measures of affect were taken both before each session and 60 min later. Repeated measure analyses of variance were conducted for positive and negative affect scores, S-IgA, and cortisol. Results indicate several significant effects. In particular, singing leads to increases in positive affect and S-IgA, while negative affect is reduced. Listening to choral music leads to an increase in negative affect, and decreases in levels of cortisol. These results suggest that choir singing positively influences both emotional affect and immune competence. The observation that subjective and physiological responses differed between listening and singing conditions invites further investigation of task factors

Kuhn, D. (2002). The effects of active and passive participation in musical activity on the immune system as measured by salivary immunoglobulin A (SigA). Journal of Music Therapy, 39(1), 30-39.

The purposes of this study were (a) to determine if musical activity would produce a significant change in the immune system as measured by Salivary Immunoglobulin A (SlgA), and (b) to determine if active participation in musical activity had a significantly different effect on the immune system than passive participation. Thirty-three participants (28 women and 5 men) were randomly assigned to one of 3 groups, 2 experimental and 1 control. Active group participants participated in a 30-minute session where they played various percussive instruments and sang. Passive group participants listened to 30 minutes worth of live music. Saliva samples were taken before and after sessions and SlgA concentrations were determined using radial immunodiffusion technique. All groups were found to be

significantly different from each other. SlgA levels of the active group showed a significantly greater increase than those of the passive group and the control group, suggesting that active participation in musical activity produces a greater effect on the immune system than passive participation.

Lally, E. (2009). The power to heal us with a smile and a song: Senior well–being, music–based participatory arts and the value of qualitative evidence. Journal of Arts and Communities, 1(1), 25–44.

Sweet Tonic is a singing-based participatory arts initiative based in the southwest of Sydney, Australia. This paper reports on a qualitative evaluation of the thirty-week workshop series. It provides qualitative evidence of the outcomes of the programme, linking these to recent debates about evidence-based policy approaches. It argues that, although Sweet Tonic is undoubtedly a beneficiary of the instrumentalist turn in arts policy, this framing also traps the programme into defining its success or failure in instrumentalist terms. It is suggested that, although such accounts are often dismissed as anecdotal, in fact the most powerful evidence of the impact of a programme like Sweet Tonic is contained in the accounts of personal experience of participants in the programme. It is therefore necessary to understand the complexities of evidence in cultural policy, and to develop new language to talk about evidence that doesn't unnecessarily privilege quantitative or statistical forms at the expense of qualitative evidence.

Laukka, P. (2007). Uses of music and psychological well-being among the elderly. Journal of Happiness Studies, 8, 215-241.

A questionnaire was sent to a random sample of 500 community living older adults in Sweden (aged 65–75 years). The questionnaire assessed uses of music in everyday life: frequency of listening, situations where music is encountered, emotional responses to music, and motives for listening (i.e., listening strategies). Also, different facets of psychological well-being (e.g., affective well-being, life satisfaction, and eudaimonic well-being) and selected background variables (e.g., education level, health status, activity level, and Big-5 personality characteristics) were assessed. Results showed that listening to music is a common leisure activity encountered in many everyday situations, and that listening to music is a frequent source of positive emotions for older adults. Also, the participants reported using a variety of listening strategies related to emotional functions (e.g., pleasure, mood regulation, and relaxation) and issues of identity, belonging, and agency. The associations between listening strategies and well-being were explored through correlation and multiple regression analyses where the influence of background variables was controlled for. Health status and personality were the most important predictors of well-being, but some listening strategies were also significantly associated with psychological well-being. The results give important insights into older adults' uses of music in everyday life and give clues regarding possible relationships between musical activities and well-being.

Levitin, D. J. & Tirovolas, A. K. (2009). Current advances in the cognitive neuroscience of music. Annals of the New York Academy of Science, 1156, 211-23.

The study of music perception and cognition is one of the oldest topics in experimental psychology. The last 20 years have seen an increased interest in understanding the functional neuroanatomy of music processing in humans, using a variety of technologies including fMRI, PET, ERP, MEG, and lesion studies. We review current findings in the context of a rich intellectual history of research, organized by the cognitive systems underlying different aspects of human musical behavior. We pay special attention to the perception of components of musical processing, musical structure, laterality effects, cultural issues, links between music and movement, emotional processing, expertise, and the amusias. Current trends are noted, such as the increased interest in evolutionary origins of music and comparisons of music and language. The review serves to demonstrate the important role that music can play in informing broad theories of higher order cognitive processes such as music in humans.

Magne, C., Schon, D. & Besson, M. (2006). Musician children detect pitch violations in both music and language better than nonmusician children: behavioural and electrophysiological approaches. Journal of Cognitive Neuroscience, 18, 199-211.

The idea that extensive musical training can influence processing in cognitive domains other than music has received considerable attention from the educational system and the media. Here we analyzed behavioral data and recorded event-related brain potentials (ERPs) from 8-year-old children to test the hypothesis that musical training facilitates pitch processing not only in music but also in language. We used a parametric manipulation of pitch so that the final notes or words of musical phrases or sentences were congruous, weakly incongruous, or strongly incongruous. Musician children outperformed nonmusician children in the detection of the weak incongruity in both music and language. Moreover, the greatest differences in the ERPs of musician and nonmusician children were also found for the weak incongruity: whereas for musician children, early negative components developed in music and late positive components in language, no such components were found for nonmusician children. Finally, comparison of these results with previous ones from adults suggests that some aspects of pitch processing are in effect earlier in music than in language. Thus, the present results reveal positive transfer effects between cognitive domains and shed light on the time course and neural basis of the development of prosodic and melodic processing.

Merrett, D.L. Peretz, I & Wilson, S.J. (2013). Moderating variables of music training-induced neuroplasticity: a review and discussion. Frontiers of Psychology, 4, 606.

A large body of literature now exists to substantiate the long-held idea that musicians' brains differ structurally and functionally from non-musicians' brains. These differences include changes in volume, morphology, density, connectivity, and function across many regions of the brain. In addition to the extensive literature that investigates these differences cross-sectionally by comparing musicians and non-musicians, longitudinal studies have demonstrated the causal influence of music training on the brain across the lifespan. However, there is a large degree of inconsistency in the findings, with discordance between studies, laboratories, and techniques. A review of this literature highlights a number of variables that appear to moderate the relationship between music training and brain structure and function. These include age at commencement of training, sex, absolute pitch (AP), type of training, and instrument of training. These moderating variables may account for previously unexplained discrepancies in the existing literature, and we propose that future studies carefully consider research designs and methodologies that control for these variables.

Miksza, P. (2010). Investigating relationships between participation in high school music ensembles and extra-musical outcomes: An analysis of the Education Longitudinal Study of 2002 using bio-ecological development model. Bulletin of the Council for Research in Music Education, 186, 7-25.

The purpose of this study was to examine the potential relationships among participation in high school music ensembles and extra-musical educational outcomes broadly defined (i.e., math achievement, community ethic, commitment to school) using data from the Education Longitudinal Study of 2002. The sample (N =12,160) was representative of white and minority high school sophomores from 603 rural, suburban, and urban schools across the United States. Bronfenbrenner's bioecological development model was used as a theoretical framework to guide the selection of predictor variables. Multilevel model analyses accounting for both individual- (i.e., music participation, SES, minority status, peer influence) and school-level (i.e., urbanicity, percent of teachers certified, number of music teachers) effects were conducted for each outcome variable. Music participation was found to be significantly ($p < .001$) related to all outcome variables. Furthermore, this relationship remained significant after controlling for the remaining individual- and school-level effects. Students in high school music ensembles are significantly more likely to (a) have higher standardized math achievement scores, (b) be more concerned about community ethics (i.e., building friendships, helping

others, correcting social inequalities), and (c) be more committed to school (i.e., less late arrivals, less cuts/skips, less absences).

Miranda, D. & Claes, M. (2009). Music listening, coping, peer affiliation and depression in adolescence. Psychology of Music, 37, 215-233.

This study was conducted with 418 French-Canadian adolescents from Montréal (Canada) and had three objectives: (1) to find empirical evidence that music listening in adolescence can lead to peer affiliation based upon music preferences; (2) to find out whether three styles of coping by music listening (original self-report scale: emotion-oriented, problem-oriented, and avoidance/disengagement) are related to depression levels in adolescence (French version of the Beck Depression Inventory: Bourque & Beaudette, 1982); (3) to examine whether peers' depression levels and coping by music listening are moderators of the relation between Metal music preference and depression levels in adolescent girls. The results of a peer nomination procedure indicated that music preferences and depression levels of participants are related to those of their peers. In girls, problem-oriented coping by music listening is linked to lower depression levels, whereas avoidance/disengagement coping by music listening is linked to higher depression levels. In boys, emotion-oriented coping by music listening is linked to higher depression levels. Finally, Metal music listening is related to higher depression levels in girls only if they affiliate with peers that are more depressed. The implications of the research regarding the music listening and psychosocial development and adjustment in adolescence are discussed.

Miranda, D. & Gaudreau, P. (2011). Music listening and emotional well-being in adolescence: A person and variable oriented study. European Review of Applied Psychology, 61, 1-11.

The principal aim of this study was to determine if different profiles (types) of emotional reactions following music listening (happiness and sadness) characterized different levels of emotional well-being (i.e.positive and negative affects) in adolescence. The secondary aim was to examine relationships betweensocial congruence in music tastes with friends or parents (i.e., sharing similar music tastes and havingfewer conflicts about music) and emotional well-being in adolescence. This study's sample was com-posed of 316 adolescents (M=15.32 and S.D.=0.90 years of age; 172 girls and 144 boys). Cluster analysisidentified three profiles: (1) 'emotionally-negative listeners' (medium happiness and higher sadness);(2) 'emotionally-limited listeners' (lower happiness and lower sadness); (3) 'emotionally-positive lis-teners' (higher happiness and lower sadness). Results indicated that 'emotionally-negative listeners'had less emotional well-being, that 'emotionally-positive listeners' had more emotional well-being, andthat social congruence in music tastes with both friends and parents were related to more emotionalwell-being.

Möckel, M., Röcker, L., Störk, T., Vollert, J., Danne, O., Eichstädt, H., Müller, R. & Hochrein, H. (1994). Immediate physiological responses of healthy volunteers to different types of music: cardiovascular, hormonal and mental changes. European Journal of Applied Physiology, 68(6), 451–9.

A group of 20 healthy volunteers [10 women, 10 men; median age 25 (20–33) years] were examined by means of pulsed wave Doppler echocardiography, blood sample analysis and psychological testing before and after listening to three different examples of music: a waltz by J. Strauss, a modern classic by H. W. Henze, and meditative music by R. Shankar. To assess small haemodynamic changes, mitral flow, which reflects left ventricular diastolic behaviour, was measured by Doppler ultrasound. Heart rate, arterial blood pressure and plasma concentrations of adrenocorticotropic hormone, cortisol, prolactin, adrenaline, noradrenaline, atrial natriuretic peptide (ANP) and tissue plasminogen activator (t-PA) were determined simultaneously. Transmitral flow profile is characterized by early E-wave and late atrial induced A-wave. Velocity-time integrals were measured and the atrial filling fraction was calculated. The mental state was measured by using a psychological score (Zerssen) with low values (minimum 0) for enthusiastic and high values (maximum 56) for depressive patterns. Music by J.

Strauss resulted in an increase of atrial filling fraction (AFF; 29% vs 26%;P<0.05) and ANP (63 pg·ml−1 vs 60 pg·ml−1;P<0.05). The mental state was improved (Zerssen: 6.5 vs 11 points;P<0.05). After the music of H. W. Henze prolactin values were lowered (7.7 ng·ml−1 vs 9.1 ng·ml−1;P<0.01). The music of R. Shankar led to a decrease of cortisol concentrations (57 ng·ml−1 vs 65 ng·ml−1;P<0.001), noradrenaline concentrations (209 µg·l−1 vs 256 µg·l−1;P<0.01) andt-PAantigen concentrations (1.1 ng·ml−1 vs 1.4 ng·ml−1;P<0.05). Heart rate and blood pressure remained unchanged during the whole experiment. We concluded that different types of music induced changes of left ventricular diastolic function and plasma hormone concentrations. After rhythmic music (Strauss) AFF and ANP increased significantly, the mental state being improved. Meditative music (Shankar) lowered plasma cortisol, noradrenaline and t-PA concentrations; the observed increase of early left ventricular filling was not statistically significant. Prolactin concentrations decreased after modern music (Henze). Thus, it would seem to be possible to detect cardiovascular changes following different types of music by Doppler ultrasound and hormone analysis, meditative music having promising therapeutic implications in the treatment of conditions of stress.

Moreno, S., Marques, C., Santos, A., Santos, M., Castro, S. L. & Besson, M. (2009). Musical training influences linguistic abilities in 8-year-old children: More evidence for brain plasticity. Cerebral Cortex, 19, 712-723.

We conducted a longitudinal study with 32 nonmusician children over 9 months to determine 1) whether functional differences between musician and nonmusician children reflect specific predispositions for music or result from musical training and 2) whether musical training improves nonmusical brain functions such as reading and linguistic pitch processing. Event-related brain potentials were recorded while 8-year-old children performed tasks designed to test the hypothesis that musical training improves pitch processing not only in music but also in speech. Following the first testing sessions nonmusician children were pseudorandomly assigned to music or to painting training for 6 months and were tested again after training using the same tests. After musical (but not painting) training, children showed enhanced reading and pitch discrimination abilities in speech. Remarkably, 6 months of musical training thus suffices to significantly improve behavior and to influence the development of neural processes as reflected in specific pattern of brain waves. These results reveal positive transfer from music to speech and highlight the influence of musical training. Finally, they demonstrate brain plasticity in showing that relatively short periods of training have strong consequences on the functional organization of the children's brain.

Moreno, S., Bialystok, E., Barac, R., Schellenberg, E. G., Cepeda, N. J. & Chau, T. (2011a). Short-term music training enhances verbal intelligence and executive function. Psychological Science, 22, 1425-1433.

Researchers have designed training methods that can be used to improve mental health and to test the efficacy of education programs. However, few studies have demonstrated broad transfer from such training to performance on untrained cognitive activities. Here we report the effects of two interactive computerized training programs developed for preschool children: one for music and one for visual art. After only 20 days of training, only children in the music group exhibited enhanced performance on a measure of verbal intelligence, with 90% of the sample showing this improvement. These improvements in verbal intelligence were positively correlated with changes in functional brain plasticity during an executive-function task. Our findings demonstrate that transfer of a high-level cognitive skill is possible in early childhood.

Moreno, S., Friesen, D. & Bialystok, E. (2011b). Effect of music training on promoting preliteracy skills: Preliminary causal evidence. Music Perception, 29, 165-172.

The present study investigated whether music training fosters children's preliteracy skills. 60 children were randomly assigned to participate in a 20-day training program in either music or visual art. Before and after training, children's phonological awareness and their ability to map visual symbols onto words (i.e., visual-auditory learning) were assessed. Equivalent improvement after training was

observed for both groups on the phonological awareness measure, but the children with music training improved significantly more than the art-trained children on the visual-auditory learning measure. Music training appears to benefit certain skills necessary for reading.

Nelson, A., Hartl, W., Jauch, K–W., Fricchione, G.L., Benson, H., Warshaw, A.L. & Conrad, C. (2008). The impact of music on hypermetabolism in critical illness. Current opinion in Clinical Nutrition and Metabolic Care, 11(6), 790–4.

Although the literature on complementary therapy, including music, is vast, there are few studies conducted in a scientific fashion exploring physiologic mechanisms. This review summarizes recent evidence on the effects of music on the hypermetabolic response of critical illness.

Music may restore some of the distorted homeostasis observed in ICU patients, as well as reducing pain and the need for sedation. Music likely reduces alterations in the hypothalamic–anterior pituitary–peripheral hormone axes that produce cortisol and growth hormone. Music may also increase growth hormone levels, which can induce decreased production of cytokines such as IL-6 by white blood cells. Further, ovarian steroid secretion may paradoxically protect women by increasing baseline circulating stress hormones, providing an opportunity for music therapy to intervene effectively. Dopaminergic neurotransmission has been implicated as a means by which music can modulate the central nervous system.

Music may play an important role as an adjunct therapy in critical care. However, further studies are necessary to elucidate how music can be further integrated clinically and the precise underlying mechanisms of its beneficial effects.

North, A.C., Hargreaves, D.J. & Hargreaves, J.J. (2004). Use of music in everyday life. Music perception, 22, 41-77.

The value of music in people's everyday lives depends on the uses they make of it and the degree to which they engage with it, which are in turn dependent on the contexts in which they hear it. Very few studies have investigated people's experiences of music in naturalistic, everyday circumstances, and this exploratory study provides some initial normative data on who people listen with, what they listen to (and what their emotional responses to this music are), when they listen, where they listen, and why they listen. A total of 346 people who owned a mobile phone were sent one text message per day for 14 days. On receiving this message, participants were required to complete a questionnaire about any music they could hear, or had heard since their previous message. Responses indicated a high compliance rate; a high incidence of exposure to music; that the greatest number of musical episodes occurred while participants were on their own; that pop music was heard most frequently; that liking for the music varied depending on who the participant was with, where they were, and whether they had chosen to be able to hear music; that music was usually experienced during the course of some activity other than deliberate music listening; that exposure to music occurred most frequently in the evening, particularly between 10 pm and 11 pm, and on weekends; that music was heard most frequently at home, with only a small number of incidences occurring in public places; that the importance of several functions of music varied according to temporal factors, the place where the music was heard, and the person or people the participant was with. Further research should include participants from a greater range of sociodemographic backgrounds and should develop context-specific theoretical explanations of the different ways in which people use music as a resource.

North, A.C., Hargreaves, D.J. & O'Neill, S.A. (2000). 'The importance of music to adolescents'. British Journal of Educational Psychology, 70, 255-272.

The study aims to determine the importance of music to adolescents in England, and investigates why they listen to and perform music. A total of 2465 adolescents (1149 males; 1266 females; 50 participants did not state their sex) between 13 and 14 years of age who were attending Year 9 at one

of 22 secondary schools in the North Staffordshire region of England. A questionnaire asked participants (a) about their degree of involvement with musical activities; (b) to rate the importance of music relative to other activities; and (c) to rate the importance of several factors that might determine why they and other people of their age and sex might listen to/perform pop and classical music. Responses indicated that i) over 50% of respondents either played an instrument currently or had played regularly before giving up, and the sample listened to music for an average of 2.45 hours per day; ii) listening to music was preferred to other indoor activities but not to outdoor activities; iii) listening to/playing pop music has different perceived benefits to listening to/ playing classical music; iv) responses to suggested reasons for listening to music could be grouped into three factors; and v) responses to suggested reasons for playing music could be grouped into four factors. These results indicate that music is important to adolescents, and that this is because it allows them to (a) portray an ' image' to the outside world and (b) satisfy their emotional needs.

Norton, A., Winner, E., Cronin, K., Overy, K., Lee, D.J. & Schlaug, G. (2005). Are there pre-existing neural, cognitive, or motoric markers for musical ability? Brain and Cognition, 59, 124-134.

Adult musician's brains show structural enlargements, but it is not known whether these are inborn or a consequence of long-term training. In addition, music training in childhood has been shown to have positive effects on visual–spatial and verbal outcomes. However, it is not known whether pre-existing advantages in these skills are found in children who choose to study a musical instrument nor is it known whether there are pre-existing associations between music and any of these outcome measures that could help explain the training effects. To answer these questions, we compared 5- to 7-year-olds beginning piano or string lessons (n = 39) with 5- to 7-year-olds not beginning instrumental training (n = 31). All children received a series of tests (visual–spatial, non-verbal reasoning, verbal, motor, and musical) and underwent magnetic resonance imaging. We found no pre-existing neural, cognitive, motor, or musical differences between groups and no correlations (after correction for multiple analyses) between music perceptual skills and any brain or visual–spatial measures. However, correlations were found between music perceptual skills and both non-verbal reasoning and phonemic awareness. Such pre-existing correlations suggest similarities in auditory and visual pattern recognition as well a sharing of the neural substrates for language and music processing, most likely due to innate abilities or implicit learning during early development. This baseline study lays the groundwork for an ongoing longitudinal study addressing the effects of intensive musical training on brain and cognitive development, and making it possible to look retroactively at the brain and cognitive development of those children who emerge showing exceptional musical talent.

Nutley, S.B., Darki, F. & Klingberg, T. (2013). Music practice is associated with development of working memory during childhood and adolescence. Frontiers in Human Neuroscience, 7, 926.

Practicing a musical instrument is associated with cognitive benefits and structural brain changes in correlational and interventional trials; however, the effect of musical training on cognition during childhood is still unclear. In this longitudinal study of child development we analyzed the association between musical practice and performance on reasoning, processing speed and working memory (WM) during development. Subjects (n = 352) between the ages of 6 and 25 years participated in neuropsychological assessments and neuroimaging investigations (n = 64) on two or three occasions, 2 years apart. Mixed model regression showed that musical practice had an overall positive association with WM capacity (visuo-spatial WM, $F = 4.59$, $p = 0.033$, verbal WM, $F = 9.69$, $p = 0.002$), processing speed, ($F = 4.91$, $p = 0.027$) and reasoning (Raven's progressive matrices, $F = 28.34$, $p < 0.001$) across all three time points, after correcting for the effect of parental education and other after school activities. Music players also had larger gray matter volume in the temporo-occipital and insular cortex ($p = 0.008$), areas previously reported to be related to musical notation reading. The change in WM between the time points was proportional to the weekly hours spent on music practice for both

WM tests (VSWM, β = 0.351, p = 0.003, verbal WM, β = 0.261, p = 0.006) but this was not significant for reasoning ability (β = 0.021, p = 0.090). These effects remained when controlling for parental education and other after school activities. In conclusion, these results indicate that music practice positively affects WM development and support the importance of practice for the development of WM during childhood and adolescence.

Painter, G. (1966). The effects of a rhythmic and sensory motor activity program on perceptual motor spatial abilities of kindergarten. Exceptional Children, 33, 113-116.

The 20 lowest functioning children in a normal kindergarten class were divided into an experimental and a control group. The experimental group was given a systematic rhythmic and sensory motor activity program based on 9 movement areas of Barsch's movegenic theory and on suggestions from Kephart. Significant mean gains were made by the experimental group in the expected areas of remediation, thus demonstrating the efficacy of such a program in a group setting within a regular public school kindergarten and suggesting the use of these methods in the amelioration of certain types of learning disabilities.

Pantev, C., Engelien, A, Candia, V. & Elbert, T. (2001). Representational cortex in musicians. Plastic alterations in response to musical practice. Annals of the New York Academy of Sciences, 930, 300-14.

The lifelong ability to adapt to environmental needs is based on the capacity of the central nervous system for plastic alterations. In a series of neurophysiological experiments, we studied the impact of music and musical training in musicians on the specific functional organization in auditory and somatosensory representational cortex. In one such study, subjects listened to music from which one specific spectral frequency was removed. This led to rapid and reversible adaptation of neuronal responses in auditory cortex. Further experimental evidence demonstrated that long years of practice and training by professional musicians to enable them to reach their capacity is associated with enlarged cortical representations in the somatosensory and auditory domains. This tuning of neuronal representations was specifically observed for musical tones and was absent when pure sinusoidal tones were used as stimuli. In the somatosensory cortex, plastic changes proved to be specific for the fingers frequently used and stimulated. These changes were not detected in the fingers of the hand that were not involved in playing the particular instrument. Neuroplastic alterations also may be driven into a domain where they may become maladaptive. The clinical syndrome of focal hand dystonia that may occur in musicians who engage in forceful practice may be one such consequence. We will discuss the possibilities of reversing maladaptive responses leading to the successful treatment of focal hand dystonia, which relies on basic research about cortical reorganization. This example elucidates how neuroscientific progress can guide the development of practice guidelines and therapeutic measures for the benefit of professional musicians.

Pascual-Leone, A. (2001). The brain that plays music and is changed by it. Annals of the New York Academy of Sciences, 930, 315-29.

Playing a musical instrument demands extensive procedural and motor learning that results in plastic reorganization of the human brain. These plastic changes seem to include the rapid unmasking of existing connections and the establishment of new ones. Therefore, both functional and structural changes take place in the brain of instrumentalists as they learn to cope with the demands of their activity. Neuroimaging techniques allow documentation of these plastic changes in the human brain. These plastic changes are fundamental to the accomplishment of skillful playing, but they pose a risk for the development of motor control dysfunctions that may give rise to overuse syndromes and focal, task-specific dystonia.

Patel, A.D. & Iverson, J.R. (2007). The linguistic benefits of musical abilities. Trends in cognitive sciences, 11, 369-372.

Growing evidence points to a link between musical abilities and certain phonetic and prosodic skills in language. However, the mechanisms that underlie these relations are not well understood. A recent study by Wong et al. suggests that musical training sharpens the subcortical encoding of linguistic pitch patterns. We consider the implications of their methods and findings for establishing a link between musical training and phonetic abilities more generally.

Portowitz, A. & Klein, P. (2007). MISC Music: A music program to enhance cognitive processing among children with learning difficulties. International Journal of Music Education (Practice), 25, 259-271.

Research findings confirm positive links between music education, scholastic achievement, and social adaptability, especially among at-risk and special needs children. However, few studies explain how this process occurs. This article presents a didactic approach, which suggests practical ways of enhancing general learning skills while teaching music. Conducted with young children with severe learning difficulties aged 4—10, the MISC-MUSIC (More Intelligent and Sensitive, or Socially Compliant Children) program (Klein, 1996) interconnects the following three components: (1) the content of the music lessons; (2) the creation of educational frameworks that nurture quality, active teacher—child interactions (mediated learning environments), and (3) the choice of relevant, general learning skills (cognitive functions) to be fostered during the music lesson. The article explains the theoretic premises of MISC-MUSIC, cites examples of how this approach was implemented, and reflects on the effectiveness of the program.

Portowitz, A., Lichtenstein, O., Egorova, L. & Brand, E. (2009). Underlying mechanisms linking music education and cognitive modifiability. Research Studies in Music Education, 31, 107-128.

This study evaluated the impact of a music program designed to foster cognitive development and social esteem among high-risk elementary school children. Addressing the central question of how music education may help children develop general learning skills, the research design interconnected between three components: (1) the content of the music lessons; (2) interactive, educational frameworks (mediated learning environments); and (3) specific learning skills to be fostered during the music lessons. All of the participants (N = 81) attended the Jaffa Institute Child-Care Centers. Children in the experimental group (n = 45) partook in two to three hours a week of music enrichment (music appreciation, performance, creativity) conducted within mediated learning environments over a period of 2 years, while children in the control group (n = 36) did not. Pre and post assessments evaluated the development of cognitive skills (Raven, Complex Figure Tests) and social esteem (Fitts). Results indicated significant differences between the groups in the development of the targeted cognitive skills.

Rabinowitch, T.C., Cross, I & Burnard, P. (2013). Long-term musical group interaction has a positive influence on empathy. Psychology of Music, 41(4), 484-498.

Musical group interaction (MGI) is a complex social setting requiring certain cognitive skills that may also elicit shared psychological states. We argue that many MGI-specific features may also be important for emotional empathy, the ability to experience another person's emotional state. We thus hypothesized that long-term repeated participation in MGI could help enhance a capacity for emotional empathy even outside of the musical context, through a familiarization with and refinement of MGI empathy-promoting musical components (EPMCs). We tested this hypothesis by designing an MGI programme for primary school children consisting of interactive musical games implementing various EPMCs. We ran the programme for an entire school year and compared the emotional empathy of MGI children to control children using existing and novel measures of empathy before and after the programme. Our results support our hypothesis: MGI children showed higher emotional empathy scores after the study compared to its beginning, and higher scores than control children at the end of the study. These findings shed new light on the emotional processes involved in musical

interaction and highlight the remarkable potential of MGI for promoting positive social-emotional capacities such as empathy.

Roden, I., Grube, D., Bongard, S. & Kreutz, G. (2014a). Does music training enhance working memory performance? Findings from a quasi-experimental longitudinal study. Psychology of Music, 42, 284-298.

Instrumental music training has been shown to enhance cognitive processing beyond general intelligence. We examined this assumption with regard to working memory performance in primary school-aged children (N = 50; 7–8 years of age) within a longitudinal study design. Half of the children participated in an extended music education program with 45 minutes of weekly instrumental music training, while the other half received extended natural science training. Each child completed a computerized test battery three times over a period of 18 months. The battery included seven subtests, which address the central executive, the phonological loop and the visuospatial sketchpad components of Baddeley's working memory model. Socio-economic background and basic cognitive functions were assessed for each participant and used as covariates in subsequent analyses of variance (ANOVAs). Significant group by time interactions were found for phonological loop and central executive subtests, indicating a superior developmental course in children with music training compared to the control group. These results confirm previous findings concerning music training and cognitive performance. It is suggested that children receiving music training benefit specifically in those aspects of cognitive functioning that are strongly related to auditory information processing.

Roden, I., Könen, T., Bongard, S., Frankenberg, E., Friedrich, E. K. & Kreutz, G. (2014b). Effects of music training on attention, processing speed and cognitive music abilities—findings from a longitudinal study. Applied Cognitive Psychology, 28, 545–557.

The present study addresses visual attention and processing speed in primary school children (N = 345; 7–8 years of age) who received either music (MC) or natural science training (NC) over a period of 18 months. Dependent variables were collected three times (T1–T3) and included measures for processing speed, visual attention and cognitive music abilities. They were submitted to latent or manifest change models including socioeconomic status and basic cognitive functions as covariates. Groups performed similarly in all dependent tasks at baseline (T1). MC showed significant increases in processing speed as well as in music abilities from T2 to T3 and increases in rhythmic abilities from T1 to T2. Although MC also showed increases in both processing speed and visual attention over time, they were at a small advantage with respect to the former and at a clear disadvantage with respect to the latter measure as compared to NC.

Saarikallio, S. (2011). Music as emotional self-regulation throughout adulthood. Psychology of Music, 39(3), 307-327.

Emotional self-regulation is acknowledged as one of the most important reasons for musical engagement at all ages. Yet there is little knowledge on how this self-regulatory use of music develops across the life span. A qualitative study was conducted to initially explore central processes and strategies of the emotional self-regulation during adulthood. The data were collected through group interviews and analyzed through qualitative content analysis. Participants were 21 interviewees with an age range of 21—70 years. The results clarified conceptual features of music-related emotional self-regulation in adulthood and revealed two main trends. First, the basic nature of regulation, including various regulatory goals and strategies, remained highly similar throughout adulthood. Second, however, several changes were also evident, and they could be further categorized into three types: change by age, event-related fluctuations, and retirement transition. The study provided knowledge about the role of music-related emotional experiences as a functional and meaningful part of human behavior and psychosocial development during adulthood.

Saarikallio, S & Erkkila, J. (2007). The role of music in adolescents' mood regulation. Psychology of Music, 35(1), 88-109.

The aim of this study was the exploration and theoretical clarification of the role of music in adolescents' mood regulation. The phenomenon was approached through an inductive theory construction. The data were gathered from eight adolescents by means of group interviews and follow-up forms, and were then analysed using constructive grounded theory methods. The analysis resulted in a theoretical model, which describes mood regulation by music as a process of satisfying personal mood-related goals through various musical activities. The general nature of the mood regulation is described, the goals and strategies of mood regulation are examined, and finally the specific role of music in mood regulation is discussed.

Sandgren, M. (2009). Evidence of strong immediate well–being effects of choral singing – with more enjoyment for women than for men. Paper presented at the 7th Triennial Conference of European Society for the Cognitive Sciences of Music (ESCOM 2009), Jyväskylä, Finland. August 12–16.

Choral singing as a leisure activity is associated with increased well-being effects. It is also known that women engage more often in singing activities than men do. The objective of the study was to investigate how emotional states vary on pre and post measurements of a regular choral rehearsal in groups of female and male choral singers. Participants were 212 individuals (women n=152, men n=60) from eleven choirs (amateur n=6, advanced n=5). Results showed that in accordance with the literature on emotions and gender, women reported significantly more positive emotional states than men did related to participating in a regular choral rehearsal. However, few differences were found. Moreover, descriptive data pointed at a pattern of gender differences. Women and men reported similar levels of negative emotions, but varied more in changes of positive emotional states on pre and post measurements. The absence of gender differences might be due to the fact that this group of choral singers had been engaged in choral singing for many years and therefore, their experiences and expectations of choral rehearsals were similar.

Savoie, I. (2012). Evaluation Report: Evaluation of Sistema NB: Department of Healthy and Inclusive Communities and Sistema New Brunswick.

This paper summarizes our global review of literature concerned with El Sistema, Venezuela's National System of Youth and Children's Orchestras and Choirs, and Sistema-inspired 78 programmes around the world. Our aim in this summary is to identify the core principles that underpin what might be called the 'Sistema ideology', and to map the existing evidence against those principles, highlighting areas for future research and issues that have been the focus of critical debate. Research and evaluations concerned with programmes that self-identified as 'El Sistema' or 'Sistema-inspired' were included in the literature review. In addition we included papers that theorized and critiqued El Sistema. The review included documents that were written in English, Spanish, Portuguese, Italian, French and a limited number in German. In total, we included 85 research and evaluation papers, representing 44 Sistema or Sistema-inspired programmes in 19 countries. Five overarching core principles are identified and examples from the literature review are provided to illustrate the evidence and debates relating to each. Overall, our key finding is that El Sistema has fostered a remarkable renewal of interest in the transformative potential of music education, generating important dialogue and debate about effective practice. We point to the need for teacher professional development, particularly relating to an inclusive pedagogy that will support the social and personal development to which Sistema programmes aspire.

Schellenberg, E.G. (2004). Music lessons enhance IQ. Psychological Science, 15(8), 511-14.

The idea that music makes you smarter has received considerable attention from scholars and the media. The present report is the first to test this hypothesis directly with random assignment of a large sample of children (N = 144) to two different types of music lessons (keyboard or voice) or to control

groups that received drama lessons or no lessons. IQ was measured before and after the lessons. Compared with children in the control groups, children in the music groups exhibited greater increases in full-scale IQ. The effect was relatively small, but it generalized across IQ subtests, index scores, and a standardized measure of academic achievement. Unexpectedly, children in the drama group exhibited substantial pre- to post-test improvements in adaptive social behavior that were not evident in the music groups.

Schlaug, G., Jancke, L., Huang, Y. & Steinmetz, H. (1995a). In vivo evidence of structural brain asummetry in musicians. Science, 267, 699.

Certain human talents, such as musical ability, have been associated with left-right differences in brain structure and function. In vivo magnetic resonance morphometry of the brain in musicians was used to measure the anatomical asymmetry of the planum temporale, a brain area containing auditory association cortex and previously shown to be a marker of structural and functional asymmetry. Musicians with perfect pitch revealed stronger leftward planum temporale asymmetry than nonmusicians or musicians without perfect pitch. The results indicate that outstanding musical ability is associated with increased leftward asymmetry of cortex subserving music-related functions.

Schlaug, G., Jancke, L., Huang,Y.X., Staiger, J. F. & Steinmetz, H. (1995b). Increased corpus-callosum size in musicians. Neuropsychologia, 33, 1047–1055.

Using in-vivo magnetic resonance morphometry it was investigated whether the midsagittal area of the corpus callosum (CC) would differ between 30 professional musicians and 30 age-, sex- and handedness-matched controls. Our analyses revealed that the anterior half of the CC was significantly larger in musicians. This difference was due to the larger anterior CC in the subgroup of musicians who had begun musical training before the age of 7. Since anatomic studies have provided evidence for a positive correlation between midsagittal callosal size and the number of fibers crossing through the CC, these data indicate a difference in interhemispheric communication and possibly in hemispheric (a)symmetry of sensorimotor areas. Our results are also compatible with plastic changes of components of the CC during a maturation period within the first decade of human life, similar to those observed in animal studies.

Schlaug, G. Norton, A., Overy, K. & Winner, E. (2005). Effects of music training on the child's brain and cognitive development. Annals New York Academy of Science, 1060, 219-230.

Research has revealed structural and functional differences in the brains of adult instrumental musicians compared to those of matched nonmusician controls, with intensity/duration of instrumental training and practice being important predictors of these differences. Nevertheless, the differential contributions of nature and nurture to these differences are not yet clear. The musician-nonmusician comparison is an ideal model for examining whether and, if so, where such functional and structural brain plasticity occurs, because musicians acquire and continuously practice a variety of complex motor, auditory, and multimodal skills (e.g., translating visually perceived musical symbols into motor commands while simultaneously monitoring instrumental output and receiving multisensory feedback). Research has also demonstrated that music training in children results in long-term enhancement of visual-spatial, verbal, and mathematical performance. However, the underlying neural bases of such enhancements and whether the intensity and duration of instrumental training or other factors, such as extracurricular activities, attention, motivation, or instructional methods can contribute to or predict these enhancements are yet unknown. Here we report the initial results from our studies examining the brain and cognitive effects of instrumental music training on young children in a longitudinal study and a cross-sectional comparison in older children. Further, we present a comparison of the results in these children's studies with observations from our cross-sectional studies with adults.

Schon, D., Magne, C. & Besson, M. (2004). The music of speech: music training facilitates pitch processing in both music and language. Psychophysiology, 41, 341-349.

The main aim of the present experiment was to determine whether extensive musical training facilitates pitch contour processing not only in music but also in language. We used a parametric manipulation of final notes' or words' fundamental frequency (F0), and we recorded behavioral and electrophysiological data to examine the precise time course of pitch processing. We compared professional musicians and nonmusicians. Results revealed that within both domains, musicians detected weak F0 manipulations better than nonmusicians. Moreover, F0 manipulations within both music and language elicited similar variations in brain electrical potentials, with overall shorter onset latency for musicians than for nonmusicians. Finally, the scalp distribution of an early negativity in the linguistic task varied with musical expertise, being largest over temporal sites bilaterally for musicians and largest centrally and over left temporal sites for nonmusicians. These results are taken as evidence that extensive musical training influences the perception of pitch contour in spoken language.

Schwartz, K.D. & Fouts, G.T. (2003). Music Preferences, Personality Style, and Developmental Issues of Adolescents. Journal of Youth and Adolescence, 32(3) 205–213.

The purpose of this study was to examine the personality characteristics and developmental issues of 3 groups of adolescent music listeners: those preferring light qualities of music, those preferring heavy qualities of music, and those who had eclectic preferences for music qualities. One hundred sixty-four adolescents completed an age-appropriate personality inventory and a systematic measure of music listening preference. The findings indicate that each of the 3 music preference groups is inclined to demonstrate a unique profile of personality dimensions and developmental issues. Those preferring heavy or light music qualities indicated at least moderate difficulty in negotiating several distinct domains of personality and/or developmental issues; those with more eclectic music preferences did not indicate similar difficulty. Thus, there was considerable support for the general hypothesis that adolescents prefer listening to music that reflects specific personalities and the developmental issues with which they are dealing.

Shifriss, R. & Bodner, E. (2014). When you're down and troubled: Views on the regulatory power of music. Psychology of Music, November 2015, vol. 43 no. 6, 793-807.

This study examined people's beliefs about the impact of music on the regulation of a bad mood. Participants ranging from 24 to 86 years of age (n = 156) were asked whether they tend to listen to music when feeling bad, and if so, what is the mood of the music (i.e., sad or happy) they choose, and whether they believe that music can improve their mood. Participants completed the Trait Meta-Mood Scale, Music in Mood Regulation Inventory, and Brief Symptoms Inventory. Compared to those who do not listen to music when in a bad mood, participants who do reported directing more attention to their emotions and using strategies for mood regulation through music more intensively, and expressed a stronger belief in their ability to influence their mood through music. Compared to those who prefer listening to sad music when in a bad mood, listeners to happy music reported a stronger tendency to repair mood and a stronger belief in their ability to influence their mood through music. The choice of happy music when in a bad mood was more common among older participants. These results are discussed in relation to theories concerning the role of music in mood regulation in late adulthood.

Standley, J.M. (2008). Does music instruction help children learn to read: Evidence of a meta-analysis. Update. Applications of Research in Music Education, 27, 17-32.

This meta-analysis of 30 studies using a variety of music interventions to affect reading skills resulted in a moderately strong, significant, overall effect size of d = .32. When music activities incorporate specific reading skills matched to the needs of identified children (d = .44) or contingent music is used to reinforce reading behavior (d = .66), benefits are large. The music activities that pair alphabet recognition with phonetic patterns, incorporate word segmentation and sound blending skills, and

promote rapid decoding skills are effective in enhancing reading instruction and require little transfer to the assessment methodology. Benefits are greater when the special music reading activities are added to an existing music education curriculum than when replacing it. All schedules of intervention are equally effective regardless of whether daily, intense, short-term, or weekly periodic intervention spread across the school year.

Taetle, L. (1999). The relationship between fine arts participation and daily school attendance at the secondary level. Contributions to Music Education, 26(1), 50-66.

The purpose of this study was to investigate the relationship between daily school attendance and enrollment in fine arts électives. The sample came from three secondary schools in a southwestern city and consisted of 508juniors enrolled in their high school elective program. The research questions asked: 1) Do grade point averages relate to daily school attendance? 2) Does elective enrollment relate to daily school attendance1? and 3) Does the interaction of elective enrollment and grade point average relate to daily school attendance? Students were divided into three groups according to their elective participation: fine arts courses only, non-fine arts courses only, and a combination of fine arts and non-fine arts courses. Students were then stratified according to grade point average (GPA): low or "at-risk " (0 to 1.9), medium (2.0 to 2.9), and high (3.0 to 4.0). Attendance rates were computed as a percentage of days absent per semester. An ANOVA compared GPA and attendance; elective participation and attendance; and the interaction of GPA and elective participation, and attendance. Three significant differences were found: Students with lower absent rates had higher GPAs; students not enrolled in fine arts electives had significantly higher absent rates than those students with at least one fine arts elective; and students with low GPAs ("at-risk") who were not enrolled in fine arts electives had significantly higher absent rates than those students who were enrolled in at least one fine arts elective. Additional preliminary data was also collected that may have implications for future research into fine arts elective participation and daily school attendance.

Tallal, P. & Gaab, N. (2006). Dynamic auditory processing, musical experience and language development. Trends in neurosciences, 29, 382-370.

Children with language-learning impairments (LLI) form a heterogeneous population with the majority having both spoken and written language deficits as well as sensorimotor deficits, specifically those related to dynamic processing. Research has focused on whether or not sensorimotor deficits, specifically auditory spectrotemporal processing deficits, cause phonological deficit, leading to language and reading impairments. New trends aimed at resolving this question include prospective longitudinal studies of genetically at-risk infants, electrophysiological and neuroimaging studies, and studies aimed at evaluating the effects of auditory training (including musical training) on brain organization for language. Better understanding of the origins of developmental LLI will advance our understanding of the neurobiological mechanisms underlying individual differences in language development and lead to more effective educational and intervention strategies.

van Eck, M., Berkhof, H., Nicolson, N. & Sulon, J. (1996). The effects of perceived stress, traits, mood states, and stressful events on salivary cortisol. Psychosomatic Medicine, 58(5), 447–58.

This study examined the effects of perceived stress and related individual characteristics, mood states, and stressful daily events on salivary cortisol levels.Forty-one "high stress" and 46 "low stress" subjects were selected on the basis of Perceived Stress Scale scores from a sample of male, white collar workers. Subjects completed Experience Sampling self-reports and collected saliva samples 10 times a day over 5 consecutive days. Multilevel analysis revealed that trait anxiety and depression, but not perceived stress, were associated with small but statistically significant cortisol elevation. No effects on cortisol were found for recent life events, chronic difficulties, trait anger, or psychosomatic symptoms. Distress, as reflected by the mood states Negative Affect and Agitation, was associated with higher cortisol levels, whereas Positive Affect had no statistically significant effect. Stressful daily

events were associated with increased cortisol secretion, the magnitude of the effect depending on whether the event was still ongoing and on how frequently a similar kind of event had occurred previously. Although perceived stress, anxiety, and depression did not increase cortisol reactivity to daily events, we found evidence for reduced habituation to recurrent events in subjects scoring high on these traits. Mood appeared to play a mediating role in the relationship between stressful events and cortisol secretion. These results suggest that negative affectivity is not just a confounder but is related to elevated cortisol secretion during normal daily activities. The finding that even minor events and fluctuations in mood states were associated with increased adrenocortical activity points to a possible mechanism linking subjective experience to health outcomes.

Vastfjall, D. (2002). Emotion induction through music: A review of the musical mood induction procedure. Musicae Scientiae, 6, Special Issue, 171-203.

This article reviews research showing that music can alter peoples' moods and emotions. The so called "musical mood induction procedure" (MMIP) relies on music to produce changes in experienced affective processes. The fact that music can have this effect on subjective experience has been utilized to study the effect of mood on cognitive processes and behavior by a large number of researchers in social, clinical, and personality psychology. This extensive body of literature, while little known among music psychologists, is likely to further help music psychologists understand affective responses to music. With this in mind, the present article aims at providing an extensive review of the methodology behind a number of studies using the MMIP. The effectiveness of music as a mood-inducing stimulus is discussed in terms of self-reports, physiological, and behavioral indices. The discussion focuses on how findings from the MMIP literature may extend into current research and debate on the complex interplay of music and emotional responses.

Watanabe, D., Savion-Lemieux, T. & Penhune, V.B. (2007). The effect of early musical training: evidence for a sensitive period in motor learning. Brain and Cognition, 176, 332–340.

Developmental changes in the human brain coincide with and underlie changes in a wide range of motor and cognitive abilities. Neuroimaging studies have shown that musical training can result in structural and functional plasticity in the brains of musicians, and that this plasticity is greater for those who begin training early in life. However, previous studies have not controlled for differences between early-trained (ET) and late-trained (LT) musicians in the total number of years of musical training and experience. In the present experiment, we tested musicians who began training before and after the age of 7 on learning of a timed motor sequence task. The groups were matched for years of musical experience, years of formal training and hours of current practice. Results showed that ET musicians performed better than LT musicians, and that this performance advantage persisted after 5 days of practice. Performance differences were greatest for a measure of response synchronization, suggesting that early training has its greatest effect on neural systems involved in sensorimotor integration and timing. These findings support the idea that there may be a sensitive period in childhood where enriched motor training through musical practice results in long-lasting benefits for performance later in life. These results are also consistent with the results of studies showing structural changes in motor-related regions of the brain in musicians that are specifically related to training early in life.

Winsler, A., Ducenne, L. & Koury, A. (2011). Singing one's way to self-regulation: The role of early music and movement curricula and private speech. Early Education and Development, 22, 274-304.

Although the role of language and private speech in the development of behavioral self-regulation has been studied, relations between behavioral self-regulation and children's experiences with other symbolic systems, such as music, have not yet been explored. Eighty-nine 3- and 4-year-old children (42 of whom had been enrolled in Kindermusik music and movement classes, and 47 demographically similar children who had not experienced structured early childhood music classes) completed a

battery of laboratory self-regulation tasks and a selective attention task during which their private speech was reliably transcribed and categorized. Children currently enrolled in Kindermusik classes showed better self-regulation than those who were not currently enrolled (d = .41), and they also used more relevant private speech during the selective attention task (d = .57), a verbal strategy that was positively related to performance. Children exposed to the music program were also more likely to engage in the facilitative strategy of singing/humming to themselves during a waiting period in which they had to inhibit their desire to examine a gift, and they were less likely to call out socially to the experimenter, a strategy negatively associated with performance and self-regulation.

Wise, G.W., Hartmann, D.J. & Fisher, B.J. (1992). Exploration of the relationship between choral singing and successful aging. Psychological Reports, 70, 1175-1183.

This paper describes a retirement village community chorus of 49 with the goal of understanding the place of choral activities in the lives of these older people. Group musical activity provides a link to previous satisfying experiences and serves as a preventive measure against alienation. However, the nature of the activity may be consistent with a willingness to give up some inner directedness. Additional research is recommended since the present design with a comparison group of 49 non-choral members did not allow separation of effects of selection from those of activity.

Woodward, S.C., Sloth-Neilson, J. & Mathiti, V. (2008). South Africa, the arts and youth in conflict with the law. International Journal of Community Music, 1(1), 69-88.

This article describes the Diversion into Music Education (DIME) youth intervention programme that originated in South Africa in 2001. DIME offers instruction in African marimba and djembe ensemble performance to juvenile offenders. Conceived as community collaboration among organizations in the cities of Cape Town, South Africa and Tampa, United States of America (including the University of the Western Cape and the University of South Florida), DIME offers a unique example of community music and multicultural music education. Its distinctive nature lies in an intervention format that integrates music teaching, mentoring and intercultural exchanges aimed at both the acquisition of musical skills that offer opportunities for healthy diversion from crime and at successful reintegration into society.

Zatorre, R. J., Chen, J. L. & Penhune, V. B. (2007). When the brain plays music: Auditory-motor interactions in music perception and production. National Review of Neuroscience, 8(7), 547-558.

Music performance is both a natural human activity, present in all societies, and one of the most complex and demanding cognitive challenges that the human mind can undertake. Unlike most other sensory–motor activities, music performance requires precise timing of several hierarchically organized actions, as well as precise control over pitch interval production, implemented through diverse effectors according to the instrument involved. We review the cognitive neuroscience literature of both motor and auditory domains, highlighting the value of studying interactions between these systems in a musical context, and propose some ideas concerning the role of the premotor cortex in integration of higher order features of music with appropriately timed and organized actions.

Zuk, J., Benjamin, K.A & Gaab, N. (2014). Behavioural and neural correlates of executive functioning in musicians and nonmusicians. PLOSone. e99868.

Executive functions (EF) are cognitive capacities that allow for planned, controlled behavior and strongly correlate with academic abilities. Several extracurricular activities have been shown to improve EF, however, the relationship between musical training and EF remains unclear due to methodological limitations in previous studies. To explore this further, two experiments were performed; one with 30 adults with and without musical training and one with 27 musically trained and untrained children (matched for general cognitive abilities and socioeconomic variables) with a standardized EF battery. Furthermore, the neural correlates of EF skills in musically trained and untrained children were investigated using fMRI. Adult musicians compared to non-musicians showed

enhanced performance on measures of cognitive flexibility, working memory, and verbal fluency. Musically trained children showed enhanced performance on measures of verbal fluency and processing speed, and significantly greater activation in pre-SMA/SMA and right VLPFC during rule representation and task-switching compared to musically untrained children. Overall, musicians show enhanced performance on several constructs of EF, and musically trained children further show heightened brain activation in traditional EF regions during task-switching. These results support the working hypothesis that musical training may promote the development and maintenance of certain EF skills, which could mediate the previously reported links between musical training and enhanced cognitive skills and academic achievement.

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APPENDIX 2

MUSIC THERAPY FOR YOUNG CHILDREN

Featured Research Details

Abad, V. & Williams, K. (2006). Early intervention music therapy for adolescent mothers and their children. British Journal of Music Therapy, 20(1), 31-38.

Adolescence is a unique and challenging period of growth, change and possible turmoil as a young person transitions towards adulthood. The capacity to provide quality parenting at this time is likely to be compromised because the teenage mother simultaneously experiences the challenges of adolescence and first time parenthood. Research suggests that teenage mothers are significantly less supportive, more detached, more intrusive, and more negative / hostile, when compared to older mothers, and may be less able to provide a stimulating learning environment.

Sing & Grow is a national early intervention music therapy project provided by Playgroup Associations and funded by the Commonwealth Government of Australia. The project provides 10 weekly group music therapy sessions to parent and child (aged 0 to 3 years) dyads from families in communities identified as marginal as a result of various circumstances, including adolescent and young parenthood.

Outcomes of clinical programmes conducted to date show that the central provision of music has been successful in promoting a range of non-musical parenting outcomes for adolescent and young mothers. This includes observed increases in their repertory of skills in relating to and interacting with their child in more gentle and nurturing ways.

Allgood, N. (2005). Parents' Perceptions of Family-based Group Music Therapy for Children with Autism Spectrum Disorders Music Therapy Perspectives 23 (2): 92-99.

Autism spectrum disorders are characterized by impairment in communication, abnormal social interactions, abnormal responses to sensory stimuli, and restricted, repetitive and stereotyped behaviors. While there is no cure for autism, active interventions that include family involvement can bring about positive changes. Music therapy has been recognized as an effective treatment for children with autism spectrum disorders. This study examined parents' perceptions of a 7-week family-based group music therapy intervention. Data were collected through pre-interview sessions with the parents and post-intervention focus group. Parents reported positive responses to the intervention and were able to articulate new insights about themselves and their children.

Archer, C. (2004). Music therapy and early intervention: The parent-child relationship is centre stage. The New Zealand Journal of Music Therapy, 16, 129-143.

The purpose of this paper is to contribute to the discussion of what constitutes best practice in one particular field of music therapy - music therapy in Early Intervention (EI). Ongoing reevaluation of what constitutes best practice will assist clinical practice and post-graduate training programmes to keep abreast of current trends. The source of material covered in this paper comes from recent research literature and the author's 13 years of clinical practice as a music therapist in EI.

Ayson, C. (2008). Child-Parent Wellbeing in a Paediatric Ward: The Role of Music Therapy in Supporting Children and Their Parents Facing the Challenge of Hospitalisation. Voices: A World Forum for Music Therapy, [S.l.], v. 8, n. 1.

This report, based on clinical practice on a children's ward in New Zealand, examines the role of short-term music therapy in supporting children and their parents facing the difficulties of hospitalisation. It

endeavours to explore three questions. How might music therapy support hospitalised children? How can it support parents of hospitalised children? Is it important/valuable for music therapists working in a paediatric ward to involve parent(s) in music therapy sessions? Three hospitalised children (aged 11 months, 5 and 7 years), who were accompanied by a parent, participated in a single individual music therapy session. From the clinical notes, semi-structured interviews with the children's parents and a staff member, and my own reflective journal it was indicated that music therapy supported the psychosocial needs of the paediatric patients and their parents in many ways. For the children music therapy: 1) promoted normalisation; and 2) provided emotional/psychological support. For parents, it: 1) elicited positive changes in mood; 2) reduced anxiety; and 3) supported parental learning/parenting. Furthermore, the findings suggested that the wellbeing of the parent-child relationship can be supported during music therapy. The importance of parental involvement varied for each case, and highlighted different views between therapist, staff member and parents regarding this. Factors that may determine parental involvement and the benefits of both parental presence and absence during sessions were elicited. The report suggests that music therapy has the potential positively to support paediatric wards in New Zealand to provide an environment that is responsive to the psychosocial needs of hospitalised children and their parents.

Braithwaite, M. & Sigafoos, J. (1999). Effects of Social versus Musical Antecedents on Communication Responsiveness in Five Children with Developmental Disabilities. Journal of Music Therapy 35(2):88-104.

The present study involved a comparison of social versus musical antecedents on communication responsiveness in five children with developmental disabilities. During the social antecedent condition, the teacher presented opportunities for the children to greet, name objects, and request materials. In the musical antecedent condition, these same opportunities were embedded within a music/singing activity A reversal design was used to compare the percentage of opportunities with appropriate communication responses across the two conditions. For three of the five children, the musical antecedent condition was associated with higher percentages of appropriate communication responses. For the other two children, the two conditions were associated with approximately equal rates of appropriate communication. Across both conditions, appropriate responses were more likely during opportunities for greeting and requesting than during opportunities to name objects. The results suggest that embedding communication opportunities within a musical activity may lead to increased appropriate communication responses for some children with developmental disabilities.

Colwell, C. (1994). Therapeutic Applications of Music in the Whole Language Kindergarten. Journal of Music Therapy 31 (4): 238-247.

Subjects (N = 27), kindergarten students enrolled in three classes of a public elementary school, participated in a whole language curriculum. As a complement to the whole language curriculum, a music program was implemented by a music therapist. In addition to integrating music activities into the curriculum, the purpose of this program was to determine the effect of shared reading paired with music on kindergarten children's reading accuracy. Each of the three classes received a different shared reading treatment condition: song rehearsal of the text set to music, spoken and song rehearsal of the text set to music, or spoken rehearsal only of the text. Subjects' readings of "big books" were videotaped and analyzed for word substitutions and omissions to calculate the percentage of text read accurately. Analysis indicated that both (a) song rehearsal of text set to music and (b) spoken and song rehearsal of book text set to music facilitated greater text accuracy than (c) spoken rehearsal only of book text ($p < .01$).

Ettenberger,M., Odell-Miller, H., Rojas Cárdenas, C., Torres Serrano, S., Parker, M., Camargo Llanos, S.M. (2014). Music Therapy With Premature Infants and Their Caregivers in Colombia – A Mixed Methods Pilot Study Including a Randomized Trial. Voices: A World Forum for Music Therapy, [S.l.], v. 14, n. 2.

This article reports the results of a three-arm mixed methods pilot study of music therapy with premature infants and their caregivers in a Neonatal Intensive Care Unit (NICU) in Bogotá, Colombia. The study included 19 medically stable babies born between the 30th and 37th week of gestation and their caregivers. Two intervention groups were compared with a control group.

The objectives were to find out whether music therapy could help the neonates to stabilize their physiological states and help mothers to reduce anxiety and strengthen the relationship with their baby.

The data collection included the babies´ weight gain, heart rate, oxygen saturation, size, cephalic perimeter and length of hospitalization. Mothers filled out the State-Trait Anxiety Inventory (STAI-C) and the Mother-to-Infant Bonding Scale (MIBS) before the first and after the last intervention. Thematic analysis was used to analyze the qualitative data obtained through questionnaires.

A trend towards an increased weight gain for both intervention groups and a shorter length of hospitalization for one of the intervention groups was noticed. Anxiety and bonding in mothers appears not to follow linear trends, as new challenges arise for parents at different stages during hospitalization. Mothers stated that music therapy was helpful for them, their baby and their relationship with the baby. Mothers across the groups think that music therapy should be a regular offer in the NICU and that music therapy helps to humanize the NICU environment.

Forrester, M. (2009). Emerging musicality during the pre-school years: A case study of one child. Psychology of Music August 26, 2009.

Studies of communication in early infancy and childhood have highlighted the significance of rhythm, sound and music for emotional and social development. There is, however, little detailed empirical data on the emergence of naturalistic music-related behaviour by children in the early years. The aim of this work is to examine instances of musicality with respect to their form and/or function and to trace out developmental indices of musically related behaviours and competencies. Employing a single-case study approach, this paper documents the emergence of one child's musicality between the ages of 1 year, and 3 years 10 months. From a data corpus of video-recordings, 33 examples of musicality, representing 20 time periods, were examined and categorized. In order to examine specific instances, ethnomethodologically informed conversation analysis was used to consider examples in more detail. Beyond indicating what conversation analysis might bring to the study of musical behaviour in context, the results highlight certain interrelationships between musicality, early word use, interpersonal skill and narrative development. Distinct phases – social-affective followed by 'song-word' play and finally narrative-related musicality – were identified in the data. Concluding comments touch on the significance of emerging musicality for social and cognitive development.

Hallam, S (2010). The power of music: Its impact on the intellectual, social and personal development of children and young people. International Journal of Music Education, August 2010, vol. 28, 3269-289.

This paper reviews the empirical evidence relating to the effects of active engagement with music on the intellectual, social and personal development of children and young people. It draws on research using the most advanced technologies to study the brain, in addition to quantitative and qualitative psychological and educational studies. It explains how musical skills may transfer to other activities if the processes involved are similar. It explores the evidence relating to the impact of musical skills on language development, literacy, numeracy, measures of intelligence, general attainment, creativity, fine motor co-ordination, concentration, self-confidence, emotional sensitivity, social skills, team work, self-discipline, and relaxation. It suggests that the positive effects of engagement with music on personal and social development only occur if it is an enjoyable and rewarding experience. This has implications for the quality of the teaching.

Hibben, J. (1992). Music Therapy in the Treatment of Families with Young Children. Music Therapy 11 (1): 28-44.

In Section 1 the author suggests that child and family therapists rarely or reluctantly include young children in cross-generational sessions. The work of several child and family therapists who have bridged the gap between the enactive modes of child learning and the verbal modes of the adults in family sessions is presented. In Section 2 the author reviews the writings of several arts therapists who use action-oriented, symbolic experiences or tasks that work well with children in family therapy. In Section 3 the author presents music therapy practices with families. The author suggests that improvisational music in the family session is similar to play and that songs in the sessions function similarly to a co-therapist. Finally, a case study illustrates the value of music in helping generations communicate, and in objectifying and working through family alliances and roles.

Humpal, M. (1991). The Effects of an Integrated Early Childhood Music Program on Social Interaction Among Children with Handicaps and Their Typical Peers. Journal of Music Therapy 28 (3): 161-177.

The purpose of this study was to examine the effects of an integrated early childhood music program on social interaction among children with handicaps and their typical peers. A field test was conducted with 15 students (age 4) from a typical preschool, and 12 students (ages 3 to 5) with moderate levels of mental retardation from a county developmental center. The children came together once weekly at the typical preschool for integrated music sessions. For 15 sessions following the pretests, the music therapist employed specific strategies to foster interaction. A trend analysis indicated that interaction among the children increased following the music therapy intervention phase. A questionnaire was submitted to the five staff members involved with the project; all agreed that the program had facilitated peer interaction and had fostered acceptance of differences among individuals.

Jacobsen, S., McKinney, C. & Holck, U. (2014). Effects of a Dyadic Music Therapy Intervention on Parent-Child Interaction, Parent Stress, and Parent-Child Relationship in Families with Emotionally Neglected Children: A Randomized Controlled Trial. Journal of Music Therapy 51 (4): 310-332.

Background: Work with families and families at risk within the field of music therapy have been developing for the last decade. To diminish risk for unhealthy child development, families with emotionally neglected children need help to improve their emotional communication and develop healthy parent-child interactions. While some researchers have investigated the effect of music therapy on either the parent or the child, no study has investigated the effect of music therapy on the observed interaction between the parent and child within the field of child protection.

Objective: The purpose of this study was to investigate the effect of a dyadic music therapy intervention on observed parent-child interaction (mutual attunement, nonverbal communication, emotional parental response), self-reported parenting stress, and self-reported parent-child relationship in families at risk and families with emotionally neglected children, ages 5–12 years.

Method: This was a randomized controlled trial study conducted at a family care center in Denmark. Eighteen parent-child dyads were randomly assigned to receive 10 weekly music therapy sessions with a credentialed music therapist (n = 9) or treatment as usual (n = 9). Observational measures for parent-child interaction, self-reported measures for parenting stress and parent-child relationship were completed at baseline and 4 months post-baseline assessment.

Results: Results of the study showed that dyads who received music therapy intervention significantly improved their nonverbal communication and mutual attunement. Similarly, parents who participated in dyadic music therapy reported themselves to be significantly less stressed by the mood of the child and to significantly improve their parent-child relationship in terms of being better at talking to and understanding their children than parents who did not receive music therapy. Both groups significantly improved in terms of increased positive and decreased negative emotional parental response,

parenting stress and stress in general. There were no significant between group differences in self-perceived autonomy, attachment, and parental competence.

Conclusions: The dyadic music therapy intervention examined in this study improved emotional communication between parent and child and interaction after 6 to 10 sessions and can be considered as a viable treatment alternative or supplement for families at risk and families with emotionally neglected children.

Jonsdottir, V. (2002). Musicking in Early Intervention. Voices: A World Forum for Music Therapy, [S.l.], v. 2, n. 2.

My interest in this subject stems from years of clinical work with handicapped children and an acquaintance with their parents/caretakers. The varying handicaps and developmental needs of these clients have called for varying theories and treatment approaches throughout their therapy processes. The effectiveness of music therapy procedures and the client's progress in music therapy has also varied. But what the handicapped children have had in common is a delight in music and musical expressiveness. In most cases they have been brought to music therapy by parents who have noticed their children's apparent interest in music. Their interest upon hearing music may have been expressed by spontaneous movements despite physical handicaps, spontaneous songlike utterances despite delayed speech, focused attention or other expressions while listening to music. Caretakers sensitive to their children's musical intelligence, and hoping for their optimal maximum obtainable development and well-being, sought the services of a music therapist, regardless of the way the children's interest was expressed interest.

Kennedy, R. (2008). Music Therapy as a Supplemental Teaching Strategy for Kindergarten ESL Students. Music Therapy Perspectives 26 (2): 97-101.

The purpose of this study was to give a descriptive account of the use of music therapy techniques on the English speaking and story retelling skills of Kindergarten students in English as a Second Language (ESL) classes. Nine students in a community based after-school ESL class and 9 students in a regular public school ESL class received music therapy sessions designed as supplemental teaching strategies in addition to their regular ESL classroom routines. Observers indicated that both groups performed well on story retelling skills and English speaking skills; although, the after-school ESL group performed better than the public school group. This study suggests that the community setting may be a more relaxed and less intimidating environment for young English language learners.

Kin, J. , Wigram, T. & Gold, C. (2008). The Effects of Improvisational Music Therapy on Joint Attention Behaviors in Autistic Children: A Randomized Controlled Study. Journal of Autism and Developmental Disorders, 38:1758.

The purpose of this study was to investigate the effects of improvisational music therapy on joint attention behaviors in pre-school children with autism. It was a randomized controlled study employing a single subject comparison design in two different conditions, improvisational music therapy and play sessions with toys, and using standardized tools and DVD analysis of sessions to evaluate behavioral changes in children with autism. The overall results indicated that improvisational music therapy was more effective at facilitating joint attention behaviors and non-verbal social communication skills in children than play. Session analysis showed significantly more and lengthier events of eye contact and turn-taking in improvisational music therapy than play sessions. The implications of these findings are discussed further.

Mclean, E. (2016). Fostering Intimacy through Musical Beginnings: Exploring the Application of Communicative Musicality Through the Musical Experience of Parents in a Neonatal Intensive Care Unit. Voices: A World Forum for Music Therapy, [S.l.], v. 16, n. 2, apr.

This paper explores the powerful role of musical moments in fostering intimacy for parents and their hospitalised infant in a neonatal intensive care unit (NICU). Grounded in Malloch & Trevarthen's theory of communicative musicality (2010a), a critical and contemporary perspective on this theory underpinning early musical interactions is presented, advocating for greater exploration of the parents' perspective to support a deepened understanding of the potential of music for supporting intimacy in the beginnings of life. Two case vignettes from my doctoral research illustrate how shared musical moments can foster intimacy for the hospitalised infant and parent in a NICU, calling for consideration of context and culture when exploring how musical beginnings can foster intimacy.

Mampe, B., Friederici, A., Christophe, A., and Wermke, K. (2009). Newborns' cry melody is shaped by their native language. Current Biology, 19, 1994-97.

Human fetuses are able to memorize auditory stimuli from the external world by the last trimester of pregnancy, with a particular sensitivity to melody contour in both music and language. Newborns prefer their mother's voice over other voices and perceive the emotional content of messages conveyed via intonation contours in maternal speech ("motherese"). Their perceptual preference for the surrounding language and their ability to distinguish between prosodically different languages and pitch changes are based on prosodic information, primarily melody. Adult-like processing of pitch intervals allows newborns to appreciate musical melodies and emotional and linguistic prosody. Although prenatal exposure to native-language prosody influences newborns' perception, the surrounding language affects sound production apparently much later. Here, we analyzed the crying patterns of 30 French and 30 German newborns with respect to their melody and intensity contours. The French group preferentially produced cries with a rising melody contour, whereas the German group preferentially produced falling contours. The data show an influence of the surrounding speech prosody on newborns' cry melody, possibly via vocal learning based on biological predispositions.

Maselko, J., Kubzansky, L., Lipsitt, L. and Burka, S. (2010). Mother's affection at 8 months predicts emotional distress in adulthood. Journal of Epidemiology and Community Health, np.

Background *Long-standing theory suggests that quality of the mother's (or primary caregiver's) interaction with a child is a key determinant of the child's subsequent resilience or vulnerability and has implications for health in adulthood. However, there is a dearth of longitudinal data with both objective assessments of nurturing behaviour during infancy and sustained follow-up ascertaining the quality of adult functioning.*

Methods *We used data from the Providence, Rhode Island birth cohort of the National Collaborative Perinatal Project (mean age 34 at follow-up, final N=482) to conduct a prospective study of the association between objectively measured affective quality of the mother–infant interaction and adult mental health. Infant–mother interaction quality was rated by an observer when infants were 8 months old, and adult emotional functioning was assessed from the Symptom Checklist-90, capturing both specific and general types of distress.*

Results *High levels of maternal affection at 8 months were associated with significantly lower levels of distress in adult offspring (1/2 standard deviation; b=−4.76, se=1.7, p<0.01). The strongest association was with the anxiety subscale. Mother's affection did not seem to be on the pathway between lower parental SES and offspring distress.*

Conclusion *These findings suggest that early nurturing and warmth have long-lasting positive effects on mental health well into adulthood.*

Malloch, S. (1999). Mother and infants and communicative musicality. Musicae Scientiae, Fall 1999-2000, vol. 3, no. 1, suppl 29-57.

Using music as a model, mother/infant vocalisations are examined using computer-based acoustic analysis. Past research is summarised which demonstrates the importance of both parties in the

mother-infant dyad. Methods are then introduced for analysing pulse, quality and narrative in mother/infant vocalisations. These three elements comprise "communicative musicality": those attributes of human communication, which are particularly exploited in music, that allow co-ordinated companionship to arise. The analysis of pulse is based on spectrographs analysis, and regular timing intervals are discovered that serve to co-ordinate the mother's and infant's joint vocalisations. Quality consists of both the pitch-contour of the vocalisations, and their timbre. Pitch plots are derived using software developed for this project using a constant Q spectral transform. I examine how the infant and mother structure their joint exploration of pitch space on the small and large scale. Timbre is measured with a variety of acoustic measures – tristimulus values, sharpness, roughness and width. It is found that the mother's voice changes its quality in response to the infant's. Narrative combines pulse and quality – it allows two persons to share a sense of passing time – and the musical companionship is examined that is created between a mother and her baby as she chants a nursery rhyme. It is concluded that communicative musicality is vital for companionable parent/infant communication.

Malloch, S., Shoemark, H., Črnčec, R., Newnham, C., Paul, C., Prior, M., et al. (2012). Music therapy with hospitalized infants—the art and science of communicative musicality. Infant Mental Health Journal, 33(4), 386-399.

Infants seek contingent, companionable interactions with others. Infants in a Neonatal Intensive Care Unit (NICU), while receiving care that optimizes their chances of survival, often do not have the kind of interactions that are optimal for their social development. Live music therapy (MT) with infants is an intervention that aims for contingent, social interaction between therapist and infant. This study, with a limited numbers of infants, examined the effectiveness of an MT intervention in the NICU at The Royal Children's Hospital Melbourne. Two groups of late pre-term and full-term infants were recruited to the study; one was given MT and the other was not. A healthy group of infants not given MT served as an additional control. The effect of MT was indexed using two measures reflecting infant social engagement: the Neurobehavioral Assessment of the Preterm Infant (NAPI) and the Alarm Distress Baby Scale (ADBB). Results suggest that the MT intervention used at The Royal Children's Hospital Melbourne supports infants' neurobehavioral development. In particular, hospitalized infants who received MT were better able to maintain self-regulation during social interaction with an adult, were less irritable and cried less, and were more positive in their response to adult handling, when compared with infants who did not receive the intervention. These are important prerequisites for social interaction and development. Further and larger scale research using MT with this population is indicated.

Molyneux, C. (2005). Music therapy as a short-term intervention with individuals and families in a child and adolescent mental health service. British Journal of Music Therapy, 19(2), 59-66.

There seems to be a growing interest in both music therapy with families and short-term therapy, and a body of music therapy literature relating to these areas. Within the context of waiting list targets in the NHS, therapists are increasingly experiencing a demand for short-term, effective interventions that are easily accessible for families and individuals. This paper describes a way of working that has developed through clinical work at Tanglewood, the Children's Day Resource at Leicestershire Child and Adolescent Mental Health Service (CAMHS) and focuses on the use of music therapy as a short-term intervention that has developed with individuals and families. Case studies will be used to illustrate a model of short-term work and some relevant literature will also be discussed.

Nicholson, J. M., Berthelsen, D., Abad, V., Williams, K. & Bradley, J. (2008). Impact of music therapy to promote positive parenting and child development. Journal of Health Psychology, 13(2), 226-238.

The effectiveness of a 10-week group music therapy program for marginalized parents and their children aged 0—5 years was examined. Musical activities were used to promote positive parent—

child relationships and children's behavioral, communicative and social development. Participants were 358 parents and children from families facing social disadvantage, young parents or parents of a child with a disability. Significant improvements were found for therapist-observed parent and child behaviors, and parent-reported irritable parenting, educational activities in the home, parent mental health and child communication and social play skills. This study provides evidence of the potential effectiveness of music therapy for early intervention.

North, F. (2014). Music, communication, relationship: A dual practitioner perspective from music therapy/speech and language therapy. Psychology of Music 42(6):776-790.

In this text, I present examples of music therapy case material from my two professional perspectives as a practising music therapist and speech and language therapist. With a focus on communication, I highlight some of the similarities and differences in my thought processes from these two separate perspectives and reflect more generally on aspects of the work I found of interest as a dual practitioner.

Oldfield, A., Bell, K. & Pool, J. (2012). Three families and three music therapists: Reflections on short term music therapy in child and family psychiatry. Nordic Journal of Music Therapy, 21(3), 250-267.

This article describes three pieces of short-term music therapy work with three different families. The work took place in a unit for child and family psychiatry. Three music therapists were involved both in the treatment and in group supervision. They were inspired to write this paper partly because family work and short-term work are still relatively unusual in clinical music therapy. In addition the projects were significant because in all three of the cases described here the parents were enabled, through music therapy, to gain fresh insights into their relationships with their children. Through reflection on the clinical work and study of relevant literature, the authors observed some common trends:

- *When working with families there appears to be a tendency to focus first on the child's difficulties and then, later in the treatment, on family relationships and the parents' difficulties.*
- *In many cases involving music therapy work with families, non-verbal, improvised music-making and playful musical exchanges seem to be key components in facilitating family interactions.*
- *The gender and past experience of music therapists carrying out family work can be a point of consideration in order to address the needs of some families.*

Oldfield, A. & Bunce, L. (2001). 'Mummy can play too...' Short-term music therapy with mothers and young children. British Journal of Music Therapy, 15(1), 27-36.

This article describes two short-term music therapy groups with mothers[1] and young children at the Croft Unit for Child and Family Psychiatry. As there is very little documented music therapy work with this client group, the authors examine literature that describes other therapeutic interventions and that looks at the links between mothers and young children's behaviour. This literature review suggests that early intervention with parents who are experiencing difficulties with their children is both important and useful. The article goes on to hypothesise why music therapy is a particularly effective way of working with mothers and young children and to examine the small amount of other documented work by music therapists with this client group. The two treatment groups with parents and young children at the Croft are then described and analysed in some detail. The authors reflect on the particular role music therapy plays in the treatment packages offered at the Croft.

Papousek, H. & Papousek, M. (1989). Forms and function of vocal matching in interactions between mothers and their precanonical infants. First language, 9, 137-168.

Seventeen mothers were recorded monthly in the laboratory during spontaneous dialogues with their 2-, 3-, and 5-month-old infants. The occurrence of vocal matching was analysed on the basis of perceptual similarity between adjacent maternal and infant utterances in relation to six sound features. Reciprocal vocal matching occurred in an average of 41% to 57% of infant non-cry vocalizations. With age, matches became more complex in number and types of included features. The high incidence of vocal matching primarily depended on mothers' propensities to model appropriately and match the infant's precanonical sounds. Various didactic strategies which were observed in mothers are discussed as a species-specific social support to the infants' early development of imitative abilities, vocal production, and communication.

Pasiali, V. (2011). Resilience, music therapy, and human adaptation: Nurturing young children and families. Nordic Journal of Music Therapy, 21(1), 36-56.

The purpose of this theoretical paper is to examine current literature in developmental psychology in order to discuss how music therapy can foster resilience in early childhood. Resilience is the ability to cope with stress and adversity. I review behavioral, psychosocial, and neurobiological processes of resilience from a systems thinking perspective, emphasizing the importance of socio-cultural experiences. In addition, I explore how music therapy can function as an asset-building, mediating, or risk-activated intervention, thus establishing a theoretical basis justifying music's therapeutic role in human adaptation processes. Moreover, I argue that music therapists must understand the processes involved in resilience and positive human adaptation in order to design proactive clinical approaches to (a) prepare young children and their families for handling adversity, (b) increase parental sensitivity, and (c) create multiple opportunities for families to develop adaptive interpersonal interaction patterns.

Pasiali, V. (2013). A clinical case study of family-based music therapy. Journal of Creativity in Mental Health, 8(3), 249-264.

Music therapists working with families provide creative interventions that can address relationship difficulties. The purpose of this study was to describe how participation in music therapy supported parent–child interactions with a family (a 35-year-old woman, her 3-year-old daughter, and her 18-month-old son) who had experienced domestic violence. Using a constructivist grounded-theory approach, the researcher collected data by videotaping eight clinical sessions, creating analytic memos and field notes, consulting with the parent, and collecting a parent journal. Results indicated bidirectional difficulties in engaging in reciprocal parent–child interactions. Establishing routines, participating in joint-attention tasks, and incorporating child-initiated ideas into the therapeutic play became vehicles for establishing trust. Music therapy may have provided experiences that facilitated the emergence of positive interactions.

Pasiali, V. (2013). Music therapy and attachment relationships across the life span. Nordic Journal of Music Therapy, Advance online publication.

Attachment refers to the quality of relationships that humans form across their life span. In music therapy, a growing body of clinical work focusing on attachment is emerging. Because participation in music therapy can promote positive and meaningful interactions over time, it creates a context for developing healthy relationships. Drawing on insights afforded from the fields of psychology and social neuroscience, the purpose of this paper is to articulate an emerging conceptual model on how music therapy interventions may target attachment across the life span. By reviewing and synthesizing current literature, the author aims to expand theoretical underpinnings that inform the work of therapists. Music-based interventions create a context-fostering attachment by: (1) supporting parent co-regulation and mutual responsiveness, (2) rebuilding capacity to form or restore relationships, (3) reducing stress and mood disturbances, (4) supporting healthy partner interactions by enhancing communication skills, and (5) providing social support and building coping skills among families and

individuals who are facing challenging life circumstances. The author organizes and interprets the information to outline different layers of prevention interventions and exemplify how music-based experiences may influence attachment relationships at different life stages.

Pavlicevic, M. (1990). Dynamic Form in clinical improvisation. British Journal of Music Therapy, 4(2), 5-9.

When a therapist and patient/client are actively engaged in improvising music together, the potential exists for the development of an intimate and dynamic emotional relationship. The improvisation reveals both players' capacity for forming, expressing and communicating dynamic forms of feeling, within the context of this music relationship.

This paper examines the concept of dynamic forms, with recourse to the literature on mother-infant interaction, and applies this concept to clarify the use of clinical improvisation in music therapy.

Register, D. (2001). The effects of an early intervention music curriculum on prereading/writing. Journal of Music Therapy, 38(3), 239-248.

This study evaluated the effects of music sessions using a curriculum designed to enhance the prereading and writing skills of 25 children aged 4 to 5 years who were enrolled in Early Intervention and Exceptional Student Education programs. This study was a replication of the work of Standley and Hughes (1997) and utilized a larger sample size (n = 50) in order to evaluate the efficacy of a music curriculum designed specifically to teach prereading and writing skills versus one that focuses on all developmental areas. Both the experimental (n = 25) and control (n = 25) groups received two 30-minute sessions each week for an entire school year for a minimum of 60 sessions per group. The differentiating factors between the two groups were the structure and components of the musical activities. The fall sessions for the experimental group were focused primarily on writing skills while the spring sessions taught reading/book concepts. Music sessions for the control group were based purely on the thematic material, as determined by the classroom teacher with purposeful exclusion of all preliteracy concepts. All participants were pretested at the beginning of the school year and posttested before the school year ended. Overall, results demonstrated that music sessions significantly enhanced both groups' abilities to learn prewriting and print concepts. However, the experimental group showed significantly higher results on the logo identification posttest and the word recognition test. Implications for curriculum design and academic and social applications of music in Early Intervention programs are discussed.

Robb, S. L. (2003). Music Interventions and Group Participation Skills of Preschoolers with Visual Impairments: Raising Questions about Music, Arousal, and Attention. Journal of Music Therapy 40 (4), 266-282.

*The purposes of this pilot study were two-fold: First, to document and compare attentive behavior during music and play-based group instructional sessions and second, to document and compare 4 group participation behaviors during music and play-based sessions. The 4 group participation behaviors included facing a central speaker, following one-step directions, manipulating objects according to their function, and remaining seated. Six of the 12 children enrolled completed the study, with all participants enrolled in an early intervention program due to visual impairments. Study participants were between the ages of 4 and 6 years inclusively. Children participated in 4, 30-minute instructional sessions. Two instructional sessions were music-based and two were play-based with the 4 sessions equally distributed across a 2-week period. An ABBA design was used to control for possible order effects. Each session was videotaped to facilitate collection of behavioral data. Statistical analysis of these data revealed that attentive behavior was significantly higher during music based-sessions (*t*(5) = 5.81;* p *= .002). Mean scores for the remaining group participation behaviors were higher in the music condition, but these differences were not statistically significant. Discussion*

regarding differential outcomes among participants, as well as an exploration of theories related to music, arousal, and attention are discussed in an effort to guide future research.

Shoemark, H. (1996). Family-centred early intervention: music therapy in the playgroup program. Australian Journal of Music Therapy, Volume 7 Issue 1996.

This article describes the inclusion of music therapy in a family- centred playgroup program within an early intervention setting. The purposes of the playgroup were to provide an introduction for the family to the formal and informal networks which it could use, and to offer support for the early development of healthy family relationships. The purpose of the music therapy program within this, was to nurture creative expression in each family member, and assist in their enjoyment of each other. Song was the primary vehicle used because of its accessibility to the group members. The value of the music session was enhanced by the use at home of an audio-cassette of the songs and a lyrics book. Verbal and written feedback indicated that music was able to support families in developing skills which would enhance their relationships.

Shoemark, H. (2008). Infant-Directed Singing as a Vehicle for Regulation Rehearsal in the Medically Fragile Full-Term Infant. Voices: A World Forum for Music Therapy, [S.l.], v. 8, n. 2.

A significant step in the full-term infant's development is the achievement of self and mutual regulation. The invasive nature of care on the Neonatal Intensive Care Unit can undermine the medically fragile full- term infant's efforts to control his experiences through regulation of stimuli. During active music therapy, the therapist provides a contingent relationship in which improvised infant-directed singing serves as a vehicle for rehearsal of self and mutual regulation.

Shoemark, H. (2016). How Can Music Foster Intimacy?. Voices: A World Forum for Music Therapy, [S.l.], v. 16, n. 2, apr.

Our first intimate relationship is with our parents. As babies, we are deeply dependent on our parents for safety and nurturing. The connection between us is created by our facial expressions, our body movements and our sounds. All of these have qualities that can be explained by our innate musicality.

Standley, J.M., Hughes, J. E. (1996). Documenting Developmentally Appropriate Objectives and Benefits of a Music Therapy Program for Early Intervention: A Behavioral Analysis. Music Therapy Perspectives, 14, 87-94.

This study documented the variety of developmentally appropriate activity components in the music therapy sessions, assessed student responses and evaluated teaching interactions using the standards of the National Association for Education of Young Children.

Two inclusive classes of four-year-old children (n = 33) were each observed twice in music therapy sessions. These children were either eligible for Early Intervention services by state of Florida guidelines (economically disadvantaged, disabled, abused, substance exposed, in foster care, or assessed as marginal for exceptional child education, n = 21), were qualified for Exceptional Student Education classifications (visually impaired, autistic, physically impaired, or speech and language impaired), or were children without such eligibility whose families paid for services

Results showed that (a) the children were on task throughout the two 30-minute sessions; (b) the teacher/aide interactions were as recommended by developmentally appropriate curriculum guidelines; (c) a high proportion of the classes were devoted to instruction time; and (d) a large number of facts, concepts and skills were taught (week 1 = 171 and week 2 = 149).

Stensæth, K. (2013). ''Musical co-creation''? Exploring health-promoting potentials on the use of musical and interactive tangibles for families with children with disabilities. International Journal of Qualitative Studies on Health and Well-being, 8, Retrieved from www.ijqhw.net.

The point of departure in this text is the ongoing qualitative interdisciplinary research project RHYME (www.RHYME.no), which addresses the lack of health-promoting interactive and musical Information and Communications Technology (ICT) for families with children with severe disabilities. The project explores a new treatment paradigm based on collaborative, tangible, interactive net-based musical "smart things" with multimedia capabilities. The goal in RHYME is twofold: (1) to reduce isolation and passivity, and (2) to promote health and well-being. Co-creation is suggested as a possible path to achieving these goals, by evoking feelings, for example, or accommodating the needs to act and to create social relations; co-creation also motivates users to communicate and collaborate within (new) social relations. This article engages co-creation by incorporating aspects connected to interaction design and the field of music and health. Empirical observations will be referred to. The research question is as follows: What might co-creation imply for families of children with disabilities when musical and interactive tangibles are used as health-promoting implements?

Thompson, G. A., McFerran, K. S. & Gold, C. (2013). Family-centred music therapy to promote social engagement in young children with severe autism spectrum disorder: A randomized controlled study. Child: Care, Health and Development, Advance online publication.

This study investigated the impacts of Family-centred music therapy (FCMT) on social engagement abilities. Twenty-three children (36–60 months) with severe ASD received either 16 weeks of FCMT in addition to their early intervention programmes (n = 12), or their early intervention programme only (n = 11). Change in social engagement was measured with standardized parent-report assessments, parent interviews and clinician observation.

Results: Intention-to-treat analysis for the Vineland Social Emotional Early Childhood Scale indicated a significant effect in favour of FCMT. Thematic qualitative analysis of the parent interviews showed that the parent–child relationship grew stronger.

Conclusion: FCMT improves social interactions in the home and community and the parent–child relationship, but not language skills or general social responsiveness. This study provides preliminary support for the use of FCMT to promote social engagement in children with severe ASD.

Trehub, S. (2001). Musical Predispositions in Infancy The Biological Foundations of Music, Vol. 930, 1–16.

Some scholars consider music to exemplify the classic criteria for a complex human adaptation, including universality, orderly development, and special-purpose cortical processes. The present account focuses on processing predispositions for music. The early appearance of receptive musical skills, well before they have obvious utility, is consistent with their proposed status as predispositions. Infants' processing of musical or music-like patterns is much like that of adults. In the early months of life, infants engage in relational processing of pitch and temporal patterns. They recognize a melody when its pitch level is shifted upward or downward, provided the relations between tones are preserved. They also recognize a tone sequence when the tempo is altered so long as the relative durations remain unchanged. Melodic contour seems to be the most salient feature of melodies for infant listeners. However, infants can detect interval changes when the component tones are related by small-integer frequency ratios. They also show enhanced processing for scales with unequal steps and for metric rhythms. Mothers sing regularly to infants, doing so in a distinctive manner marked by high pitch, slow tempo, and emotional expressiveness. The pitch and tempo of mothers' songs are unusually stable over extended periods. Infant listeners prefer the maternal singing style to the usual style of singing, and they are more attentive to maternal singing than to maternal speech. Maternal singing also has a moderating effect on infant arousal. The implications of these findings for the origins of music are discussed.

Vlismas, W., Malloch, S. & Burnham, D. (2013). The effects of music and movement on mother–infant interactions. Early Child Development and Care, 183(11), 1669-1688.

Two experiments investigated the effects of a music and movement (M&M) programme on healthy first-time mothers and their 2–6-month-old infants over a five-week period. Experiment 1 (N = 96) examined the effects of the M&M activities and the face-to-face (F2F) social contact of a group instruction method on the perception of mothers' interactions with their infants and maternal postnatal attachment. Generally, M&M increased mothers' interactions with their infants specific to music-type activities and mothers' attachment to their infants. Contrary results occurred for No M&M-control group mothers. The presence/absence of F2F had no effect. Experiment 2 (N = 44) focused on behavioural effects of M&M on mothers' infant-directed speech (IDS) and mother–infant reciprocity. M&M increased dyadic reciprocity, and increased the duration, mean pitch and pitch range of mothers' IDS. Without M&M a decrease in attentional characteristics of mothers' IDS and dyadic reciprocity occurred.

Vosoughi, S., Roy, B., Frank, M., and Roy, D. (2010). Effects of caregiver prosody on child language acquisition. Speech Prosody, 100429, 1-4.

This paper investigates the role of prosody in one child's lexical acquisition using an ecologically valid, high-density, longitudinal corpus. The corpus consists of high fidelity recordings collected from microphones embedded throughout the home of a family with a young child. We analyze data collected continuously from ages 9 – 24 months, including the child's first productive use of language at about 11 months and ending at the child's active use of more than 500 words. We found significant correlations between prosody of caregivers' speech and age of acquisition for individual words.

Walworth, D. (2009). Effects of Developmental Music Groups for Parents and Premature or Typical Infants Under Two Years on Parental Responsiveness and Infant Social Development. Journal of music therapy 46(1):32-52.

The purpose of this study was to examine the effect of music therapy intervention on premature infants' and full term infants' developmental responses and parents' responsiveness. Subjects (n = 56) were parent-infant dyads who attended developmental music groups or a control condition assessing responsiveness during toy play. All subjects were matched according to developmental age and were also matched by group for socioeconomic status and for maternal depression. Types of infant play and parent responsiveness were measured using observation of a standardized toy play for parent-infant dyads. Observations were coded with the number of seconds spent in each behavior using the SCRIBE observation program. Parents completed a questionnaire on the perception of their infant's general development, interpretations of their child's needs, the purpose of using music with their child, and their child's response to music. The infants attending the developmental music groups with their parents demonstrated significantly more social toy play ($p < .05$) during the standardized parent-infant toy play than infants who did not attend the music groups. While not significant, graphic analysis of parent responsiveness showed parents who attended the developmental music groups engaged in more positive and less negative play behaviors with their infants than parents who did not attend the music groups. This study demonstrates the first findings of positive effects of developmental music groups on social behaviors for both premature and full term infants under 2 years old.

Wetherick, D. (2009). Music in the family: music making and music therapy with young children and their families. The Journal of Family Health Care [19(2):56-58]

Songs and singing games are a healthy part of young children's social, emotional and cognitive development. Such shared music making can facilitate and strengthen relationships between parents and children. Family health workers can encourage carers' informal uses of music with their children. In cases of developmental delay, disability, severe illness or family stress, music can continue to have a

significant role in supporting children and parents. In some cases referral to specialist music therapy services may be appropriate for assessment and/or treatment.

Woodward, A. (2004). Music therapy for autistic children and their families: A creative spectrum. British Journal of Music Therapy, 18(1), 8-24.

This paper uses three clinical examples to illustrate a range of approaches to working with children with autism and their parents: a group for children with autism and their parents in a mainstream primary school, short-term work with a 4-year-old autistic girl and her mother, and work with a mother and her two young sons, one of whom has Asperger's Syndrome. Music therapy can help children with autism to communicate and interact and can build their self-confidence. It can also play an important role for parents of children with autism, who may be under great stress, by fostering relationships, developing positive interactions and helping them to feel contained and supported.

Young, S. (2006). Seen but not heard: Young children, improvised singing and educational practice. Contemporary Issues in Early Childhood, 7(3), 270-280.

In this article the author suggests that the persistence of a 'performance model' of early childhood music education has detracted attention from children's spontaneous musical activity. The article focuses on one dimension of children's spontaneous musicality: improvised singing. Descriptions of short episodes taken from two periods of observation, the first in a day-care setting among two- and three-year-olds and the second in a nursery among three-year-olds, provide examples of different kinds of improvised singing and how they are integrated into physical movement, and play with objects and malleable substances such as sand and water. The descriptions move into detailed discussion which draws attention to the way in which, as they play, the children's singing represents one mode blended among many and gives insight into time-based processes. The author goes on to suggest that these time-based processes support ways of engaging, either with material things or in interacting with others. The article contains a number of propositions for the benefits which might accrue from a reconsideration of singing in early childhood education.

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APPENDIX 3

MUSIC THERAPY FOR PEOPLE WITH AUTISTIC SPECTRUM DISORDERS

Featured Research Details

Arezina, C.H. (2011). The Effect of Interactive Music Therapy on Joint Attention Skills in Preschool Children with Autism Spectrum Disorder [Master's thesis]. Lawrence, KS: University of Kansas.

The purpose of this study was to investigate the effect of interactive music sessions on joint attention behaviors in preschool children with Autism Spectrum Disorders (ASD). Joint attention, the ability to share attention to a stimulus with another person, is a key deficit in children with ASD. Lack of joint attention behaviors contributes to the limited social and verbal skills that characterize ASD; joint attention behaviors are the primary component of the early screening for ASD advocated by the American Academy of Pediatrics. Participants (N=6; 5 male, 1 female) were between 36 and 64 months old at the time of the study, and were recruited from the child development program at a large Midwestern university. All children were enrolled in classrooms with curricula designed specifically for children with ASD. A multiple treatment (within-subject) design was used, with three treatment conditions: interactive music therapy, non-music interactive play, and independent play. Participants experienced each condition six times for a total of 18 ten-minute sessions over a five-week period. Session order was randomized to control for order effect. Behavioral observation of videotaped sessions was used to determine both interaction (responding to a bid for joint attention) and requesting behavior (initiating joint attention). Visual analysis of data graphs and statistical analysis were used to determine treatment effect. Interaction behaviors were most frequent in the interactive music therapy sessions, with less interaction in non-music interactive play sessions, and much less interaction during independent play. Although the difference between was less significant for the two children with the best interaction skills prior to the study, overall, the between-subject ANOVA revealed a significant difference in interaction among all three conditions ($F [2, 105] = 62.028$, $p < 0.001$; Bonferroni $p < 0.01$ between all conditions). Requesting behavior was highly variable across sessions, regardless of treatment condition, although requesting was generally higher in the interactive conditions than in the independent play sessions. Implications, limitations, and opportunities for further research are discussed.

Brown, S. (1994). Autism and music therapy - is change possible and why music? Journal of British Music Therapy, 8(1), 15-25.

From existent research and literature, supported by her own case work presented in this article, Brown identifies the following reasons for why music therapy is so relevant to working with people on the autistic spectrum:

1. Because music contains the same paradoxical elements of fixed organisation and creativity that are needed in all our dealings with the world, we as therapists can use its inherent structures and .potential creativity to help the person with autism develop more coherent and adaptable responses to other world structures.

2. Because the elements of music are intricately involved in developing social interaction both in infancy and throughout life, we can use these elements to foster and develop social relationships.

3. Because human beings are rhythm and pitch, there is always musical potential for creating communication, by the therapist picking up and putting into musical organisation even apparently

meaningless body movements and activities, vocal sounds such as crying or screaming, and emotional states.

4. Finally, because of music's direct relationship to our emotions, it can provide access to a wide diversity of emotional qualities, with a directness of connection that can bypass cognitive processes involving thought and language. It can enable a person to begin to explore feelings and/or emotional difficulties arising from the issues of 'secondary handicaps'; it can give access to a wide range of rich emotional qualities outside that person's immediate experience; and it can provide the opportunity to do this in a shared emotional context.

Brown concludes, "This article has set out to show that music used as therapy can help people with autism cognitively, socially, emotionally because of its deep connections with the structure of our physical being, the processing of our cognitive world, our emotional and feeling states, and the development of our social relationships from infancy throughout adulthood. Music focuses on developing what we share as human beings, rather than on the pathology that divides us. The final paradox of music, perhaps, is that it is through our universal musical humanness that the uniqueness of each of us as an individual can be so fully celebrated."

Brownell, M. (2002). Musically adapted Social Stories™ to modify behaviors in students with autism: Four case studies. Journal of Music Therapy, 39(2), 117- 144.

The purpose of the present study was to investigate the effect of a musical presentation of social story information on the behaviors of students with autism. Social stories are a means of incorporating an individual with autism's propensity toward visual learning with educationally necessary behavior modifications. Participants in the study were four first- and second-grade students with a primary diagnosis of autism attending an elementary school in eastern Iowa. A unique social story was created for each student that addressed a current behavioral goal. Subsequently, original music was composed using the text of the social story as lyrics. The independent variable for this study was one of three treatment conditions: baseline (A); reading the story (B); and singing the story (C). The reading and singing versions of the social stories were alternately presented to the students using the counterbalanced treatment order ABAC/ACAB. The dependent variable was the frequency with which the target behavior occurred under each condition of the independent variable. Data were collected for a period of 1 hour following presentation of the social story. Results from all four cases indicated that both the reading condition (B) and the singing condition (C) were significantly ($p < .05$) more effective in reducing the target behavior than the no-contact control condition (A). The singing condition was significantly more effective than the reading condition only in Case Study III. For the remaining case studies, the mean frequency of the target behavior was smaller during the singing condition, but not significantly so. These results suggested that the use of a musically adapted version of social stories is an effective and viable treatment option for modifying behaviors with this population.

De Bruyn, L., Moelants, D. & Leman, M. (2012). An embodied approach to testing musical empathy in participants with an autism spectrum disorder. Music and Medicine, 4(1), 28-36.

One of the main symptoms of autism spectrum disorders is a disturbance of social skills, more particularly a disturbance of the ability to share the feelings and emotions with other persons. While this lack of empathy in autism subjects is evident in social contexts, it is less evident whether it also occurs in artistic contexts. This paper aims at testing to what extent subjects with autism can develop an empathic relationship with music through listening.

A number of studies have been addressing the role of music for people with ASD, thereby mainly focusing on the perception of musical structure. Several studies showed that ASD-

subjects are superior to typically developing subjects when it comes to detailed processing of musical structures. Research of Heaton et al.[167], for example, showed that children with ASD outperform their matched controls on pitch discrimination, pitch categorization and pitch memory tasks. The results of Bonnel et al.[168] showed that subjects with ASD were superior to typically developing individuals in the pitch discrimination and categorization tasks. Research on ASD and affect perception in music are much more rare.

Four experiments requiring an increasing level of empathy with music, from synchronization, and attuning to emotional empathy, were carried out, using kinematic devices for measuring embodied listening responses and a verbal emotion attribution task. Results suggest that people with ASD have a corporeal understanding of the affective features of music, since they are able to mirror structural and even affective features of the music into corporeal articulations. However, this corporeal understanding does not give them a straightforward access to the emotional content of the music. The 14 participants with ASD seemed to rely on disembodied cognitive processes to attribute affects to music.

Dezfoolian, L., Zarei, M., Ashayeri, H. & Looyeh, M. Y. (2013). A pilot study on the effects of orff-based therapeutic music in children with autism spectrum disorder. Music and Medicine, 5(3), 162-168.

This study strove to determine "…the effectiveness of Orff music therapy on social interaction, verbal communication, and repetitive behaviour of children with autism. Five children with autism who had no previous experience in music or play therapy were recruited. Social interaction, verbal communication, and repetitive behaviour of the participants were scored pre- and post-intervention (Orff music therapy) using Autism Diagnostic Interview–Revised. The mean scores of social interaction were 26.60 and 14 before and after therapy, respectively (P < .001). The mean scores of verbal communication and repetitive behaviour were reduced significantly (P < .05). The reduction in the scores indicated a good outcome. All participants improved significantly in their social interaction and verbal communication. The Orff music therapy also helped to decrease their repetitive behaviour."

Edgerton, C. L. (1994). The effect of improvisational music therapy on the communicative behaviours of autistic children. Journal of Music Therapy, 31(1), 31-62.

"The purpose of this study was to determine the effectiveness of improvisational music therapy, based on Nordoff and Robbins' (1977) Creative Music Therapy approach, on autistic children's communicative behaviours. Eleven autistic children, ranging in age from 6 to 9 years, participated in individual improvisational music therapy sessions for a period of 10 weeks. A reversal design was applied. The Checklist of Communicative Responses/Acts Score Sheet (CRASS), designed specifically for this study, was used to measure the subjects' musical and nonmusical communicative behaviours. Results strongly suggest the efficacy of improvisational music therapy in increasing autistic children's communicative behaviours. Significant differences were found between the subjects' first session CRASS scores and those of their last sessions (p < .01). Also, abrupt and substantial decreases in scores were noted for all 11 subjects when reversal was applied."

[167] Heaton P., Hermelin B., and Pring L. (1998). Autism and pitch processing: A precursor for savant musical ability? Music Percept, 15(3), 291-305; Heaton P., Pring L., and Hermelin B. (2001). Musical processing in high functioning children with autism. Biol found Music, 930, 443-444; Heaton P. (2005). Interval and contour processing in autism. J Autism Dev Disord, 35(6), 787- 793.

[168] Bonnel A., Mottron L., Peretz I., Trudel M., Gallun E., and Bonnel A.-M. (2003). Enhanced pitch sensitivity in individuals with autism: A signal detection analysis. J Cogn Neurosci, 15(2), 226- 235.

Evers, S. (1992). 'Music Therapy in the treatment of autistic children: medico-sociological data from the Federal Republic of Germany'. Acta: Paedipsychiatrica International 55(3): 157-8. Also in The journal of Child and Adolescent Psychiatry.

Data from paediatricians and paediatric institutions showed that music therapy is already accepted as a treatment. Postal Survey results from 191 child psychiatrists and 127 paediatric institutions revealed that music therapy is recommended as a treatment by 14.5% of paediatricians and 56% of psychiatrists.

Gattino, G. S., Riesgo, R. d. S., Longo, D., Leite, J. C. L. & Faccini, L. S. (2011). Effects of relational music therapy on communication of children with autism: A randomized controlled study. Nordic Journal of Music Therapy, 20(2), 142-154.

This randomized controlled trial investigated the effects of Relational Music Therapy (RMT) in verbal, nonverbal and social communication of 24 boys with autism spectrum disorders from the Programme for Invasive Developmental Disorders (Porto Alegre City, Brazil). It was designed to compare individuals treated with music therapy and standard treatment (clinical routine activities including medical examinations and consultations.

The outcomes were assessed by two blind evaluators, before and after interventions, through the verbal, nonverbal and social communication scores of Brazilian version of the Childhood Autism Rating Scale (CARS-BR). The CARS-BR scores in T1 and T2 did not show a statistically significant difference in the three measured outcomes. However, the study found a positive statistically significant difference on subgroup analysis of nonverbal communication among patients with autistic disorder, p = 0.008 and standard mean difference of 2.22 (95% CI 1.90 to 2.53). The results observed in the investigation of the effects of relational music therapy on communication skills of children with autistic spectrum disorders are inconclusive. The next investigations need more rigorous designs leading to smaller effect size estimates and more accurate tools for the outcome assessment (including some specific instrument of music therapy). These modifications will increase the accuracy to observe the treatment effects in this population.

Geretsegger M, Elefant C, Mössler KA, Gold C. (2014). Music therapy for people with autism spectrum disorder. Cochrane Database of Systematic Reviews , Issue 6. Art. No.: CD004381.

The most recent review of music therapy used with children on the autistic spectrum (2014) drew on 10 randomised controlled trials (RCTs) or controlled clinical trials comparing music therapy or music therapy added to standard care to 'placebo' therapy, no treatment, or standard care for individuals with autistic spectrum disorders (total participants=165). The review examined the short- and medium-term effect of music therapy interventions (one week to seven months).

"The review found that music therapy was superior to 'placebo' therapy or standard care with respect to social interaction, non-verbal and verbal communicative skills, initiating behaviour, and social-emotional reciprocity. Music therapy was also superior to 'placebo' therapy or standard care in the areas of social adaptation, joy, and the quality of parent-child relationships. None of the included studies reported any side effects caused by music therapy. The small sample sizes of the studies limit the methodological strength of these findings.

Music therapy may help children with ASD to improve their skills in important areas such as social interaction and communication. Music therapy may also contribute to increasing social adaptation skills in children with ASD and to promoting the quality of parent-child relationships. Some of the included studies featured interventions that correspond well with treatment in clinical practice. More research with adequate design and using larger numbers of patients is needed. It is important to specifically examine how long the effects of music therapy last. The application of music therapy

requires specialised academic and clinical training. This is important when applying the results of this review to practice."

Heaton, P., Hermelin, B. & Pring, L. (1999). Can children with autistic spectrum disorders perceive affect in music? An experimental investigation. Psychological Medicine 29(6):1405-10.

Children with autistic spectrum disorders typically show impairments in processing affective information within social and interpersonal domains. It has yet to be established whether such difficulties persist in the area of music; a domain which is characteristically rich in emotional content.

Fourteen children with autism and Asperger syndrome and their age and intelligence matched controls were tested for their ability to identify the affective connotations of melodies in the major or minor musical mode. They were required to match musical fragments with schematic representations of happy and sad faces.

The groups did not differ in their ability to ascribe the musical examples to the two affective categories. In contrast to their performance within social and interpersonal domains, children with autistic disorders showed no deficits in processing affect in musical stimuli.

Hillier, A., Greher, G., Poto, N. & Dougherty, M. (2012). Positive outcomes following participation in a music intervention for adolescents and young adults on the autism spectrum. Psychology of Music, 40(2):201-15.

Music interventions are frequently utilized with those with autism spectrum disorders (ASD) and have shown a range of benefits. However, empirical evaluations are lacking and would be a timely step forward in the field. Here we report the findings of our pilot music program for adolescents and young adults with ASD. Evaluation of the program focused on self-esteem, anxiety, and attitudes toward and relationships with peers as these are pervasive challenges for those with ASD. Pre- and post-outcome measures showed a significant increase in self-esteem, reduced self-reported anxiety, and more positive attitudes toward peers. Weekly measures taken pre- and post-each session also showed a significant reduction in self-reported ratings of anxiety. These findings provide some initial empirical support for the efficacy of music participation in treating some of the core challenges seen in ASD.

Kalas, A. (2012). Joint attention responses of children with autism spectrum disorder to simple versus complex music. Journal of Music Therapy 49(4), 430-452.

Joint attention deficits are viewed as one of the earliest manifestations and most characteristic features of the social deficits in Autism Spectrum Disorder (ASD).The purpose of this study was to examine the effect of simple versus complex music on joint attention of children with ASD.

Thirty children with a diagnosis of ASD participated in this study. Fifteen of the participants were diagnosed with severe ASD and 15 were diagnosed with mild/moderate ASD. Each participant took part in six, 10-minute individual music conditions (3 simple & 3 complex) over a 3-week period. Each condition was designed to elicit responses to joint attention.

Results indicated a statistically significant interaction between music modality and functioning level. Therefore, the effect of simple versus complex music was dependent on functioning level. Specifically, the Simple Music Condition was more effective in eliciting Responses to Joint Attention (RJA) for children diagnosed with severe ASD, whereas the Complex Music Condition was more effective in eliciting RJA for children diagnosed with mild/moderate ASD.

The results of the present study indicate that for children in the severe range of functioning, music that is simple, with clear and predictable patterns, may be most effective in eliciting responses to bids for joint attention. On the contrary, for children in the mild/moderate range of functioning, music that is more complex and variable may be most effective in eliciting responses to bids for joint attention.

These results demonstrate that careful manipulation of specific musical elements can help provide the optimal conditions for facilitating joint attention with children with ASD.

Kaplan, R. S. & Steele, A. L. (2005). An analysis of music therapy program goals and outcomes for clients with diagnoses on the autism spectrum. Journal of Music Therapy, 42(1), 2-19.

"The researchers analyzed data related to goals and outcomes over 2 program years for 40 music therapy clients, ranging in age from 2–49 years, with diagnoses on the autism spectrum. They investigated music therapy interventions, session types, and formats most frequently used; goals most frequently addressed; assessed level of difficulty of clients and their situations; and generalization of skills attained in music therapy to other settings.

"Primary goal areas were ranked from language/communication (41%), behavioral/psychosocial (39%), cognitive (8%), and musical (7%), to perceptual/motor (5%). One hundred percent of subjects reached their initial objectives in these goal areas within one year or less, regardless of session type, level of difficulty, or goal area. Seventy-seven percent of intermediate objectives were reached within that time. The most frequently utilized interventions were interactive instrument playing, musical instrument instruction, interactive singing, instrument choices, and song choices. Specific interventions chosen did not affect accomplishment of initial objectives. However, there was more variation among interventions in terms of achievement of intermediate objectives. Session formats were ranked from activity-based as most frequent to lesson-based, client-led/"shadow," and ensemble format. All formats were successful when addressing initial objectives, with lesson-based format being most effective in reaching intermediate objectives. Lastly, 100% of parents and caregivers surveyed indicated subjects generalized skills/responses acquired in music therapy to non-music therapy environments."

Katagiri, J. (2009). The effect of background music and song texts on the emotional understanding of children with autism. Journal of Music Therapy, 46(1), 15-31.

The purpose of this study was to examine the effect of background music and song texts to teach emotional understanding to children with autism. Participants were 12 students (mean age 11.5 years) with a primary diagnosis of autism who were attending schools in Japan. Each participant was taught four emotions to decode and encode: happiness, sadness, anger, and fear by the counterbalanced treatment-order. The treatment consisted of the four conditions: (a) no contact control (NCC)—no purposeful teaching of the selected emotion, (b) contact control (CC)—teaching the selected emotion using verbal instructions alone, (c) background music (BM)—teaching the selected emotion by verbal instructions with background music representing the emotion, and singing songs (SS)—teaching the selected emotion by singing specially composed songs about the emotion. Participants were given a pretest and a posttest and received 8 individual sessions between these tests. The results indicated that all participants improved significantly in their understanding of the four selected emotions. Background music was significantly more effective than the other three conditions in improving participants' emotional understanding. The findings suggest that background music can be an effective tool to increase emotional understanding in children with autism, which is crucial to their social interactions.

Kern, P. (2004). Making friends in music: Including children with autism in an interactive play setting. Music Therapy Today: A Quarterly Journal of Studies in Music and Music Therapy, 5(4).

"This paper describes a cumulative case study design investigating the effectiveness of embedded music therapy interventions designed for the inclusion of young children with Autism Spectrum Disorder in an inclusive childcare program. The results indicated positive effects on all target children's performance within the childcare routine: In eight of nine cases, the songs produced desirable outcomes. The musical playground environment facilitated the involvement of children with

autism with peers. The music therapy collaborative consultative approach enabled teachers to implement interventions successfully in ongoing childcare routines. Peer-mediated strategies increased peer interactions and meaningful play on the playground and laid the foundation for forming friendships."

Kern, P., Rivera, N. R., Chandler, A. & Humpal, M. (2013). Music therapy services for individuals with autism spectrum disorder: A survey of clinical practices and training needs. Journal of Music Therapy, 50(4), 274-303.

The purpose of this study was to evaluate the status of music therapy practices for serving clients with ASD, the implementation of national ASD standards and guidelines, the awareness of recent developments, and training needs of music therapists.

Professional members of the American Music Therapy Association who are working with individuals with ASD served as the sample for this national cross-sectional survey study (N = 328). A 45-item online questionnaire was designed and distributed through email and social media. Participants accessed the online survey through SurveyMonkey®.

Findings suggest music therapy practices and services for individuals with ASD have shifted and now reflect a slightly higher percentage of caseload, a broader age range of clients, and a trend to serve clients in home and community settings. Most therapeutic processes align with recommended practices for ASD and incorporate several of the recognized evidence-based practices. Less understood or recognized are inclusion practices and latest developments in the field of ASD.

Music therapists have a solid understanding of providing services for individuals with ASD, but would benefit from advanced online training and improved information dissemination to stay current with the rapidly changing aspects pertinent to this population.

Kim, J. (2006). The effects of improvisational music therapy on joint attention behaviours in children with autistic spectrum disorder. PhD Thesis, Aalborg University.

This research study was designed to look at joint attention behaviours in children with autistic spectrum disorders in two different conditions: improvisational music therapy and free play. Standardized tools (Pervasive Developmental Disorder Behavior Inventory (PDDBI), the Early Social Communication Scales (ESCS), and the Mother Play Intervention Profile (MPIP)) and DVD analysis of sessions were used to evaluate changes in joint attention behaviours. 10 children, all male, age between 3-6 year olds, with clear diagnoses of autistic spectrum disorder completed the trial.

"The overall results from the PDDBI, the ESCS and session analysis were generally in favour of music therapy over free play, indicating improvisational music therapy was more effective at improving joint attention behaviours in children than free play. The most clinically relevant and important findings were that children displayed markedly more and longer events of 'eye contact' 'joy' 'emotional synchronicity' and 'initiation of engagement' spontaneously in improvisational music therapy than free play, and also in unstructured part than structured part. The findings highlighted the 'motivational aspects' of musical interaction between the child and the therapist, and supported the long-lived claims of improvisational music therapy, promoting self-expression', emotional communication and social interaction."

Kim, J., Wigram, T. & Gold, C. (2008). The effects of improvisational music therapy on joint attention behaviors in autistic children: a randomized controlled study. Journal of Autism and Developmental Disorders; 38(9), 1758-66.

The purpose of this study was to investigate the effects of improvisational music therapy on joint attention behaviors in pre-school children with autism. It was a randomized controlled study

employing a single subject comparison design in two different conditions, improvisational music therapy and play sessions with toys, and using standardized tools and DVD analysis of sessions to evaluate behavioral changes in children with autism. The overall results indicated that improvisational music therapy was more effective at facilitating joint attention behaviors and non-verbal social communication skills in children than play. Session analysis showed significantly more and lengthier events of eye contact and turn-taking in improvisational music therapy than play sessions. The implications of these findings are discussed further.

LaGasse, A. B. & Hardy, M. W. (2013). Considering rhythm for sensorimotor regulation in children with Autism Spectrum Disorders. Music Therapy Perspectives, 31(1). 67-77.

Autism spectrum disorders (ASD) are traditionally characterized by a lack of social emotional processing, repetitive behaviors, and cognitive inflexibility. However, researchers and clinicians are beginning to recognize an extended profile of ASD that includes deficits in sensorimotor skills. This extended profile has emerged from advances in technology that allow for precise measurement of motor movements and observation of neuroanatomical differences of motor areas in the brain of persons with ASD. Although this research may provide insight as to extended needs of children with autism, inconsistent findings regarding motor skills and neurological structures also lead to more questions about the nature of autism. As evidence for motor differences in ASD grows, there are potential implications for treatment and therapy for individuals with autism. The purpose of this paper is to review evidence of motor differences in ASD, present clinical findings within motor research, and then to draw parallels from existing music therapy sensorimotor treatment to maximize the benefits of music therapy. Concepts are illustrated in a case example of a boy with ASD and motor dyspraxia.

Mehler, J. (2013). Parental perception of music therapy for children diagnosed with autism spectrum disorders. Open Access Theses. Paper 425.

The purpose of this study was to examine retrospective and current parental perceptions of music therapy for 50 children (under 7 years old) diagnosed with autism spectrum disorders. This study also investigated the differences between parents' retrospective and current perceptions, as well as the variables that predict current parental perceptions and changes in parental perceptions.

Results revealed that parents' retrospective perceptions of music therapy were generally positive, with musical skills reported as the most anticipated change in children's functional skills. Parents' current perceptions of music therapy tended to be extremely positive, with musical skills also reported as the most observed change in children's functional skills. Results indicated a significant difference between parents' retrospective and current perceptions, with current perceptions of music therapy being more favourable. Results indicated that observed changes in children's functional skills, specifically in musical, social, and motor skills, were significant predictors of current parental perception of music therapy. "Parents who recognize functional outcomes, outside of musical skills, may be more likely to continue music therapy sessions and be compliant with treatment recommendations."

Oldfield, A., Bell, K. & Pool, J. (2012). Three families and three music therapists: reflections on short-term music therapy in child and family psychiatry. Nordic Journal of Music Therapy 21(3), 250-67.

This article describes three pieces of short-term music therapy work with three different families. The work took place in a unit for child and family psychiatry. Three music therapists were involved both in the treatment and in group supervision. They were inspired to write this paper partly because family work and short-term work are still relatively unusual in clinical music therapy. In addition the projects were significant because in all three of the cases described here the parents were enabled, through music therapy, to gain fresh insights into their relationships with their children. Through reflection on the clinical work and study of relevant literature, the authors observed some common trends:

• *When working with families there appears to be a tendency to focus first on the child's difficulties and then, later in the treatment, on family relationships and the parents' difficulties.*

• *In many cases involving music therapy work with families, non-verbal, improvised music-making and playful musical exchanges seem to be key components in facilitating family interactions.*

• *The gender and past experience of music therapists carrying out family work can be a point of consideration in order to address the needs of some families.*

Pasiali, V. (2004). The use of prescriptive songs in a home-based environment to promote social skills acquisition by children with autism: three case studies. Music Therapy Perspectives, 22(1), 11-20.

The researcher investigated the effect of prescriptive therapeutic songs on promoting social skills acquisition by children who have autism. Participants were three children with autism. The researcher created an individualized song for each participant, the purpose of which was to decrease an undesirable behavior identified by the parents. The researcher developed the lyrics of each song by following the current guidelines for writing the text of social stories. "Social stories" is a strategy developed by special educators for modifying problematic behaviors of children with autism. The adapted lyrics were then set to the tune of a favorite song of the child. The song intervention was implemented during the treatment phases of the ABAB reversal design. Even though the results are not conclusive, there is some indication that prescriptive songs are a viable intervention with children who have autism.

Reschke-Hernandez, A. E. (2011). History of music therapy treatment interventions for children with autism. Journal of Music Therapy, 48(2), 169-207.

The purpose of this paper is to provide a systematic review of the history of music therapy research and treatment of children with autism. Understanding such history is important in order to improve clinical efficacy and inform future research. This paper includes a history of autism diagnosis, reviews strengths and limitations of music therapy practice with children with autism from 1940–2009, and suggests direction for future music therapy research and clinical practice with this population. Literature was limited to the English language and obtained with the following search terms: autism, autistic, (early) infantile autism, child, therapeutic music, musical therapy, and music therapy. Table of contents from music therapy journals were searched, and reference lists from obtained articles were perused for additional articles. This historical review focused primarily on journal articles, however, books and book chapters that appeared to hold particular historical significance were also included.

Thompson G. (2012). Making a Connection: Randomised Controlled Trial of Family Centred Music Therapy for Young Children with Autism Spectrum Disorder [PhD thesis]. Melbourne, Australia: The University of Melbourne.

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

Quantitative analysis showed that children in the treatment group made improvements in the quality of their social interactions in the home and community, as well as their level of engagement within the music therapy sessions. The qualitative and mixed data analysis suggested that there were also improvements in the closeness of the parent-child relationship. Further, parents were able to adapt music activities to support their child in various activities in the home and community. These outcomes

provide preliminary support for family-centred music therapy's effectiveness in promoting developmental change in children's social communication skills, and fostering greater closeness in the parent-child relationship.

Thompson, G. & McFerran, K. S. (2013). "We've got a special connection": Qualitative analysis of descriptions of change in the parent–child relationship by mothers of young children with autism spectrum disorder. Nordic Journal of Music Therapy, Advance online publication.

This paper presents a qualitative analysis of semi-structured interviews with 11 mothers who participated in family-centred music therapy sessions along with their child. The interview questions focussed on changes to the nature of the parent–child relationship. Analysis of the interviews identified three aspects of positive change to the parent–child relationship, namely: the quality of the relationship; the parents' perception of the child and the parents' response to the child.

Whipple, J. (2004). Music in intervention for children and adolescents with autism: A meta-analysis. Journal of Music Therapy, 41(2), 90-106.

This meta-analysis of 12 dependent variables from 9 quantitative studies comparing music to no-music conditions during treatment of children and adolescents with autism resulted in an overall effect size of d = .77 and a mean weighted correlation of r = .36 (p = .00). Since the confidence interval did not include 0, results were considered to be significant. All effects were in a positive direction, indicating benefits of the use of music in intervention.

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Appendix 4

Music Therapy for people with Learning Disabilities

Featured Research Details

Aldridge, D., Gustroff, D. & Neugebauer, L. (1995). A pilot study of music therapy in the treatment of children with developmental delay. Complementary Therapies in Medicine, 3(4), 197-205.

In a crossover study of music therapy for children who are developmentally delayed, the children in the initial treatment group change more than the children on the waiting list. When the waiting list group are treated and then tested, the newly treated children catch up in their development. Such changes can be demonstrated at a level of clinical significance. There is a continuing improvement in hearing and speech, hand—eye co-ordination, and personal—social interaction. Music therapy seems to have an effect on personal relationship, emphasising the positive benefits of active listening and performing, and this in turn sets the context for developmental change. A further investigation of the data revealed the importance of hand—eye co-ordination for developmental changes. The active element of musical playing, which demands the skill of hand—eye co-ordination, appears to play a significant role in developmental changes as they occur in the therapeutic musical relationship.

Chester, K. K., Holmberg, T. K., Lawrence, M. P. & Thurmond, L. L. (1999). A program-based consultative music therapy model for public schools. Music Therapy Perspectives, 17(2), 82-91.

The purpose of this article is to provide a comprehensive description of a program-based consultative model of music therapy service delivery within a public school system. The philosophy of the model, methods for determining classroom criteria for qualification, program planning, functions of the music therapist, and logistics are discussed. Benefits of this model are: more students receive services, teachers use music therapist-generated strategies regularly, collaboration occurs across disciplines, and the music therapist's time serving the classrooms is maximized. The description of this model may be used by music therapists, public school administrators, faculty, and other service providers as a resource when exploring options for music therapy service delivery.

Curtis, Sandra & Chesley Sigmon Mercado (2004). Community Music Therapy for Citizens with Developmental Disabilities. Voices: A World Forum for Music Therapy [Online], 4.3.

Examination of the lives of people with developmental disabilities in the 21st century highlights the need to formulate creative solutions for the challenge of providing meaningful community engagement. The Performing Arts Program described in this paper is representative of a new paradigm in clinical music therapy in its practice of Community Music Therapy. Adults with developmental disabilities of varying functioning levels participated in community-based performing ensembles — instrumental/vocal groups and American Sign Language (ASL) music interpretation groups. A variety of community engagement strategies were used within a Community Music Therapy approach, with sessions culminating in public performances. The results of this powerful program were examined using qualitative methods with procedural, therapeutic, and self-advocacy considerations. The Performing Arts Program was successful in fostering community engagement, social networking, and friendship building. Implications for the changing trends in music therapy are discussed.

Daveson, B. & Edwards, J. (1998). A role for music therapy in special education. International Journal of Disability, Development and Education, 45(4), 449-455.

Music therapy is the planned use of music to achieve therapeutic aims. This article outlines the role and application of music therapy in special education with reference to findings documented in recent research and practice literature. Music therapy in Australia is practised in medical contexts (e.g.,

nursing homes, hospice care, hospitals) and education contexts (e.g., special schools, regular schools, and special education development units). Music therapists also work in private practice or in community programs.

Dorothea, P. (2012). Music therapy for children with down syndrome: Perceptions of caregivers in a special school setting. Kairaranga: The New Zealand Journal of Education, 13(1), 36-43.

Down syndrome is a genetic disorder resulting from chromosome 21 having three copies (trisomy 21). Cognitive functioning and anatomical features cause speech and language development delay (Kumin, 2003). Children with Down syndrome generally enjoy communication (Schoenbrodt, 2004), and respond well to interaction and social scripts. Music therapy has been extensively used in the past four decades as a treatment for children with disabilities (Nordoff & Robbins, 2007; Wigram, Pederson & Bonde, 2002). Children with Down syndrome seem specifically responsive to music and show potential to be part of group music-making (Wigram et al., 2002). In both speech and music, rhythm and sound are primary elements and all elements of music may be integrated into a speech-language programme (Birkenshaw, 1994; Wilmot, 2004). Family and caregiver support are required for therapy to be effective. Caregivers' views of music therapy for children with Down syndrome were examined as a preliminary step in the evaluation of music therapy outcomes for this population. A questionnaire examining perspectives of effects of music on the communication development of children with Down syndrome was given to 19 caregivers of children with Down syndrome working in a special school environment. Consistent with reports in the literature, caregivers perceive children with Down syndrome as responsive to music, and to have musical and communicative strengths. Caregivers perceived that communication and social skills may develop through regular music therapy sessions. These perceptions corresponded with the views of music therapists who were later interviewed as part of this study.

Fragkouli, A. (2013). Music therapy in special schools: The assessment of the quality of relationship. Approaches: Music Therapy & Special Music Education, 5(2), 152-165.

This qualitative scientific study – by means of analysing recorded therapeutic sessions with children with autism or mental disability in a special school – examines the process of creating a relationship between the therapist and the child in the context of music-therapeutic moments. The analysis of therapeutic moments was carried out through the AQR-instrument (Assessment of the Quality of Relationship) and led to a) the evaluation of the quality of relationship between the therapist and the child with autism or mental disability during therapy, b) the evaluation of the correspondence of the therapeutic intervention to each child's developmental level (modus), and c) the appreciation of the differentiation in the relationship between the therapist and the child with autism or mental disability, as well as the size of that differentiation. Regardless of the pathology, it was observed that music therapy with children is advisable when the child shows disorders in his/her emotional development and in the ability to create a relationship. Music-therapeutic interventions that use the child itself as a starting point and follow the concept of elemental music, succeed in mobilising children's healthy part and promote their development, in many areas. Research data are based on the author's dissertation thesis: "Music therapy for children with psychological disorders in special education"

Gold, C., Voracek, M. & Wigram, T. (2004). Effects of music therapy for children and adolescents with psychopathology: A meta-analysis. Journal of Child Psychology and Psychiatry and Allied Disciplines, 45, 1054-1063.

A meta-analysis of eleven music therapy studies involving children and adolescents with psychopathology, including six which were carried in special education settings (Edgerton, 1994; Eidson, 1989; Haines, 1989; Michel & Farrell, 1973; Michel & Martin, 1970; Montello & Coons, 1998). The review found that music therapy is highly significant ($p < .001$) as an effective treatment for children and adolescents with behavioural or developmental disorders. It was theorised that this effect

may be due to the short concentration span experienced by children with these disabilities, with music therapy interventions serving as a motivating medium for engaging the child and therefore allowing them to achieve their full potential. It also noted that eclectic music therapy approaches were the most successful, with strict behavioural interventions indicating non-significant outcomes.

Holck, U. (2004). Turn-taking in music therapy with children with communication disorders. British Journal of Music Therapy, 18(2), 45-54.

In a well-functioning dialogue, the nonverbal and often implicit visual and auditory cues ensure good continuation without interruptions or overlapping speak. In mutual interplay, both partners participate in turn-organisation, and therefore an analysis of cues indicating turn-taking and turn-yielding can provide information about the participants' social skills, whether or not the dialogue is verbal.

This article presents relevant concepts from conversation analysis literature in order to analyse music therapy interplay aimed at promoting preverbal and social skills. As the character of the turn organisation is dependent on the developmental age of the participants, the described cues are compared to research in early mother–child interplay, as well as studies of turn-organisation in dialogues with disabled children.

The theoretical part of the article is illustrated by a turn-analysis of case material from music therapy with a 2-year-old boy with communication disorders. The analysis was a part of the author's doctoral research and focuses on the boy's participation in turn-organisation as well as the therapist's use of turn-yielding and turn overlapping.

Hooper, J. (2001). Overcoming the problems of deinstitutionalization: Using music activities to encourage interaction between four adults with a developmental disability. Music Therapy Perspectives, 19(2), 121-127.

Since individuals with a developmental disability often experience difficulty in establishing and sustaining social contact, this article evaluates a program of music-based activities which provided structure and direct peer interactions.

The four participants in this study were adults with developmental disabilities who shared an apartment together. Their interactions were recorded at baseline and during five music sessions and five control sessions (indoor ball games). Both treatment conditions resulted in an increased level of positive interaction and a low level of negative interaction. Both treatment conditions affirmed the value of non-verbal interventions in encouraging interaction and diffusing the stress often associated with interacting for this patient population.

Hooper, J. & Lindsay, B. (1990). Music and the mentally handicapped: The effect of music on anxiety. British Journal of Music Therapy, 4(2), 18-26.

This study reports the effects of music on the anxiety and agitation of four women with moderate and mild mental handicap. Music therapy and recorded music were compared with a control condition using controlled case studies. Two measures of anxiety were recorded — pulse rate and a behavioural rating. No improvement was found under the control conditions, while both music conditions produced some improvements. Variations in the pattern of responses to each form of music are discussed.

Hooper, J. & Lindsay, B. (1992). Improving the quality of life through music: A case study. Mental Handicap, 20(1), 27-30.

This study reports the effect of relaxing music on the anxiety and agitation of a disturbed mentally handicapped woman. While the emphasis is on the short term effect of treatment, the study suggests that there may be other long term effects which in turn reflect an improved quality of life.

Hooper, J., Wigram, T., Carson, D. & Lindsay, B. (2011). The practical implication of comparing how adults with and without intellectual disability respond to music. British Journal of Learning Disabilities, 39(1), 22-28.

Previous researchers who compared how people with, and without, an intellectual disability respond to music focused on musical aptitude, but not on arousal. This paper presents the background, methodology, and results of a study that selected fifteen different pieces of music, and compared the arousal response of adults with (n = 48), and without (n = 48), an intellectual disability. There was a very strong significant positive correlation (rho = 0.831, N = 15, P < 0.001, two-tailed), which the present authors believe implies that music, identified as sedative by individuals who do not have an intellectual disability, can be used appropriately in an intervention predicated for lowering the arousal levels of the intellectually disabled population.

Jellison, J. A. (2000). A content analysis of music research with disabled children and youth (1975-1999): Applications in special education. In Effectiveness of Music Therapy Procedures. Documentation of Research and Clinical Practice (3rd ed., pp. 199-264). Silver Spring, MD 20910: American Music Therapy Assn.

This systematic review identifies 148 studies of disabled children and youth published in refereed English language journals between 1975 and 1999 (inclusive). Only papers that reported data and used well-established descriptive or experimental research methodologies were included. A North American bias was apparent in the selection of literature. Jellison identified a balance between articles which described clinical practice (n=72) and empirical articles (n=76) where researchers 'structured music to facilitate the acquisition of academic, social, motor and verbal behaviours' (p. 235) to evaluate outcomes. One hundred and nine of the studies noted the function of music for non-music outcomes. The reports demonstrated that music used as a stimulus cue or prompt, could improve the accuracy of student responses and increase activity levels. It was shown to improve functional hand use, early written communication skills, social skills and comprehension, head posturing, in-seat behaviour, and preacademic skills, and to increase interactions and imitative behaviour. The use of music to facilitate specific behaviours did not reduce the participants' enjoyment of music in other settings.[169]

Lee, J.-y. & McFerran, K. (2012). The improvement of non-verbal communication skills of five females with profound and multiple disabilities using song-choices in music therapy. Voices: A World Forum for Music Therapy, 12(3).

Facilitating the expression of preferences and choices of non-verbal adults who have profound and multiple disabilities is important yet challenging. The present research project aimed to examine whether consistent opportunities for expressing song-choices within music therapy resulted in an improvement in communication abilities of five females with profound and multiple disabilities. A multiple case study design was used. Each participant attended weekly thirty-minute sessions comprising three song-preference assessment sessions followed by ten song-choice intervention sessions. Affective responses to songs in the song-preference assessment were analyzed to identify each participant's preferred songs. Four song-choice opportunities consisting of a pair of preferred and less-preferred songs were offered during the intervention sessions, and intentional choice-making behaviors were facilitated. The descriptive video-analysis of the sessions shows that the participants were able to indicate consistent preferences for songs, make intentional choices of songs, and improve communication skills throughout the ten intervention sessions. Two participants developed clear

[169] McFerran, K. & Rickson, D. (2007). Music therapy in special education: Where are we now? Kairaranga: The New Zealand Journal of Education 8(1), 40-47.

choice-making skills, such as selecting a preferred song-card from two options and alternating eye-gaze between a song-card and the researcher. The other three participants demonstrated idiosyncratic but clear intentional behaviors using body *movements, facial expressions, and vocalizations to indicate choices of preferred songs. Inter-rater reliability was calculated. These results suggest that some adults with profound and multiple disabilities are capable of improving non-verbal communication skills when appropriate interventions and strategies are provided and also highlight the potential of music therapy to promote communication development of these individuals.*

Magee, W. & Bowen, C. (2008). Using music in leisure to enhance social relationships with patients with complex disabilities. NeuroRehabilitation, 23(4), 305-311.

Acquired and complex disabilities stemming from severe brain damage and neurological illness usually affect communication, cognitive, physical or sensory abilities in any combination. Improved understanding of the care needs of people with complex disabilities has addressed many functional aspects of care. However, relatives and carers can be left at a loss knowing how to provide or share in meaningful activities with someone who can no longer communicate or respond to their environment. As a result, the individual with complex needs can become increasingly isolated from their previous support network. Based on theoretical foundations for music as instinctive in human beings, this paper offers practical recommendations for the creative use of music for people with complex physical and sensory needs which prevent active participation in previous leisure pursuits. Recommendations are made for relatives and carers to manage the environment of an individual who has limited capacity to control their environment or make choices about leisure activities. Particular emphasis is given to activities which can be shared between a facilitator and the patient, thereby enhancing social relationships.

McFerran, K. & Rickson, D. (2007). Music therapy in special education: Where are we now? Kairaranga: The New Zealand Journal of Education 8(1), 40-47.

Research is an essential aspect of the music therapy profession. Practice is grounded in theoretical frameworks based on research studies and the evaluation of clinical interventions. Early research drew heavily on behavioural principles, observing measurable change in response to musical interventions. As the profession gained stature, music therapy researchers also began to ask questions requiring in-depth qualitative analysis. Nevertheless, ready acceptance and appreciation of music therapy as a valid service within special education settings in both Australia and New Zealand is variable. Music therapists continue to be challenged to demonstrate the effectiveness of music therapy. The current article outlines the historical precedent for a likely increase in qualitative emphasis, and describes the current knowledge base generated through the literature on the topic of music therapy in special education. It also explores the need for new research in the evidence-based framework and proposes a research path for future studies.

Meadows, T. (1997). Music therapy for children with severe and profound multiple disabilities: a review of literature [online]. Australian Journal of Music Therapy, Vol. 8, No. 1997, 3-17.

One way of presenting the music therapy literature for children with severe and profound multiple disabilities is by goal, orientation and method. This gives an indication of the ways music therapists work with these children, showing both the diversity and similarities in overall approach. Given the diverse goals of music therapists, there seems to be many similarities in the methods used. For example, instrumental and vocal activities were used to meet all the general goals identified in this review. It appears, therefore, that it is not so much the methods that are different as the meaning given to the therapy experience. For example, when a child first plays an instrument independently, it can be framed in two entirely different ways. From a behavioural orientation, it may be an example of following directions and paying attention to the task. From a broader educational perspective (developmental music therapy) on the other hand, it may be the child's first communication of intent

or interaction. The first goal of fulfilling the child's basic needs reflects a developmental music therapy or healing orientation that places an emphasis on the quality of the therapeutic environment and the relationship with the therapist. It has not been identified as a goal when working from other orientations. Taking another perspective, the general goal of developing specific skills means different things in different orientations. From a behavioural orientation, developing skills means targeting and systematically working toward the mastery of a specific skill, task or behavior that was identified by the therapist to meet adaptive or educational needs. Typically, music listening is used to reward or reinforce the child and the music therapist takes on an instructional role. From a healing orientation, developing skills means fostering, allowing and encouraging the child to develop his/her own unique ways of communicating and interacting to become whole. As such, sessions take place spontaneously and develop in unique and unpredictable ways. A central focus is placed on the music as a representation of the process, perhaps without necessity for interpretation or explanation. Further, the therapist uses his/her own experiences to further understand this process.

Montello, L. & Coons, E. E. (1999). Effects of active versus passive group music therapy on preadolescents with emotional, learning, and behavioral disorders. Journal of Music Therapy, 35(1), 49-67.

This study attempted to compare the behavioural effects of active, rhythm-based group music therapy vs. those of passive, listening-based group music therapy on preadolescents with emotional, learning, and behavioural disorders. Twelve music therapy sessions were conducted over a 4-month period with three different groups of subjects (n = 16), with two groups participating in active music therapy and the other receiving passive music therapy. Results indicate that subjects improved significantly after receiving both music therapy interventions. The most significant change in subjects was found on the aggression/hostility scale. These results suggest that group music therapy can facilitate the process of self-expression in emotionally disturbed/learning disabled adolescents and provide a channel for transforming frustration, anger, and aggression into the experience of creativity and self-mastery. Discussion of results also includes recommendations for choosing one music therapy approach over another based on personality types and/or clinical diagnoses of subjects.

Nicholls, T. (2002). 'Could I Play a Different Role?': Group Music Therapy with Severely Learning Disabled Adolescents. In Davies, A. & Richards, E. (Eds.) Music Therapy and Group Work: Sound Company (pp.231-246). London: Jessica Kingsley Publishing.

For severely learning disabled adolescents, music therapy groups can be powerful. It can help them in their search for a 'healthier' way of relating to others, and help to develop both the confidence and the skills for interacting with others. Using improvised music as the medium of exchange can offer the possibility of a different experience in a group, finding freedom of movement and exploring new ways of being. Expressing oneself and relating to others musically is often experienced as easier and less frightening than through impaired verbal communication.

Ockelford, A., Welch, G. & Zimmermann, S. (2002). Music education for pupils with severe or profound and multiple difficulties - current provision and future need. British Journal of Special Education, 29(4), 178-192.

There is a general agreement about the important role that music can play in the education and daily lives of children with severe or profound and multiple learning difficulties. But what are the distinctions and relationships between music education, music therapy and music as a vehicle for other forms of learning, occupation, development or engagement? To what extent are professionals in schools aware of these issues and prepared to explore them from an informed perspective? In this article, Dr Adam Ockelford, Deputy Director of Education and Employment for the Royal National

Institute of the Blind (RNIB), Sally Zimmermann, Music Education and Employment Advisor (RNIB); and Professor Graham Welch, Chair of Music Education and Head of the School of Arts and Humanities, Institute of Education, University of London, present and expand on the key findings from their recent

research project, 'PROMISE', which examined the Provision of Music in Special Education and specifically in schools for pupils with severe or profound and multiple difficulties. The authors conclude their paper with an acknowledgement that a great deal of significant work takes place in these contexts at present but that further research, leading to the provision of new resources for curriculum and staff development, is crucial to the realisation of music's full potential in the lives of pupils with severe and profound and multiple learning difficulties.

Pavlicevic, M., O'Neil, N., Powell, H., Jones, O. & Sampathianaki, E. (2013). Making music, making friends: Long-term music therapy with young adults with severe learning disabilities. Journal of Intellectual Disabilities, Advance online publication.

This collaborative practitioner research study emerged from music therapists' concerns about the value of improvisational, music-centred music therapy for young adults with severe learning disabilities (SLDs), given the long-term nature of such work. Concerns included the relevance, in this context, of formulating, and reporting on, therapeutic aims, development, change; and working in 'goal-oriented' way. Focus groups with the young adults' families and a range of professionals suggest that, rather than leading to developmental change, long-term shared therapeutic musicking provides young adults with ongoing opportunities for experiencing confidence and self-esteem, with feelings of shared acceptance and success, and also provides young adults and their families with opportunities for developing and sustaining friendships. In addition, families experienced meeting other parents and carers in the communal reception area as supportive and countering their isolation. Focus groups assigned intrapersonal, relational and social values to long-term music therapy for young adults with SLDs.

Stalker, K. (1998). Some ethical and methodological issues in research with people with learning difficulties. Disability and Society, 13(1), 5-19.

This paper discusses some ethical and methodological issues which arose in a recent study examining the exercise of choice by people with learning difficulties. The research aimed to examine in detail the choice-making process, and to explore ways of involving people with learning difficulties both as respondents and as contributors to the study design. Various dilemmas were encountered-including how to gain informed consent from people with profound impairment, the risk of intrusion when conducting research in people's own homes, and the dangers of raising expectations of continuing friendship. The importance of accountability when analysing data and disseminating findings is highlighted. A Research Advisory Group, including two people with learning difficulties, was set up to give guidance on the study. Steps were taken, but not enough, to facilitate their involvement in the meetings. Reflecting on experience gained in this study and on research reported elsewhere, a number of pointers for future research are drawn. These include the need to consider the potential implications of intellectual impairment for involvement in the research process.

Toolan, P. & Coleman, S. (1994). Music therapy, a description of process: Engagement and avoidance in five people with learning disabilities. Journal of Intellectual Disability Research, 38, 433-444.

A number of approaches exist within the field of music therapy. Some models for evaluating the efficacy of therapy have been adopted in the UK in recent years. These have measured the occurrence of specific behaviours within therapy, or compared music therapy with other interventions. There is a need to find reasonably reliable methods of describing change and the therapeutic process occurring within music therapy. This paper describes change occurring in five people with learning disabilities, in terms of their levels of engagement in therapy and in the therapeutic relationship. A method is provided to evaluate independent observers' perceptions of change in the patients over a 30-session period of therapy. A significant increase in levels of engagement over time was found. It was also found that the degree of change over time was not related to the mean level of engagement. The present authors discuss some subtle factors involved in therapeutic engagement for the five patients

in the study, and stress the importance of a therapy which emphasizes the dynamics of interpersonal communication for people with limited opportunities to express thoughts and emotions.

Watson, T. (Ed.) (2007). Music Therapy with Adults with Learning Disabilities. Hove: Routledge.

This book brings together an experienced and highly skilled set of music therapists to offer a detailed exploration and understanding of music therapy used with adults with learning disabilities. It offers insights into the role of music therapy in addressing the real and everyday issues that people with learning disability face. Case studies evidence how well music therapy facilitates group dynamics and relationships, the role of music therapy for people with profound and multiple disabilities and the significance of the deep emotional and empathic engagement afforded by music therapy for people with learning disabilities.

Wilson, S. (1991). Music therapy in education. British Journal of Music Therapy, 5(2), 14-17.

This paper discusses the connection between music and the cognitive processes. It refers to learning experiences for children with learning difficulties with special reference to observational and perceptual abilities, interactive processes and memory stimulation. In this context the paper discusses how music can influence and even precipitate awareness.

The paper also discusses the importance of a therapeutic learning environment and the influence of music as a sometimes essential aspect of this environment. It distinguishes between music education and music therapy and points out the relevance of music therapy as an established part of the curriculum in the appropriate setting.

The ideas set out here have been borne out by the writer's work at a treatment centre for children with multiple problems in Toronto, Canada. The primary classroom in this centre incorporates a daily ritual of music. It is at these times that the children's attention is centred.

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APPENDIX 5

MUSIC THERAPY FOR PEOPLE WITH A MENTAL ILLNESS

Featured Research Details

Albornoz, Y. (2011). The Effects of Group Improvisational Music Therapy On Depression In Adolescents And Adults With Substance Abuse: A Randomized Controlled Trial. Nordic Journal Of Music Therapy, Vol. 20, No. 3, 208–224.

The effect of group improvisational music therapy on depression in adolescents and adults with substance abuse was investigated. It was hypothesized that group improvisational music therapy would relieve depressive symptoms. Twenty-four Spanish-speaking patients receiving treatment for substance abuse at Fundación José Felix Ribas (FJFR) in Mérida-Venezuela participated in the study. Participants completed the Beck Depression Inventory (BDI) and the Hamilton Rating Scale for Depression (HRSD) before being randomly assigned to experimental or control groups, each consisting of three cohort groups recruited over a nine-month period. The experimental group received 12 group improvisation sessions over a three-month period, along with the standard treatment program provided at the facility, and the control group received only the standard treatment program. Post-test measures were completed at the end of each three-month treatment cycle. Differences between the groups (pre-test–post-test scores) were calculated (Mann–Whitney U Test). Results showed that both groups were equally matched on all pre-test measures. As for post-test measures, significant differences were found between the groups on HRSD but not the BDI. The experimental group was significantly less depressed after treatment than the control group, as measured by the HRSD. Improvisational music therapy led to statistically significant greater improvements in psychologist-rated depression (HRSD) when compared with the regular treatment program alone; improvisational music therapy had a clinically significant effect. Among limitations of the study were: a small sample size and the absence of a depression assessment tool for substance abuse.

Ansdell, G. & Meehan, J. (2010). ''Some Light at the End of the Tunnel'': Exploring Users' Evidence for the Effectiveness of Music Therapy in Adult Mental Health Settings. Music and Medicine: An Interdisciplinary Journal. Vol 2, No 1.

This study responds to the current demand for evidence of the effectiveness of music therapy in adult psychiatric care and rehabilitation. The qualitative, idiographic, and user-based perspective of the study also responds to the growing requirement that ''evidence-based practice'' take into account patients' needs, experiences, and evaluations of services. The study is based on verbal data from 19 patients with chronic mental health problems who completed at least 10 individual sessions of professional music therapy in a London mental health unit. In-depth analysis of semistructured interviews using interpretive phenomenological analysis elicits patients' experiences of the process of music therapy and its varied benefits for them in relation to their symptoms, coping strategies, and overall quality of life. The data suggest how the approach to music therapy taken in this situation often works in relation to users' long-standing relationship to music, as expressed through their ''music-health-illness narratives.'' Participation in music therapy has benefits in itself but can also help reestablish patients' ongoing use of music as a health- promoting resource and coping strategy in their lives.

Babamohamadi, H., Sotodehasl, N., Koenig, H.G., Al Zaben, F., Jahani, C. & Ghorbani, R. (2016). The Effect of Holy Qur'an Recitation on Depressive Symptoms in Hemodialysis Patients: A Randomized Clinical Trial. Journal of Religion and Health.

Patients with advanced renal failure often face considerable sociopsychological stress as a result of lifestyle changes due to the disease and its treatment. The aim of the present study is to examine the effect of the Holy Qur'an recitation on depressive symptoms in hemodialysis patients. In this clinical trial, 54 hemodialysis patients were randomized to either an experimental (n = 27) or a control (n = 27) group. Patients completed the Beck Depression Inventory-II (BDI-II) at baseline and at 1 month after the intervention. Participants in the experimental group listened to recitation of the Holy Qur'an, while those in the control group received no intervention. The mean BDI-II score at baseline was 33.6 (±6.7) for the experimental group and 29.3 (±9.0) for the control group; at the end of treatment, BDI-II scores in the experimental and control groups were 14.5 (±4.8) and 31.6 (±9.2), respectively. Results from the repeated-measures general linear model controlling for baseline differences indicated a significant treatment effect (F = 9.30, p = 0.004, Cohen's d = 0.85). Holy Qur'an recitation has a significant effect on lowering depressive symptoms in hemodialysis patients. Holy Qur'an recitation is an easy-to-implement and cost-effective strategy that may be used to supplement the treatment of depression in this setting in Iran.

Bodner, E., Iancu, J., Gilboa, A., Sarel, A., Mazor, A. & Amir, D. (2007). Finding words for emotions: The reactions of patients with major depressive disorder towards various musical excerpts. Arts in Psychotherapy, 34(2), 142-50.

This study aims to show that the specific use of sad music in patients with major depressive disorder can circumvent the verbal barrier they typically experience when asked to express their emotions.

We examined the effect of four emotionally distinctive types of music (i.e. happiness, fear, anger, and sadness) on 14 hospitalized patients with major depressive disorder (MDD group) and 31 healthy controls (HC group). Participants were asked to choose emotional descriptors that expressed the feelings that were induced in them by each excerpt. We hypothesized that in the specific case of sad music, patients with MDD would describe the music more vividly than HC participants.

Patients with MDD chose fewer emotional labels than controls in response to angry, scary, and happy excerpts. Patients with MDD and controls chose similar emotional labels in response to sad music, but patients with MDD chose more labels in response to sad music than to any other excerpt, while controls demonstrated the exact opposite pattern.

These findings are in line with clinical descriptions of patients with MDD as demonstrating difficulties in verbalizing their emotions. Their intensified response to sad music is in accordance with their focus on sad cues. The use of sad music in psychotherapy is thus recommended as means of bypassing the verbal barrier experienced by patients with MDD.

Chan, M. F., Wong, Z. Y. & Thayala, N. V. (2011). The effectiveness of music listening in reducing depressive symptoms in adults: A systematic review. Complementary Therapies in Medicine, 19, 6, 332.

This study aimed to review trials of the effectiveness of music listening in reducing depressive symptoms in adults, and identify areas requiring further study. We systematically search 9 databases and reviewed 17 studies included randomized controlled and quasi-experimental trails of music listening in reducing depressive symptoms in adults. The Joanna Briggs Institute-Meta Analysis of Statistics Assessment and Review Instrument was used for quality assessment of included studies.

Music listening over a period of time helps to reduce depressive symptoms in the adult population. Daily intervention does not seem to be superior over weekly intervention and it is recommended that music listening session be conducted repeatedly over a time span of more than 3 weeks to allow an accumulative effect to occur.

Chen, X. J., Leith, H., Aarø, L.E., Manger, T. & Gold, C. (2016). Music therapy for improving mental health problems of offenders in correctional settings: systematic review and meta-analysis. Journal of Experimental Criminology, 12, 2, 209.

The aim of this review was to assess the effectiveness of music therapy on improving the mental health of offenders in correctional settings. Multiple databases and journals were searched to identify randomized controlled trials and quasi-randomized controlled trials of music therapy for offenders in correctional settings.

Five studies (n = 409; predominantly male) were included in random-effects meta-analyses. Music therapy was effective for promoting offenders' self-esteem (Hedges' g = 0.55, p < 0.001) and social functioning (g = 0.35, p < 0.05). Effects on anxiety and depression depended on the number of sessions. For both outcomes, the studies with 20 or more sessions had larger effects than the study that had fewer than 20 sessions, and this difference was statistically significant (Q = 11.88, df = 1, p < 0.001, anxiety; Q = 9.16, df = 1, p = 0.002, depression). No significant effects were found on behavior management or between different music therapy approaches.

Edwards, J. (2014). Music therapy in the treatment and management of mental disorders. Irish Journal of Psychological Medicine, Volume 23, Issue 1, 33-35.

An increasing number of research studies support the benefits of providing music therapy in addition to standard treatment for people who have mental disorders. The objective of this paper was to review and summarise recent research findings in relation to this work.

The findings support a role for music therapy as a structured interaction that patients are able to use to participate successfully, manage some of their symptoms, and express feelings relating to their experiences. Music therapy is demonstrated to be a beneficial intervention for people who have enduring mental illness. Music therapy invites and encourages participation from people of lower functioning levels and employs a non-verbal medium with which people have prior positive associations and in most cases have lifelong experience of using music for self-expression and pleasure. Additionally, the available peer reviewed literature supports the proposition that clinical outcomes are available through the use of music therapy intervention in conjunction with standard, well-established treatment methods.

Erkkilä, J., Punkanen, M., Fachner, J., Ala-Ruona, E., Pöntiö, I., Tervaniemi, M., Vanhala, M. & Gold, C. (2011). Individual music therapy for depression: randomised controlled trial. The British Journal of Psychiatry 199, 132–139.

This study aimed to determine the efficacy of music therapy added to standard care compared with standard care only in the treatment of depression among working-age people.

79 Participants with an ICD–10 diagnosis of depression were randomised to receive individual music therapy plus standard care (20 bi-weekly sessions) or standard care only, and followed up at baseline, at 3 months (after intervention) and at 6 months. Clinical measures included depression, anxiety, general functioning, quality of life and alexithymia.

Participants receiving music therapy plus standard care showed greater improvement than those receiving standard care only in depression symptoms (mean difference 4.65, 95% CI 0.59 to 8.70), anxiety symptoms (1.82, 95% CI 0.09 to 3.55) and general functioning (–4.58, 95% CI –8.93 to –0.24) at 3-month follow-up. The response rate was significantly higher for the music therapy plus standard care group than for the standard care only group (odds ratio 2.96, 95% CI 1.01 to 9.02).

Gold, C. (2007). Music therapy improves symptoms in adults hospitalised with schizophrenia. Evidence-Based Mental Health. 10(3), 77.

This randomised controlled trial implemented across 4 London hospitals over 3 months, involved 81 adult inpatients (>18 years old) with a primary diagnosis of schizophrenia or schizophrenia-like psychosis. Patients were offered weekly, music therapy (access to a range of musical instruments and encouragement to express themselves accompanied by a trained music therapist during weekly individual sessions of up to 45 min) plus standard care (access to occupational, social and other activities and nursing care) versus standard care alone for up to 12 weeks.

In people hospitalised with schizophrenia, adding music therapy to standard care lead to greater improvement in symptoms compared with standard care alone at 12 weeks (change in PANSS total score from baseline: 29.00 with music therapy plus standard care vs 22.96 with standard care alone; p = 0.045). There was no significant difference in patient satisfaction with care and global function between groups (change in CSQ score from baseline: +1.82 with music therapy plus standard care vs +0.33 with standard care alone; reported as non-significant; change in GAF score from baseline: +4.74 with music therapy plus standard care vs +4.60 with standard care; reported as non-significant).

Gold, C., Assmus, J., Hjørnevik, K., Gunnhild Qvale, L., Kirkwood Brown, F., Lill Hansen, A., Waage, L. & Stige, B. (2014). Music Therapy for Prisoners: Pilot Randomised Controlled Trial and Implications for Evaluating Psychosocial Interventions. International Journal of Offender Therapy and Comparative Criminology, 2014 vol. 58 no. 12, 1520-1539.

Mental health problems are common among prison inmates. Music therapy has been shown to reduce mental health problems. It may also be beneficial in the rehabilitation of prisoners, but rigorous outcome research is lacking. We compared group music therapy with standard care for prisoners in a pilot randomised controlled trial that started with the establishment of music therapy services in a prison near Bergen in 2008. In all, 113 prisoners agreed to participate. Anxiety (STAI-State [State–Trait Anxiety Inventory], STAI-Trait), depression (HADS-D [Hospital Anxiety and Depression Scale]), and social relationships (Quality of Life Enjoyment and Satisfaction Questionnaire [Q-LES-Q]) were assessed at baseline; every 2 weeks in the experimental group; after 1, 3, and 6 months in the control group; and at release. No restrictions were placed on the frequency, duration, or contents of music therapy. Duration of stay in the institution was short (62% stayed less than 1 month). Only a minority reached clinical cutoffs for anxiety and depression at baseline. Between-group analyses of effects were not possible. Music therapy was well accepted and attractive among the prisoners. Post hoc analysis of within-group changes suggested a reduction of state anxiety after 2 weeks of music therapy (d = 0.33, p = .025). Short sentences and low baseline levels of psychological disturbance impeded the examination of effects in this study. Recommendations for planning future studies are given, concerning the careful choice of participants, interventions and settings, comparison condition and design aspects, choice of outcomes, and integration of research approaches. Thus, the present study has important implications for future studies evaluating interventions for improving prisoners' mental health.

Gold, C., Heldal, T. O., Dahle, T. & Wigram, T. (2005). Music therapy for schizophrenia or schizophrenia-like illnesses. Cochrane Database of Systematic Reviews, 3.

A review of all randomised controlled trials that compared music therapy with standard care or other psychosocial interventions for schizophrenia, to identify the effects of music therapy, or music therapy added to standard care, compared to placebo, standard care or no treatment for people with serious mental illnesses such as schizophrenia.

Conclusions: Music therapy as an addition to standard care helps people with schizophrenia to improve their global state and may also improve mental state and functioning if a sufficient number of music therapy sessions are provided. Further research should address the dose-effect relationship and the long-term effects of music therapy.

Gold, C., Solli, H.P., Kruger, V. et al. (2009). Dose-response relationship in music therapy for people with serious mental disorders: systematic review and meta-analysis. Clinical Psychology Review,29, 193–207.

Serious mental disorders have considerable individual and societal impact, and traditional treatments may show limited effects. Music therapy may be beneficial in psychosis and depression, including treatment-resistant cases. The aim of this review was to examine the benefits of music therapy for people with serious mental disorders. All existing prospective studies were combined using mixed-effects meta-analysis models, allowing to examine the influence of study design (RCT vs. CCT vs. pre-post study), type of disorder (psychotic vs. non-psychotic), and number of sessions. Results showed that music therapy, when added to standard care, has strong and significant effects on global state, general symptoms, negative symptoms, depression, anxiety, functioning, and musical engagement. Significant dose–effect relationships were identified for general, negative, and depressive symptoms, as well as functioning, with explained variance ranging from 73% to 78%. Small effect sizes for these outcomes are achieved after 3 to 10, large effects after 16 to 51 sessions. The findings suggest that music therapy is an effective treatment which helps people with psychotic and non-psychotic severe mental disorders to improve global state, symptoms, and functioning. Slight improvements can be seen with a few therapy sessions, but longer courses or more frequent sessions are needed to achieve more substantial benefits.

Grocke, D. Bloch, S. & Castle, D. (2009). The Effect of Group Music Therapy on Quality of Life for Participants Living with a Severe and Enduring Mental Illness. Journal of Music Therapy, 46 (2), 90-104.

A 10-week group music therapy project was designed to determine whether music therapy influenced quality of life and social anxiety for people with a severe and enduring mental illness living in the community. Ten one-hour weekly sessions including song singing, song writing and improvisation, culminated in each group recording original song/s in a professional studio. The principal outcome measure was the WHOQOLBREF Quality of Life (QoL) Scale; other instruments used were the Social Interaction Anxiety Scale (SIAS) and the Brief Symptom Inventory (BSI). Qualitative data were gathered through focus group interviews and an analysis of lyric themes. Statistically significant improvement was found on five items of the QoL Scale. There were no changes on the BSI indicating that QoL improvement was not mediated by symptomatic change. Themes from the focus groups were: music therapy gave joy and pleasure, working as a team was beneficial, participants were pleasantly surprised at their creativity, and they took pride in their song. An analysis of song lyrics resulted in 6 themes: a concern for the world, peace and the environment; living with mental illness is difficult; coping with mental illness requires strength; religion and spirituality are sources of support; living in the present is healing; and working as a team is enjoyable.

Hakvoort, L., Bogaerts, S., Thaut, M. & Spreen, M. (2015). Influence of Music Therapy on Coping Skills and Anger Management in Forensic Psychiatric Patients. International Journal of Offender Therapy and Comparative Criminology, July, vol. 59 no. 8, 810-836.

The effect of music therapy on anger management and coping skills is an innovative subject in the field of forensic psychiatry. This study explores the following research question: Can music therapy treatment contribute to positive changes in coping skills, anger management, and dysfunctional behavior of forensic psychiatric patients? To investigate this question, first a literature review is offered on music therapy and anger management in forensic psychiatry. Then, an explorative study is presented. In the study, a pre- and post-test design was used with a random assignment of patients to either treatment or control condition. Fourteen participants' complete datasets were collected. All participants received "treatment as usual." Nine of the participants received a standardized, music therapy anger management program; the five controls received, unplanned, an aggression management program. Results suggested that anger management skills improved for all participants. The improvement of positive coping skills and diminishing of avoidance as a coping skill were measured to show greater changes in music therapy participants. When controlling for the exact

number of treatment hours, the outcomes suggested that music therapy might accelerate the process of behavioral changes.

Hannibal, N., Pedersen, I. N., Hestbæk, T., Egelund, T. & Munk Jørgensen, P. (2012). Schizophrenia and personality disorder patients' adherence to music therapy. Nordic Journal of Psychiatry, Vol. 66, Nr. 6, 376–379.

Background: Music therapy is used in psychiatric treatment of severe psychiatric conditions such as schizophrenia, depression and personality disorder. Aim: To investigate adherence and predictors for adherence to music therapy treatment in patients diagnosed with schizophrenia or personality disorder. Method: Demographic, psychiatric and therapeutic data were collected for 27 patients receiving music therapy treatment over a 1-year observation period and a 1-year follow-up period. Predictors for adherence to music therapeutic treatment were determined by means of regression analysis. Results: Drop-out from treatment was low (11.5%) and none of the variables significantly predicted adherence. Lack of significance may be because of type 2 error. Conclusion: Patients with severe mental disorder may adhere to music therapy treatment.

Hsu, W-C. & Lai, H-L. (2004). Effects of music on major depression in psychiatric inpatients. Archives of Psychiatric Nursing Volume 18, Issue 5, October, 193–199.

The study was to assess the effectiveness of soft music for treatment of major depressive disorder inpatients in Kaohsiung City, Taiwan. A pretest-posttest with a two-group repeated measures design was used. Patients with major depressive disorder were recruited through referred by the psychiatric physicians. Subjects listened to their choice of music for 2 weeks. Depression was measured with the Zung's Depression Scale before the study and at two weekly posttests. Using repeated measures ANCOVA, music resulted in significantly better depressive scores, as well as significantly better subscores of depression compared with controls. Depression improved weekly, indicating a cumulative dose effect. The findings provide evidence for psychiatric nurses to use soft music as an empirically based intervention for depressed inpatients.

Kamioka, H., Tsutani, K., Yamada, M., Park, H., Okuizumi, H., Tsuruoka, K., Honda, T., Okada, S., Park S.J., Kitayuguchi, J. et al. (2014). Effectiveness of music therapy: a summary of systematic reviews based on randomized controlled trials of music interventions. Patient Prefer Adherence, 8, 727–54.

This systematic review was to summarize evidence for the effectiveness of music therapy (MT) and to assess the quality of systematic reviews (SRs) based on randomized controlled trials (RCTs).

21 Randomised Controlled Trials studies were included, all of which had at least one treatment group in which MT was applied. We searched the following databases from 1995 to October 1, 2012: MEDLINE via PubMed, CINAHL (Cumulative Index of Nursing and Allied Health Literature), Web of Science, Global Health Library, and Ichushi-Web. We also searched all Cochrane Database and Campbell Systematic Reviews up to October 1, 2012. Based on the International Classification of Diseases, 10th revision, we identified a disease targeted for each article.

This comprehensive summary of systematic reviews demonstrated that music therapy treatment improved the following: global and social functioning in schizophrenia and/or serious mental disorders, gait and related activities in Parkinson's disease, depressive symptoms, and sleep quality. MT may have the potential for improving other diseases, but there is not enough evidence at present. Most importantly, no specific adverse effect or harmful phenomenon occurred in any of the studies, and MT was well tolerated by almost all patients.

Koelsch, S. (2010). Towards a neural basis of music-evoked emotions. Trends in Cognitive Sciences, 14, 3, 131.

Music is capable of evoking exceptionally strong emotions and of reliably affecting the mood of individuals. Functional neuroimaging and lesion studies show that music-evoked emotions can modulate activity in virtually all limbic and paralimbic brain structures. These structures are crucially involved in the initiation, generation, detection, maintenance, regulation and termination of emotions that have survival value for the individual and the species. Therefore, at least some music-evoked emotions involve the very core of evolutionarily adaptive neuroaffective mechanisms. Because dysfunctions in these structures are related to emotional disorders, a better understanding of music-evoked emotions and their neural correlates can lead to a more systematic and effective use of music in therapy.

Maratos. A., Gold. C., Wang, X. & Crawford, M. (2008). Music therapy for depression. Cochrane Database of Systematic Reviews, Issue 1. Art. No.: CD004517.

This review aimed to identify randomised controlled trials and controlled clinical trials examining the efficacy of music therapy in reducing the symptoms of clinical depression, to compare efficacy of music therapy plus standard care with standard care alone or with other psychological or pharmacological therapies and to compare efficacy of different forms of music therapy.

Five studies met the inclusion criteria of the review. Marked variations in the interventions offered and the populations studied meant that meta-analysis was not appropriate. Four of the five studies individually reported greater reduction in symptoms of depression among those randomised to music therapy than to those in standard care conditions. The fifth study, in which music therapy was used as an active control treatment, reported no significant change in mental state for music therapy compared with standard care. Dropout rates from music therapy conditions appeared to be low in all studies.

Findings from individual randomised trials suggest that music therapy is accepted by people with depression and is associated with improvements in mood. However, the small number and low methodological quality of studies mean that it is not possible to be confident about its effectiveness. High quality trials evaluating the effects of music therapy on depression are required.

McCaffrey, T., Edwards, J. & Fannon, D. (2011). Is there a role for music therapy in the recovery approach in mental health? The Arts in Psychotherapy, Vol. 38, Issue 3, July, 185–189.

The recovery approach in mental health care emphasises the importance of the service user leading a fulfilling, meaningful life beyond the limitations of illness or symptomatology. This approach to care is increasingly included as a central part of mental health policy and service provision in a number of countries including the UK and Ireland, to address the needs of people who have severe and enduring mental disorders. It is an autonomous, holistic and empowering way of working with individuals as they journey towards healing. Fundamental to this model is the relationship fostered between service users and health professionals. The recovery philosophy of care mirrors some of the core principles of music therapy, including the importance of the therapeutic relationship and the possibilities for change and growth within this. This paper explores the congruence between music therapy and the recovery approach by providing: (1) An overview of current published evidence for music therapy in mental health care. (2) A discussion of this psycho-social creative arts therapy intervention within the specialized area of recovery in psychiatry, and (3) case vignettes to illustrate the application of this philosophy in music therapy work within a recovery service.

Montello, L. M. & Coons, E. E. (1998). Effect of active versus passive group music therapy on preadolescents with emotional, learning, and behavioral disorders. Journal of Music Therapy, 35, 49–67.

This study attempted to compare the behavioral effects of active, rhythm-based group music therapy vs. those of passive, listening-based group music therapy on preadolescents with emotional, learning, and behavioral disorders. It was hypothesized that preadolescents who participated in active music

therapy would more significantly improve target behaviors than those involved in passive music therapy Achenbach's Teacher Report Form (TRF) was used to confirm changes among subjects in attention, motivation, and hostility as rated by homeroom teachers. Twelve music therapy sessions were conducted over a 4-month period with three different groups of subjects (n = 16), with two groups participating in active music therapy and the other receiving passive music therapy. Results indicate that subjects improved significantly after receiving both music therapy interventions. The most significant change in subjects was found on the aggression/hostility scale. These results suggest that group music therapy can facilitate the process of self-expression in emotionally disturbed/learning disabled adolescents and provide a channel for transforming frustration, anger, and aggression into the experience of creativity and self-mastery. Discussion of results also includes recommendations for choosing one music therapy approach over another based on personality types and/or clinical diagnoses of subjects.

Mössler, K., Assmus, J., Heldal, T.O., Fuchs, K. & Gold, C. (2012). Music therapy techniques as predictors of change in mental health care. The Arts in Psychotherapy Volume 39, Issue 4, September, 333–341.

The application of music in therapy is realised through different working modalities which can be categorised into three types of techniques: production, reception, and reproduction. These techniques are commonly used in mental health settings in music therapy practice and previous research suggests that specific working modalities might be important predictors of change in music therapy. However, little is known about which ingredients specifically contribute to the outcomes of music therapy. This study aimed to investigate the application of music therapy techniques and whether they predict changes in clinical outcomes in mental health settings with individuals displaying a low therapy motivation. Participants (N = 31) were assessed before, during, and after participating in individual music therapy. Music therapy techniques were assessed for three selected therapy sessions per participant. Associations between music therapy techniques and outcomes were calculated using linear models with repeated measures. Results showed that reproduction techniques were used most intensely. In addition, relational competencies (interpersonal and social skills) amongst the participants improved when focusing on reproducing music (e.g. singing or playing familiar songs, learning musical skills). Results indicated that reproduction music therapy techniques may foster the development of relational competencies in individuals with low motivation.

Mössler, K., Chen, X., Heldal, T.O. & Gold, C. (2011). Music therapy for people with schizophrenia and schizophrenia-like disorders. Cochrane Database of Systematic Reviews, Issue 12. Art. No.: CD004025.

A review of the effects of music therapy, or music therapy added to standard care, compared with 'placebo' therapy, standard care or no treatment for people with serious mental disorders such as schizophrenia.

Conclusions: Music therapy as an addition to standard care helps people with schizophrenia to improve their global state, mental state (including negative symptoms) and social functioning if a sufficient number of music therapy sessions are provided by qualified music therapists. Further research should especially address the long-term effects of music therapy, dose-response relationships, as well as the relevance of outcomes measures in relation to music therapy.

Odell-Miller, H. (1995). Why Provide Music Therapy in the Community for Adults with Mental Health Problems? British Journal of Music Therapy, June, vol. 9, no. 1, 4-10.

This paper describes music therapy within a community mental health setting for adults using a care programme approach in England. It describes the setting, and emphasises the importance of multidisciplinary teamwork in order to enable music therapy to be effective. It provides some statistics and descriptive clinical information which demonstrate the efficacy of music therapy for adults with long-term mental health problems, and argues that music therapy should be apriority for this client

group. To support these points of view, the article includes a case study showing a psychoanalytically informed approach in music therapy. This paper was given as a keynote address at the 1994 Australian Conference of Music Therapy.

Within the paper a small survey shows that 90% of long-term chronically ill people who engaged in music therapy for periods of two to four years, once or twice a week, individually and in groups, had a regular pattern of breakdown and admission to hospital before embarking on therapy, and a decrease (and often cessation), after embarking on a period of music therapy.

Pasiali, V. (2014). Music therapy and attachment relationships across the life span. Nordic Journal of Music Therapy, 23, 3, 202.

Attachment refers to the quality of relationships that humans form across their life span. In music therapy, a growing body of clinical work focusing on attachment is emerging. Because participation in music therapy can promote positive and meaningful interactions over time, it creates a context for developing healthy relationships. Drawing on insights afforded from the fields of psychology and social neuroscience, the purpose of this paper is to articulate an emerging conceptual model on how music therapy interventions may target attachment across the life span. By reviewing and synthesizing current literature, the author aims to expand theoretical underpinnings that inform the work of therapists. Music-based interventions create a context-fostering attachment by: (1) supporting parent co-regulation and mutual responsiveness, (2) rebuilding capacity to form or restore relationships, (3) reducing stress and mood disturbances, (4) supporting healthy partner interactions by enhancing communication skills, and (5) providing social support and building coping skills among families and individuals who are facing challenging life circumstances. The author organizes and interprets the information to outline different layers of prevention interventions and exemplify how music-based experiences may influence attachment relationships at different life stages.

Pavlicevic, M., Trevarthen, C. & Duncan, J. (1994). Improvisational music therapy and the rehabilitation of persons suffering from chronic schizophrenia. Journal of Music Therapy, 31(2), 86–104.

Persons suffering from chronic schizophrenia characteristically show signs of social withdrawal and emotional flattening. Music therapy, which makes use of spontaneous musical improvisation to establish a nonverbal interaction between therapist and person, encourages persons to develop their interactive capacities. This study shows that patients suffering from schizophrenia who attended a series of individual music therapy sessions improved in their clinical status and in their level of musical interaction with the therapist. The results suggest that music therapy can play a role in the rehabilitation of chronic schizophrenics.

Pellitier, C. L. (2004). The effect of music on decreasing arousal due to stress: A meta-analysis. Journal of Music Therapy, 42, 192-214.

A meta-analytic review of research articles using music to decrease arousal due to stress was conducted on 22 quantitative studies. Results demonstrated that music alone and music assisted relaxation techniques significantly decreased arousal (d = +.67). Further analysis of each study revealed that the amount of stress reduction was significantly different when considering age, type of stress, music assisted relaxation technique, musical preference, previous music experience, and type of intervention. Implications and suggestions for future research are discussed.

Silverman, M. J. (2003). The influence of music on the symptoms of psychosis: A meta-analysis. Journal of Music Therapy, 40(1), 27–40.

The purpose of this study was to analyze the existing quantitative research evaluating the influence of music upon the symptoms of psychosis. A meta-analysis was conducted on 19 studies. Results indicated that music has proven to be significantly effective in suppressing and combating the symptoms of psychosis (d = +0.71). However, there were no differing effects between live versus

recorded music and between structured music therapy groups versus passive listening. Nor were there differing effects between preferred versus therapist-selected music. Additionally, classical music did not prove as effective as nonclassical music in reducing psychotic symptoms. This supports the therapeutic potential of popular music while dispelling the theory that classical music provides the form and structure that can contribute to mental health and well-being. Further quantitative research is recommended and strongly warranted to refine unique aspects of music therapy interventions effective for those with psychotic symptoms.

Silverman, M.J. (2006). Psychiatric patients' perception of music therapy and other psychoeducational programming. Journal of Music Therapy, 43(2), 111-22.

The purpose of this study was to quantitatively evaluate psychiatric patients' perception of their psychoeducational programming. Participants (N = 73) completed a survey rating on each class/therapy in which they were enrolled and its helpfulness. Participants answered questions concerning which class/therapy addressed specific psychiatric deficit areas most effectively. Results indicated that participants rated music therapy as significantly more helpful than all other programming ($p < .05$). Further analyses indicated that participants admitted to a psychiatric institution only once rated their classes as more helpful when compared to participants who had been admitted multiple times. Additionally, participants who were minorities rated programming as more helpful than participants who were Caucasian. Participants consistently rated music therapy as more effective than other programming in addressing specific psychiatric deficit areas. Additionally, 57% of participants noted that music therapy was their favorite class/therapy. Reasons for these discrepancies are discussed and suggestions for future research are made.

Talwar, N., Crawford, M.J., Maratos, A., Nur, U., Mcdermott, O. & Procter, S (2006). Music therapy for in-patients with schizophrenia. Exploratory randomised controlled trial. The British Journal of Psychiatry, 189, 405–409.

This study aimed to examine the feasibility of a randomised trial of music therapy for inpatients with schizophrenia, and explore its effects on mental health.

Up to 12 weeks of individual music therapy plus standard care were compared with standard care alone. Masked assessments of mental health, global functioning and satisfaction with care were conducted at 3 months. Of 115 eligible patients 81 (70%) were randomised. Two-thirds of those randomised to music therapy attended at least four sessions (median attendance, eight sessions). Multivariate analysis demonstrated a trend towards improved symptom scores among those randomised to music therapy, especially in general symptoms of schizophrenia.

Tang, W., Yao, X. & Zheng, Z. (1994). Rehabilitative effect of music therapy for residual schizophrenia: A one-month randomised controlled trial in Shanghai. British Journal of Psychiatry, 165(Suppl. 24), 38–44.

Discusses the results of a study on the usefulness of music therapy (MT) for patients with residual schizophrenia. 76 inpatient Ss participated; the experimental group received a 1-mo course of MT that included both passive listening to music and active participation in the singing of popular songs with other Ss. MT significantly diminished Ss' negative symptoms, increased their ability to converse with others, reduced their social isolation, and increased their level of interest in external events.

Thaut, M. H. (1989). The influence of music therapy interventions on self-rated changes in relaxation, affect, and thought in psychiatric prisoner-patients. Journal of Music Therapy, 26, 155–166.

This study attempted to measure self-perceived changes in states of relaxation, mood/emotion, and thought/insight in psychiatric prisoner-patients before and after music therapy. Three scales were used to measure the changes; scales were derived from a survey of 130 prisoner-patients concerning the perceived therapeutic benefit of participating in music therapy. The study was conducted over a 3-month period with eight different groups of patients (N = 50), with each group participating in three

different treatment modalities: music group therapy, instrumental group improvisation, and music and relaxation. Results showed a significant change ($p < .05$) in self-perceived ratings across all scales before versus after music therapy. The magnitude of change differed significantly ($p < .05$) between scales. All eight groups showed similar responses, and the different treatment modalities did not significantly influence the results.

Trimmer, C., Tyo, R. & Naeem, F. (2016). Cognitive Behavioural Therapy-Based Music (CBT-Music) Group for Symptoms of Anxiety and Depression. Canadian Journal of Community Mental Health, 1.

Cognitive behavioural therapy-based music (CBT-Music) group is a nine-week guided self-help group for individuals with mild-to-moderate symptoms of anxiety and/or depression. This is a novel treatment developed for use in a community-based mental health setting. A feasibility study (a randomized control trial) has shown promising results for the CBT-Music group.

Ulrich, G, Houtmans, T. & Gold, G. (2007). The additional therapeutic effect of group music therapy for schizophrenic patients: a randomized study. Acta Psychiatrica Scandinavica, 116, 362–370.

Schizophrenia is one of the most serious mental disorders. Music therapy has only recently been introduced as a form of treatment. The aim of this study was to examine the effect of music therapy for schizophrenic in-patients needing acute care. Thirty-seven patients with psychotic disorders were randomly assigned to an experimental group and a control group. Both groups received medication and treatment indicated for their disorder. Additionally, the experimental group (n = 21) underwent group music therapy.

Significant effects of music therapy are found in patients' self-evaluation of their psychosocial orientation and for negative symptoms. No differences were found in the quality of life. Musical activity diminishes negative symptoms and improves interpersonal contact. These positive effects of music therapy could increase the patient's abilities to adapt to the social environment in the community after discharge from the hospital.

You, Z. Y. & Wang, J. Z. (2002). Zhongguo yi xue ke xue yuan xue bao. [Metaanalysis of assisted music therapy for chronic schizophrenia], 24(6), 564–567. Institute of Evidence-Based Medicine, Shandong University, Jinan 250012, China.

OBJECTIVE: To evaluate the effect of assisted music therapy for chronic schizophrenia. METHODS: 11 articles including 603 chronic schizophrenia patients were meta-analyzed using fixed effect model or random effect model. RESULTS: 6 randomized controlled trials were synthesized, showing that the difference was significant in statistics between experimental group (patients with music and drugs therapy) and control group (patients with drugs therapy only). Both the scores of SANS and BPRS for the control group were higher than those for the experimental group (SANS, d = 0.68; 95%CI: 0.46-0.90 and BPRS, d = 0.44; 95%CI: 0.06-0.82). In addition, the scores of both SANS and BPRS for the pre-test were higher than those for the post-test (SANS, d = 1.17; 95%CI: 0.02-2.32 and BPRS, d = 2.05; 95%CI: 0.28-3.82). CONCLUSION: The short-term effect of assisted music therapy is positive for chronic schizophrenia, but the long-term effect is still to be further studied.

Zhao, K., Bai, Z.G., Bo, A. & Chi, I. (2016). A systematic review and meta-analysis of music therapy for the older adults with depression. International Journal of Geriatric Psychiatry.

This study (a systematic review and meta-analysis of randomized controlled trials) strove to determine the efficacy of music therapy in the management of depression in the elderly. Change in depressive symptoms was measured with various scales. Standardized mean differences were calculated for each therapy–control contrast.

A comprehensive search yielded 2,692 citations; 19 articles met inclusion criteria. Meta-analysis suggests that music therapy plus standard treatment has statistical significance in reducing depressive

symptoms among older adults (standardized mean differences = 1.02; 95% CI = 0.87, 1.17). This systematic review and meta-analysis suggests that music therapy has an effect on reducing depressive symptoms to some extent. However, high-quality trials evaluating the effects of music therapy on depression are required.

Other Research

Aalbers, S., Spreen, M., Bosveld-van Haandel, L. & Bogaerts, S. (2016). Evaluation of client progress in music therapy: an illustration of an N-of-1 design in individual short-term improvisational music therapy with clients with depression. Nordic Journal of Music Therapy, 1.

Bunt, L., Pike, D. & Wren, V. (1987). Music Therapy in a General Hospital's Psychiatric Unit — A 'Pilot' Evaluation of An Eight Week Programme. British Journal of Music Therapy December vol. 1 no. 2, 22-27.

Chan, M. F., Chan, E. A. & Mok, E. (2010). Effects of music on depression and sleep quality in elderly people: A randomised controlled trial, Complementary Therapies in Medicine, 18, 3-4, 150.

Cohen, G.D., Perlstein, S., Chapline, J., Kelly, J., Firth, K. & Simmens, S. (2006). The Impact of Professionally Conducted Cultural Programs on the Physical Health, Mental Health, and Social Functioning of Older Adults. The Gerontologist, 46 (6), 726-734.

Field, T., Martinez, A., Nawrocki, T., Pickens, J., Fox, N. A. & Schanberg, S. (1998). Music shifts frontal EEG in depressed adolescents. Adolescence, 33(129), 109–116.

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APPENDIX 6

MUSIC THERAPY FOR PEOPLE LIVING WITH DEMENTIA

Featured Research Details

Ashida, S. (2000). The effect of reminiscence music therapy sessions on changes in depressive symptoms in elderly persons with dementia. Journal of Music Therapy, 37(3), 170-182.

This study examined the effectiveness of reminiscence focused music therapy treatment on depressive symptoms in elderly people with dementia. Twenty elderly (3 mate & 17 female) who were diagnosed as having dementia and residing at 2 different residential care facilities in Florida were assigned to 1 of 4 small groups. Each of the participants served as his or her own control in an O1 O2 × O3 design. The depressive symptoms were measured using Cornell Scale for Depression in Dementia*. The differences between the scores of pretest, posttest 1 after a week of 5-day no treatment, and posttest 2 after a week of 5-day reminiscence focused music therapy treatment were compared. A one-way analysis of variance (ANOVA) and Newman-Keuls Multiple Comparison Procedure indicated statistically significant differences between pretest and posttest 2 as well as posttest 1 and posttest 2, while no significant differences were found between pretest and posttest 1. Results indicated that participation in small group reminiscence focused music therapy groups might help to reduce depressive symptoms in elderly people with dementia. Results of behavioral observations and future implications are also discussed.*

Baker, F. A. & Ballantyne, J. (2013). "You've got to accentuate the positive": Group songwriting to promote a life of enjoyment, engagement and meaning in aging Australians. Nordic Journal of Music Therapy, 22(1), 7-24.

This study investigated whether group songwriting and performing affects people's perceptions of quality of life and feelings of connectedness in a community of retirees. An inductive thematic analysis of data transcripts from focus groups and written questionnaires from participants and students involved in the project were undertaken, and categories generated interpreted within the framework of positive psychology. Participants reported that the programme stimulated their enjoyment, positively affected emotions and improved wellbeing. They experienced enhanced connection with each other and with others in the broader community. They experienced a sense of accomplishment, meaning, and engagement in creating and performing their own songs.

Brotons, M. & Pickett-Cooper, P. (1996) The effects of music therapy intervention on agitation behaviours of Alzheimer's disease patients. Journal of Music Therapy, 33, 2-18.

*The purpose of this study was to examine the effects of live music therapy on agitation behavior of Alzheimer's Disease (AD) patients during and after music therapy intervention. A second purpose was to determine if there was a difference in the effect of music therapy between those patients who had a musical background and those who did not. A third purpose was to examine if there was a difference between music therapists' and caregivers' post-music therapy agitation scores. Agitation behavior in this study was defined as overt behavior that indicates restlessness, hyperactivity, or subjective distress. The dependent measures included: (a) scores on the Agitation Behavior Scale, and (b) number of dosages of PRN medication. Subjects for this study were 20 residents, 17 females and 3 males, from four different facilities in the Northwest. Their age range was 70 to 96(*M *= 82,* SD *= 6.57). The criteria for selection were: (a) A primary diagnosis of dementia with strong medical and behavioral indications that a post mortem examination would indicate the patients' presenting problems were the result of Alzheimer's disease, (b) the presence of agitation, (c) sufficient verbal ability to answer simple social and activity questions, and (c) the written consent of the patient's guardian or representative.*

Subjects, grouped by three or four, participated twice a week for 30 minutes for a total of five music therapy sessions. Caregivers having close contact with patients rated subjects' agitation behavior based on their observation of the subjects' behavior during the morning just prior to the beginning of music therapy (baseline). Music therapy sessions were videotaped for post-hoc agitation behavior analysis during music therapy, and for reliability purposes. Once music therapy sessions were over, subjects' behavior was observed for the next 20 minutes by a music therapist and a caregiver. In addition, subjects' charts were reviewed weekly to note the number of dosages of PRN medication administered each day of the week. The results of a two-factor analysis of variance with repeated measures show no effects with respect to music background (F_1 *= 1.79,* p *= .20), but identify significant main effects of agitation behavior (*F_3 *= 16.33,* p *= .0001). Subsequent Fisher PLSD tests indicate that subjects appeared significantly more agitated before music therapy (*M *= 11.46) than during either of the two music therapy observations (*M *= 7.68 &* M *= 7.52, respectively) and after music therapy sessions (*M *= 8.37). No two-way interaction between music background and agitation behavior (*F_3 *= 1.34,* p *= .28) was noted. Results of an independent* t *test between music therapists and caregivers post-music therapy agitation scores indicate no significant differences between scores [*t*(78) = .67,* p *= .50]. Implications for music therapy practice are discussed.*

Brotons M. & Marti, P. (2003). Music therapy with Alzheimer's patients and their family caregivers: a pilot project. Journal of Music Therapy 40(2), 138-150.

The purpose of this paper is to present the results of a pilot project sponsored by a private foundation in Spain ("Fundació la Caixa"), in order to demonstrate some of the applications of music therapy, and to measure more systematically some of its effects on people with a probable diagnosis of Alzheimer's Disease and Related Disorders (ADRD) in early-moderate stages of the disease, and their family caregivers. Subjects for this project were 14 patients (5 women and 9 men) with a probable diagnosis of Alzheimer's disease, and 14 family caregivers (9 women and 5 men) from a rural area outside of Barcelona. Their age range was 70 to 80 years. Prior to the beginning of the project, a neuropsychologist specialized in gerontology administered a series of standardized tests to the participants. These same tests were administered again 2 days before the end of the project and 2 months later for follow-up purposes. The results of the satisfaction questionnaire showed that the caregivers perceived an improvement in the social and emotional areas of their patients, and statistical tests showed significant differences between pre and posttest scores in the following tests: (a) Dementia Scale (X^2 *= 12.29,*p *= .002), (b) NPI (*X^2 *= 17.72,* p *= .001), (c) the Cohen-Mansfield agitation scale (*X^2 *= 11.45,* p *= .003), (d) Burden Interview (*X^2 *= 9.19,* p *= .01), (e) Memory and Behavior Problems Checklist (frequency subscale) (*X^2*= 11.09,* p *= .004), (f) STAI-S (*X^2 *= 14.72,* p *= .001), and (g) Beck's Depression Inventory (*X^2 *= 9.38,* p *= .009). These results and their implications are discussed extensively.*

Brotons, M. (2000). An Overview of the Music Therapy Literature Relating to Elderly People. In Aldridge, D. (Ed.) Music Therapy in Dementia Care (pp. 33-62). London: Jessica Kingsley Publishing.

Objectives: *The aim of this overview is to present the developments of music therapy in France, its techniques, mechanisms and principal indications, mainly in the context of Alzheimer's disease.*

Methods: *An international review of the literature on music therapy applied to Alzheimer's disease was conducted using the principal scientific search engines. A work group of experts in music therapy and psychosocial techniques then considered the different points highlighted in the review of literature and discussed them.*

Results and Discussion: *Clinical and neurophysiological studies have enlightened some positive benefits of music in providing support for people with Alzheimer's disease or related disorders. Music therapy acts mainly through emotional and psycho-physiological pathways. It includes a series of techniques that can respond to targeted therapeutic objectives. Some studies have shown that music therapy*

reduces anxiety, alleviates periods of depression and aggressive behaviour and thus significantly improves mood, communication and autonomy of patients.

Conclusion: *Psychosocial interventions, such as music therapy, can contribute to maintain or rehabilitate functional cognitive and sensory abilities, as well as emotional and social skills and to reduce the severity of some behavioural disorders.*

Brotons, M. & Koger, S. M. (2000). The impact of music therapy on language functioning in dementia. Journal of Music Therapy, 37(3), 183-195.

*Dementias, such as Alzheimer's disease, include a progressive deterioration of language functioning. While some researchers have reported an increase in patients' self-expression following music therapy, it is not clear whether these changes specifically reflect improved language skills or whether simple interpersonal interaction with a therapist could account for the improvement. In this study, the effects of music therapy were compared to conversational sessions on language functioning in dementia patients. Participants were selected according to the following criteria: (a) residing in a facility specializing in Alzheimer's and related disorders; (b) possessing sufficient verbal ability to answer simple questions and to comply with requests to speak, participate, or sit down; and (c) attaining the written consent of the patient's guardian or representative. All participants had been in music therapy twice per week for at least 3 months prior to the study onset. One week prior to the beginning of the study, subjects were assessed for cognitive functioning using the Mini-Mental State Examination (MMSE), and language ability via the Western Aphasia Battery (WAB). A within-subjects design was used, with order of condition (music or group conversation first) counter-balanced between participants. Subjects participated in groups of 2 to 4, twice per week for 20–30 minutes for a total of 8 sessions (4 music therapy and 4 conversation sessions or vice-versa), and were re-tested on the WAB at the end of each 2 week (4 session) interval. Results from 20 participants revealed that music therapy significantly improved performance on both speech content and fluency dimensions of the spontaneous speech subscale of the WAB (*p *= .01). While the difference in overall Aphasia Quotient (AQ) for music and conversation sessions (mean AQ = 76 vs. 70, respectively) did not reach statistical significance, data were only available for 10 participants (5 per condition). Hopefully, these findings will stimulate additional research on the use of music therapy interventions with demented patients, as it may offer a noninvasive mechanism to enhance communication between victims and their caregivers.*

Brotons, M., Koger, S. M. & Pickett-Cooper, P. (1997). Music and dementias: A review of literature. Journal of Music Therapy, 34(4), 204–245.

*This paper represents an extensive review of literature published in the area of music/music therapy end dementias from 1985–1996. Research outcomes were categorized, coded, and summarized in order to outline recommendations that may be used in clinical practice as well as in future research. The decision to set 1985 as the earliest publication date for consideration was based on the fact that all studies identified as using music/music therapy for people with dementias were published after 1985. Literature used in this analysis included articles published in refereed journals, written in English, which addressed the use of music/music therapy with individuals having dementia either as a basis for an experimental study or as the main topic of a published report. A total of 69 references were identified. Of these, 42 were empirical studies, including 30 clinical empirical reports (experimental, descriptive, or case studies) using music as a therapeutic intervention (independent variable). The clinical empirical research studies were categorized according to the functional areas (dependent variable) addressed: (a) participation/preferences for music activities (*n *= 11), (b) social/emotional skills (*n *= 7), (c) cognitive skills (*n *= 2), and (d) behavior management (*n*= 10). The remaining 12 empirical studies were either in the area of assessment or music cognition from a neuropsychological perspective. Narrative case studies and anecdotal accounts of music in therapy or articles describing*

nonmusic objectives taught through music numbered 8. Theoretical/philosophical papers describing and recommending music techniques as an alternative treatment for a variety of therapeutic objectives totaled 79. Results of the studies analyzed show that, in general, music/music therapy is an effective intervention to maintain and improve active involvement, social, emotional and cognitive skills, and to decrease behavior problems of individuals with dementias. Suggestions for clinical practice and future research endeavors are discussed.

Bruer, R. A., Spitznagel, E. & Cloninger, C. R. (2007). The temporal limits of cognitive change from music therapy in elderly persons with dementia or dementia-like cognitive impairment: A randomized controlled trial. Journal of Music Therapy, 44(4), 308-328.

*This study explored the temporal limits of cognitive change from an intention-to-treat with group music therapy. Elderly cognitively-impaired psychiatric inpatients (*N *= 28) participated in an 8-week randomized control trial using a crossover design. Once a week, subjects were assigned either to music therapy or a control treatment (age-appropriate movie). The Mini-Mental State Exam (MMSE) assessed cognition 3 times every week: prior to the intervention, immediately after the mid-afternoon intervention, and the morning following the intervention. Comparisons between conditions included weekly changes in individual subject's MMSE scores from weekly baseline to both the 2 follow-ups and the following week's baseline. Significant next morning improvements in MMSE scores were found within intent-to-treat music therapy cases as compared to control cases. While all the subjects in this study were cognitively impaired, only 17 had been formally diagnosed with dementia. Based on a Cochrane Collaboration suggestion that music therapy studies within geriatric populations look specifically at the treatment of dementia, a final generalized estimating equation model considered only the change within the 17 dementia-diagnosed subjects. Immediately after the intervention, MMSE scores in the dementia-diagnosed subjects assigned to music therapy improved 2.00 points compared to the dementia-diagnosed subjects assigned to the control group (*Z *= 1.99,* p *< .05). Next-day MMSE test scores in the dementia-diagnosed subjects assigned to music therapy showed average improvements of 3.69 points compared to the control subjects (*Z *= 3.38,* p *< .001). By the following week, no significant cognitive differences remained between the two groups. It was concluded that a reasonable music therapy intervention facilitated by a trained and accredited music therapist significantly improved next-morning cognitive functioning among dementia patients. With many music therapists working in geriatric settings, more research is justified to both replicate this study and provide better guidance into the effective use of music therapy in the treatment of dementia.*

Cevasco, A.M. & Grant, R.E. (2003). Comparison of different methods for eliciting exercise to music for clients with Alzheimer's Disease. Journal of Music Therapy 40(1), 41-56.

Many of the noted problems associated with Alzheimer's disease (AD) sometimes can be delayed, retarded, or even reversed with proper exercise and interaction with the environment. An overwhelming body of research efforts has revealed that music activity brings about the greatest degree of responsiveness, including exercise, in clients with AD; yet, specific techniques which elicit the greatest amount of physical responses during the music activities remain unidentified. The purpose of this study was two-fold: comparing two methods of intervention and comparing responses to vocal versus instrumental music during exercise and exercise with instruments. In Experiment 1 the authors compared 2 treatment conditions to facilitate exercise during music activities: (a) verbalizing the movement for each task once, one beat before commencing, followed by visual cueing for the remainder of the task; (b) verbal and visual cueing for each revolution or change in rhythm for the duration of the task. Data collection over 38 sessions consisted of recording the participation of each client at 30-second intervals for the duration of each treatment condition, indicating at each interval whether the client was participating in the designated movement (difficult), participating in exercise approximating the designated movement (easy), or not participating. Results indicated that the

continuous verbal cueing/easy treatment elicited significantly greater participation than one verbal cue/difficult treatment,p < .05. Furthermore, the approximation/precise response (easy) resulted in significantly greater responses than the precise response (difficult), p < .001.
In Experiment 2 the responses to types of music, vocal versus instrumental, during types of activities, exercise with and without instruments, were examined. Data were collected over 26 sessions, 52 activities, in the same 2 assisted living facilities as those in Experiment 1, but one year later. Results indicated that both the type of activity and the type of music had some effect on participation. Also, data indicated participation in exercise to instrumental music was significantly greater than exercise with instruments to vocal music, p < .05.

Ceccato, E., Vigato, G., Bonetto, C., Bevilacqua, A., Pizziolo, P., Crociani, S., et al. (2012). STAM protocol in dementia: A multicenter, single-blind, randomized, and controlled trial. American Journal of Alzheimer's Disease and Other Dementias, 27(5), 301-310.

Background: *The Sound Training for Attention and Memory in Dementia (STAM-Dem) is a manualized music-based protocol designed to be used in the rehabilitation of cognitive functions in elderly patients with dementia (PWD).*
Method: *This was a multicenter, single-blind, randomized, and controlled trial that involved 51 PWD. The objective was to test the STAM-Dem efficacy. Patients in the experimental group followed the STAM-Dem for 2 weekly sessions of 45 minutes for 12 weeks (in addition to standard care). Those in the control group continued with the normal "standard care" provided.*
Results: *In the experimental group, the instruments immediate prose memory test (MPI), deferred prose memory test (MPD), attentional matrices, activities of daily living, Music Therapy Activity Scale (SVAM) and Geriatric Music Therapy Profile (GMP) increase significantly from pre to post-test (P < .05).*
Conclusion: *The protocol is feasible and data suggest that there was an effect on attentino (matrices) and prose memory skills (MPI and MPD). The effect size reveals a general improvement in the results of the experimental group.*

Chan, M. F., Wong, Z. Y., Onishi, H. & Thayala, N. V. (2012). Effects of music on depression in older people: a randomised controlled trial. Journal of Clinical Nursing, 21(5-6), 776-783.

Aim. *To determine the effect of music on depression levels in older adults.*
Background. *Depression is a common psychiatric disorder in older adults, and its impacts on this group of people, along with its conventional treatment, merit our attention. Conventional pharmacological methods might result in dependence and impairment in psychomotor and cognitive functioning. Listening to music, which is a non-pharmacological method, might reduce depression.*
Design. *A randomised controlled study.*
Method. *The study was conducted from July 2009–June 2010 at participants' home in Singapore. In total, 50 older adults (24 using music and 26 control) completed the study after being recruited. Participants listened to their choice of music for 30 minutes per week for eight weeks.*
Outcome measures. *Depression scores were collected once a week for eight weeks.*
Results. *Depression levels reduced weekly in the music group, indicating a cumulative dose effect, and a statistically significant reduction in depression levels was found over time in the music group compared with non-music group.*
Conclusions. *Listening to music can help older people to reduce their depression level.*
Relevance to clinical practice. *Music is a non-invasive, simple and inexpensive therapeutic method of improving life quality in community-dwelling older people.*

Choi, A. N., Lee, M. S., Cheong, K. J. & Lee, J. S. (2009). Effects of group music intervention on behavioral and psychological symptoms in patients with dementia: A pilot-controlled trial. International Journal of Neuroscience, 119(4), 471-481.

We investigated the effects of group music intervention on behavioral and psychological symptoms in patients with dementia. Twenty patients were nonrandomly allocated to either a music-intervention group, or an usual care group. The music-intervention group received 50 minutes of music intervention 3 times per week for 5 consecutive weeks. After 15 sessions, the music-intervention group showed significant in improvement with regard to agitation, and the total scores of both patients and caregivers were lower, compared with the control group. These findings suggest that music can improve behavioral and psychological symptoms, especially in patients with dementia and their caregivers.

Chou, K.-R. & Lin, Y. (2012). P-444-The effectiveness of group music therapy to improve depression and cognition status in elderly persons with dementia. European Psychiatry, 27(1), 1.

This study (a randomized clinical trial design with permuted block randomization) aimed to determine the effectiveness of group music therapy to improve the depression and cognitive function of elderly persons with dementia in three nursing homes in Taiwan.

Of the 104 elderly persons with dementia randomly assigned to the experimental or control group, 100 completed the study: 49 in the experimental group and 51 in the control group. The experimental group received 12 sessions of group music therapy of 30 min each. The control group maintained routine activities of daily living.

Groups were compared for depression and cognitive function before the intervention, at the 6th and 12th session and one month after cessation. Generalized estimating equations (GEEs) were used to estimate repeated effects of music therapy.

Results indicated that: 1) depression decreased at the 12th session ($P < 0.001$); 2) cortisol level was not significant decreased in the experimental and control group after music therapy; and 3) cognitive function improved significantly at 6th, 12th session, and one month follow-up ($P < 0.044$; $P < 0.001$; $P < 0.026$). Music therapy is more appropriate for mild and moderate dementia. The music therapy had more impact on dementia elders' function of recall than on orientation, registration, attention and calculation, language and spatial.

Conclusions: Depression in elderly with dementia can be decreased and their cognitive function improved slightly through group music therapy. The mechanism behind the diminished cortisol levels in the effects of music therapy in dementia remains to be determined.

Chu, H., Yang, C.-Y., Lin, Y., Ou, K.-L., Lee, T.-Y., O'Brien, A. P., et al. (2014). The impact of group music therapy on depression and cognition in elderly persons with dementia: A randomized controlled study. Biological Research for Nursing, April 2014 vol. 16 no. 2, 209-217.

Objective: *The aims of this study were to determine the effectiveness of group music therapy for improving depression and delaying the deterioration of cognitive functions in elderly persons with dementia.*

Method: *The study had a prospective, parallel-group design with permuted-block randomization. Older persons with dementia (N = 104) were randomly assigned to the experimental or control group. The experimental group received 12 sessions of group music therapy (two 30-min sessions per week for 6 weeks), and the control group received usual care. Data were collected 4 times: (1) 1 week before the intervention, (2) the 6th session of the intervention, (3) the 12th session of the intervention, and (4) 1 month after the final session.*

Results: *Group music therapy reduced depression in persons with dementia. Improvements in depression occurred immediately after music therapy and were apparent throughout the course of*

therapy. The cortisol level did not significantly decrease after the group music therapy. Cognitive function significantly improved slightly at the 6th session, the 12th session, and 1 month after the sessions ended; in particular, short-term recall function improved. The group music therapy intervention had the greatest impact in subjects with mild and moderate dementia.

Conclusion: *The group music intervention is a noninvasive and inexpensive therapy that appeared to reduce elders' depression. It also delayed the deterioration of cognitive functions, particularly short-term recall function. Group music therapy may be an appropriate intervention among elderly persons with mild and moderate dementia.*

Clair, A.A. (1996). The effect of singing on alert responses in persons with late stage dementia. Journal of Music Therapy, 33(4), 234-247.

Twenty-six persons with late stage dementia living in residential care homes, who were no longer ambulatory, and who no longer had discernible language were selected to participate in this study. The investigator met each subject individually, after obtaining permission to do so from legal guardians, for a series of sessions that were scheduled at the same time and place for 40 minutes on each of four sequential days. Each session consisted of randomly ordered, 2-minute segments of the investigator reading the newspaper, singing unaccompanied familiar songs, and sitting in silence. The subject was videotaped during all session. Tapes were later analyzed through an interval recording data collection method to determine whether individuals displayed alert responses as defined by head and eye movements, limb movements, changes in facial expressions, and vocalizations. Data were analyzed to compare the number of alert responses during the three conditions; reading, singing, and silence. Results indicated that alert responses were most frequent during singing, with alert responses during reading being the next most frequent. While there was no statistically significant difference between the number of responses during singing and reading, the number of alert responses during silence was significantly lower than for the other conditions. Additionally, responses during all conditions tended to increase over time from the first through the fourth experimental sessions. This study has implications for music therapists and others who wish to use singing as a stimulus for responses in persons who are in the late stages of dementia. First, persons are likely to respond to singing, even if they make little or no response to other stimulation. Response to singing is not contingent upon instrumental accompaniment. Therefore, any caregiver can use singing to encourage responses. Second, persons who are relatively nonresponsive in an initial session may grow in their response activity over time. Therefore, activities which are designed to foster responses should occur over a series of sessions to allow for latency periods. Though the subject sample in this study was small, and generalization to other persons with late stage dementia is guarded, there is indication that singing is a viable source of stimulation for those who have severe dementia and are generally unresponsive. Singing may therefore be an important component of programs designed to provide for life quality through stimulation.

Clark, M.E., Lipe, A.W. & Bilbrey, M. (1998). Use of music to decrease aggressive behaviors in people with dementia. Journal of Gerontological Nursing, 24(7), 10-17.

The purpose of this study was to examine the effects of recorded, preferred music in decreasing occurrences of aggressive behavior among individuals with Alzheimer's type dementia during bathing episodes. Eighteen older adults, age 55 to 95, with severe levels of cognitive impairment, participated in the study. They were randomly scheduled for observation during bath time under either a control (no music) condition or an experimental condition in which recorded selections of preferred music were played via audiotape recorder during the bathing episode. Following a 2-week (10 episode) observation period, conditions were reversed. A total of 20 observations were recorded for each individual. Results indicated that during the music condition, decreases occurred in 12 of 15 identified aggressive behaviors. Decreases were significant ($p < 0.05$) for the total number of observed behaviors

and for hitting behaviors. During the music condition, caregivers frequently reported improved affect and a general increase in cooperation with the bathing task. The implications of these findings for improving the overall quality of care for severely cognitively impaired older adults are discussed.

Clément, S., Tonini, A., Khatir, F., Schiaratura, L. & Samson, S. (2012). Short and longer term effects of musical intervention in severe Alzheimer's disease. Music Perception: An Interdisciplinary Journal, 29(5), 533-541.

In this study, we examined short and longer term effects of musical and cooking interventions on emotional well-being of severe Alzheimer's disease (AD) patients. These two pleasurable activities (i.e., listening to music, tasting sweets) that were collectively performed (i.e., playing music together, collaborative preparation of a cake) were compared in two groups of matched patients with AD (N = 14). Each intervention lasted four weeks (two sessions per week) and their effects were regularly assessed up to four weeks after the end of the intervention. We repeatedly evaluated the emotional state of both groups before, during, and after the intervention periods by analyzing discourse content and facial expressions from short filmed interviews as well as caregivers' judgments of mood. The results reveal short-term benefits of both music and cooking interventions on emotional state on all these measures, but long-term benefits were only evident after the music intervention. The present finding suggests that non-pharmacological approaches offer promising methods to improve the quality of life of patients with dementia and that music stimulation is particularly effective to produce long lasting effects on patients' emotional well-being.

Cooke, M., Moyle, W., Shum, D., Harrison, S. & Murfield, J. (2010). A randomized controlled trial exploring the effect of music on quality of life and depression in older people with dementia. Journal of Health Psychology, 15(5), 765-776.

*This randomized controlled trial investigated the effect of live music on quality of life and depression in 47 older people with dementia using the Dementia Quality of Life and Geriatric Depression Scale. The control/reading group reported higher mid-point feelings of belonging than the music group (*F*(1, 45) = 6.672,* p *< .05). Sub-analyses of ≥ 50 per cent music session attendance found improvements in self-esteem over time (*F*(2, 46) = 4.471,* p *< .05). Participants with scores that were suggestive of increased depressive symptoms had fewer depressive symptoms over time (*F*(2, 22) = 8.129,* p *< .01). Findings suggest music and reading activities can improve self-esteem, belonging and depression in some older people with dementia.*

Creech, A., Hallam, S., Varvarigou, M., McQueen, H. & Gaunt, H. (2013). Active music making: A route to enhanced subjective well-being among older people. Perspectives in Public Health, 133(1), 36-43.

Aims: *This research explored the relationship between active music making and subjective well-being, in older people's lives. The research focused on how participation in making music might enhance older people's social, emotional and cognitive well-being, through meeting the basic psychological needs identified in earlier research.*

Method: *The research comprised three case studies, each offering a variety of musical activities to older people. In each case study a sample of older people were asked to complete questionnaires and psychological needs scales related to autonomy, competence, relatedness and self-realisation before and after a substantial period of active engagement with music.*

Results: *Principal components analysis (PCA) of responses to the CASP-121 and the Basic Needs Satisfaction scale[2] revealed three factors: purpose (having a positive outlook on life; autonomy and control; and social affirmation (positive social relationships, competence and a sense of recognised accomplishment). Comparisons of those engaged in music making with those participating in other activities revealed statistically significant differences on all three factors with the music groups giving more positive responses.*

Conclusions: *The enhanced subjective well-being found among participants in music may have been due to the potential for music to provide a sense of purpose through progression in music and creative expression. Control and autonomy may be supported by the holistic nature of musical engagement, whereby meeting new musical challenges involves physical and cognitive engagement. Finally, social affirmation may be supported through social interaction; giving and receiving peer support; and performance, which confers status, a sense of giving something back to the community, pride and opportunities for positive reinforcement. Further research needs to identify the mechanisms through which music is able to achieve these effects.*

Cuddy, L. L. & Duffin, J. (2005). Music, memory, and Alzheimer's disease: is music recognition spared in dementia, and how can it be assessed? Medical Hypotheses, 64(2), 229-235.

Despite intriguing and suggestive clinical observations, no formal research has assessed the possible sparing of musical recognition and memory in Alzheimer's dementia (AD). A case study is presented of an 84-year old woman with severe cognitive impairment implicating AD, but for whom music recognition and memory, according to her caregivers, appeared to be spared. The hypotheses addressed were, first, that memory for familiar music may be spared in dementia, and second, that musical recognition and memory may be reliably assessed with existing tests if behavioral observation is employed to overcome the problem of verbal or written communication.

Our hypotheses were stimulated by the patient EN, for whom diagnosis of AD became probable in 2000. With severe problems in memory, language, and cognition, she now has a mini-mental status score of 8 (out of 30) and is unable to understand or recall standard instructions. In order to assess her music recognition abilities, three tests from the previous literature were adapted for behavioral observation. Two tests involved the discrimination of familiar melodies from unfamiliar melodies. The third involved the detection of distortions ("wrong" notes) in familiar melodies and discrimination of distorted melodies from melodies correctly reproduced. Test melodies were presented to EN on a CD player and her responses were observed by two test administrators. EN responded to familiar melodies by singing along, usually with the words, and often continuing to sing after the stimulus had stopped. She never responded to the unfamiliar melodies. She responded to distorted melodies with facial expressions – surprise, laughter, a frown, or an exclamation, "Oh, dear!"; she never responded in this way to the undistorted melodies. Allowing these responses as indicators of detection, the results for EN were in the normal or near normal range of scores for elderly controls. As well, lyrics to familiar melodies, spoken in a conversational voice without rhythmic or pitch clues, often prompted EN to sing the tune that correctly accompanied the lyrics.

EN's results provide encouraging support for our hypotheses that sparing of musical memory may be a feature of some forms of dementia and that it may be reliably and quantitatively assessed through behavioral observation. The contrast between EN's response to music and her mini-mental status is dramatic.

The article concludes with several considerations why music may be preserved in dementia and suggestions to guide future research.

Devereaux, M. A. (1997). The effects of individualized music on cognitively impaired nursing home residents exhibiting agitation . Unpublished master's thesis, College of St. Catherine, St. Paul, Minnesota.

Devereaux conducted a modified replication of Gerdner's study (1992). A quasi-experimental one-group pretest/post test design was used to evaluate the effects of individualized music on the frequency of agitation. The study consisted of a convenience sample of five female subjects (mean age

90 years) residing in a skilled nursing home. The frequency of agitation was measured using the Modified Cohen-Mansfield Agitation Inventory. Baseline data was collected during week one. Using recommendations from the original study, the time of intervention was individualized based on each subject's peak level of agitation. Individualized music was played for 30 minutes on five consecutive days during week two. The post intervention observation period was extended to 90 minutes. Paired t-test revealed a significant decrease in agitated behaviors during the intervention period and the 90 minutes immediately following the intervention.

Erkkilä, J., Punkanen, M., Fachner, J., Ala-Ruona, E., Pöntiö, I., Tervaniemi, M.,Vanhala, M. & Gold, C. (2011). 'Individual Music Therapy for Depression: Randomised Controlled Trial'. British Journal of Psychiatry, 199, 132–9.

Music therapy has previously been found to be effective in the treatment of depression but the studies have been methodologically insufficient and lacking in clarity about the clinical model employed. This study aimed to determine the efficacy of music therapy added to standard care compared with standard care only in the treatment of depression among working-age people.
Method *Participants (n = 79) with an ICD–10 diagnosis of depression were randomised to receive individual music therapy plus standard care (20 bi-weekly sessions) or standard care only, and followed up at baseline, at 3 months (after intervention) and at 6 months. Clinical measures included depression, anxiety, general functioning, quality of life and alexithymia.*
Results *Participants receiving music therapy plus standard care showed greater improvement than those receiving standard care only in depression symptoms (mean difference 4.65, 95% CI 0.59 to 8.70), anxiety symptoms (1.82, 95% CI 0.09 to 3.55) and general functioning (–4.58, 95% CI –8.93 to –0.24) at 3-month follow-up. The response rate was significantly higher for the music therapy plus standard care group than for the standard care only group (odds ratio 2.96, 95% CI 1.01 to 9.02).*
Conclusions *Individual music therapy combined with standard care is effective for depression among working-age people with depression. The results of this study along with the previous research indicate that music therapy with its specific qualities is a valuable enhancement to established treatment practices.*

Fachner, J., Gold, C., & Erkkila, J. (2012). Music Therapy Modulates Fronto-Temporal Activity in Rest-EEG in Depressed Clients'. Brain Topography, 26(2), 338-354.

Fronto-temporal areas process shared elements of speech and music. Improvisational psychodynamic music therapy (MT) utilizes verbal and musical reflection on emotions and images arising from clinical improvisation. Music listening is shifting frontal alpha asymmetries (FAA) in depression, and increases frontal midline theta (FMT). In a two-armed randomized controlled trial (RCT) with 79 depressed clients (with comorbid anxiety), we compared standard care (SC) versus MT added to SC at intake and after 3 months. We found that MT significantly reduced depression and anxiety symptoms. The purpose of this study is to test whether or not MT has an impact on anterior fronto-temporal resting state alpha and theta oscillations. Correlations between anterior EEG, Montgomery–Åsberg Depression Rating Scale (MADRS) and the Hospital Anxiety and Depression Scale—Anxiety Subscale (HADS-A), power spectral analysis (topography, means, asymmetry) and normative EEG database comparisons were explored. After 3 month of MT, lasting changes in resting EEG were observed, i.e., significant absolute power increases at left fronto-temporal alpha, but most distinct for theta (also at left fronto-central and right temporoparietal leads). MT differed to SC at F7–F8 (z scored FAA, $p < .03$*) and T3–T4 (theta,* $p < .005$*) asymmetry scores, pointing towards decreased relative left-sided brain activity after MT; pre/post increased FMT and decreased HADS-A scores (*$r = .42$*,* $p < .05$*) indicate reduced anxiety after MT. Verbal reflection and improvising on emotions in MT may induce neural reorganization in fronto-temporal areas. Alpha and theta changes in fronto-temporal and*

temporoparietal areas indicate MT action and treatment effects on cortical activity in depression, suggesting an impact of MT on anxiety reduction.

Gerdner, L.A. (2000). Effects of individualized versus classical "relaxation" music on the frequency of agitation in elderly persons with Alzheimer's disease and related disorders. International Psychogeriatrics, 12(1), 49-65.

Confusion and agitation in elderly patients are crucial problems. This study tested Gerdner's mid-range theory of individualized music intervention for agitation. An experimental repeated measures pretest-posttest crossover design compared the immediate and residual effects of individualized music to classical "relaxation" music relative to baseline on the frequency of agitated behaviors in elderly persons with Alzheimer's disease and related disorders (ADRD). Thirty-nine subjects were recruited from six long-term-care facilities in Iowa. The sample consisted of 30 women and 9 men (mean age 82 years) with severe cognitive impairment. Baseline data were collected for 3 weeks. Findings from the Modified Hartsock Music Preference Questionnaire guided the selection of individualized music. Group A (n = 16) received individualized music for 6 weeks followed by a 2-week "washout" period and 6 weeks of classical "relaxation" music. Group B (n = 23) received the same protocol but in reverse order. Music interventions were presented for 30 minutes, two times per week. The Modified Cohen-Mansfield Agitation Inventory measured the dependent variable. A repeated measures analysis of variance with Bonferroni post hoc test showed a significant reduction in agitation during and following individualized music compared to classical music. This study expands science by testing and supporting a theoretically based intervention for agitation in persons with ADRD.

Gerdner, L. A. (2005). Use of individualized music by trained staff and family: Translating research into practice. Journal of Gerontological Nursing, 31(6), 22-30.

This pilot study used a mixed methodology to evaluate the effectiveness of individualized music for the management of agitation when implemented by trained staff and family. Music was administered daily and as needed to eight elderly individuals with dementia who resided in a long-term care facility. A statistically significant reduction in agitation was found during the presenta- tion of music and an overall reduc- tion in agitation was found on day shift during weeks 1 to 8 and on evening shift during weeks 5 to 8. Staff and family interviews provided convergent validity of findings. Music also promoted meaningful interaction between the resident and others.

Gold, K. (2013). But does it do any good? Measuring the impact of music therapy on people with advanced dementia. Dementia: The International Journal of Social Research and Practice, Advance online publication.

This article describes the impact of music therapy upon a group of nine people with advanced dementia in a hospital setting. It demonstrates how the impact of music therapy was measured using the case notes completed by nursing and care staff and how these notes suggested that music therapy had a positive effect on the mood and behaviour on eight of the nine people receiving music therapy.

Groene, R. W. (1993). Effectiveness of music therapy 1:1 intervention with individuals having senile dementia of the Alzheimer's type. Journal of Music Therapy, 30(3), 138-157.

Thirty persons (16 females and 14 males) with an average age of 77.5 years who resided in a major metropolitan health care facility on a special Alzheimer's unit and who exhibited wandering behavior, took part in this study. Proper permission and informed consent were obtained from all involved parties. Participants were randomly assigned to either mostly music attention or mostly reading attention groups. Individual reading and music preference histories were taken to tailor treatment sessions. Baseline and session wandering behavior were measured by pedometers, mercury counters, and cyclometers. Participants received seven one-to-one sessions by the music therapist (either five sessions of music and two reading, or five sessions reading and two music). Seating/proximity duration

was recorded on videotape. The Mini-Mental Status Exam (MMSE, a brief cognitive test) was administered at pre and post sessions. Results indicated that participants remained seated or in close proximity to the session area longer for music sessions than for reading sessions under all conditions. Mean differences in seatinglproximity time were significant in favor of all music versus all reading sessions. There was a significant session effect for an increase for seating/proximity scores and a decrease in wandering scores over the course of Sessions 1–5 for both groups. No significant differences were found in wandering or cognitive difference scores for treatments or groups.

Guétin, S., Portet, F., Picot, M., Pommié, C., Messaoudi, M., Djabelkir et al. (2009). Effect of music therapy on anxiety and depression in patients with Alzheimer's type dementia: randomised, controlled study. Dementia and geriatric cognitive disorders, 28(1), 36-46.

Background/Aims: Numerous studies have indicated the value of music therapy in the management of patients with Alzheimer's disease. A recent pilot study demonstrated the feasibility and usefulness of a new music therapy technique. The aim of this controlled, randomised study was to assess the effects of this new music therapy technique on anxiety and depression in patients with mild to moderate Alzheimer-type dementia. Methods: This was a single-centre, comparative, controlled, randomised study, with blinded assessment of its results. The duration of follow-up was 24 weeks. The treated group (n = 15) participated in weekly sessions of individual, receptive music therapy. The musical style of the session was chosen by the patient. The validated 'U' technique was employed. The control group (n = 15) participated under the same conditions in reading sessions. The principal endpoint, measured at weeks 1, 4, 8, 16 and 24, was the level of anxiety (Hamilton Scale). Changes in the depression score (Geriatric Depression Scale) were also analyzed as a secondary endpoint. Results: Significant improvements in anxiety ($p < 0.01$) and depression ($p < 0.01$) were observed in the music therapy group as from week 4 and until week 16. The effect of music therapy was sustained for up to 8 weeks after the discontinuation of sessions between weeks 16 and 24 ($p < 0.01$). Conclusion: These results confirm the valuable effect of music therapy on anxiety and depression in patients with mild to moderate Alzheimer's disease. This new music therapy technique is simple to implement and can easily be integrated in a multidisciplinary programme for the management of Alzheimer's disease.

Guétin, S., Charras, K., Berard, A., Arbus, C. et al. (2013). An overview of the use of music therapy in the context of Alzheimer's disease: A report of a French expert group. Dementia, 12(5), 619-634.

Objectives: *The aim of this overview is to present the developments of music therapy in France, its techniques, mechanisms and principal indications, mainly in the context of Alzheimer's disease.*

Methods: *An international review of the literature on music therapy applied to Alzheimer's disease was conducted using the principal scientific search engines. A work group of experts in music therapy and psychosocial techniques then considered the different points highlighted in the review of literature and discussed them.*

Results and Discussion: *Clinical and neurophysiological studies have enlightened some positive benefits of music in providing support for people with Alzheimer's disease or related disorders. Music therapy acts mainly through emotional and psycho-physiological pathways. It includes a series of techniques that can respond to targeted therapeutic objectives. Some studies have shown that music therapy reduces anxiety, alleviates periods of depression and aggressive behaviour and thus significantly improves mood, communication and autonomy of patients.*

Conclusion: *Psychosocial interventions, such as music therapy, can contribute to maintain or rehabilitate functional cognitive and sensory abilities, as well as emotional and social skills and to reduce the severity of some behavioural disorders.*

Hailstone, J. C., Omar, R. & Warren, J. D. (2009). Relatively preserved knowledge of music in semantic dementia. Journal of Neurology, Neurosurgery & Psychiatry, 80(7), 808-809.

The brain basis for music knowledge and the effects of disease on music cognition are poorly understood. Here we present evidence for relatively preserved knowledge of music in a musically untrained patient with semantic dementia and characteristic asymmetric anterior temporal lobe atrophy. Our findings suggest that music is partly separable neuropsychologically and anatomically from other semantic domains, with implications for the clinical management of patients with brain disease.

Han, P., Kwan, M., Chen, D., Yusoff, S. Z., Chionh, H. L., Goh, J., et al. (2010). A controlled naturalistic study on a weekly music therapy and activity program on disruptive and depressive behaviors in dementia. Dementia and Geriatric Cognitive Disorders, 30(6), 540-546.

Aim: This study explores the effects of a weekly structured music therapy and activity program (MAP) on behavioral and depressive symptoms in persons with dementia (PWD) in a naturalistic setting. Methods: PWD attended a weekly group MAP conducted by a qualified music therapist and occupational therapist for 8 weeks. Two validated scales, the Apparent Emotion Scale (AES) and the Revised Memory and Behavioral Problems Checklist (RMBPC), were used to measure change in outcomes of mood and behavior. Results: Twenty-eight subjects completed the intervention, while 15 wait-list subjects served as controls. Baseline AES and RMBPC scores were not significantly different between the intervention and control groups. After intervention, RMBPC scores improved significantly (p = 0.006) with 95% CI of the difference between the mean intervention and control group scores compared to baseline at –62.1 to –11.20. Total RMBPC scores in the intervention group improved from 75.3 to 54.5, but worsened in the control group, increasing from 62.3 to 78.6. AES scores showed a nonsignificant trend towards improvement in the intervention group. Conclusion: The results suggest that a weekly MAP can ameliorate behavioral and depressive symptoms in PWD.

Hanser, S.B. & Thompson, L.W. (1994). Effects of a music therapy strategy on depressed older adults. Journal of Gerontology, 49(6), 265-9.

A music-facilitated psychoeducational strategy was developed as a cost-effective and accessible intervention for older adults experiencing symptoms of depression, distress, and anxiety. Thirty older adults who had been diagnosed with major or minor depressive disorder were randomly assigned to one of three 8-week conditions: (1) a home-based program where participants learned music listening stress reduction techniques at weekly home visits by a music therapist; (2) a self-administered program where participants applied these same techniques with moderate therapist intervention (a weekly telephone call); or (3) a wait list control. Participants in both music conditions performed significantly better than the controls on standardized tests of depression, distress, self-esteem, and mood. These improvements were clinically significant and maintained over a 9-month follow-up period. The potential for this type of intervention with homebound elders and others who have limited access to services is discussed.

Holmes, C., Knights, A., Dean, C., Hodkinson, S. & Hopkins, V. (2006). Keep music live: Music and the alleviation of apathy in dementia subjects. International Psychogeriatrics, 18(4), 623-630.

Background: A recent Cochrane report concluded that more and better quality research is required to investigate the effectiveness of music therapy in reducing problems in behavioral, social, emotional and cognitive domains in patients with dementia. This randomized placebo-controlled trial with blinded observer rater aimed to explore whether music, live or pre-recorded, is effective in the treatment of apathy in subjects with moderate to severe dementia.
Methods: Thirty-two subjects meeting ICD-10 diagnostic criteria for moderate to severe dementia and fulfilling diagnostic criteria for apathy were exposed to live interactive music, passive pre-recorded

music or silence for 30 minutes. Each subject was randomized to 30-minute music or silent periods and was video recorded and the muted recording analyzed every 3 minutes using dementia care mapping to assess the quality of engagement to the blinded music intervention.
Results: Compared to low baseline levels of positive engagement (12.5%) in the silent placebo period, the majority of subjects (69%), regardless of dementia severity, showed a significant and positive engagement to live music. Engagement to pre-recorded music was non-significant, with just 25% of all subjects showing positive engagement. No subjects showed any evidence of experiencing a state of ill-being during either the live or pre-recorded music sessions.
Conclusions: During the intervention, live interactive music has immediate and positive engagement effects in dementia subjects with apathy, regardless of the severity of their dementia. Pre-recorded music is non-harmful but less clearly beneficial.

Hong, I. S. & Choi, M. J. (2011). Songwriting oriented activities improve the cognitive functions of the aged with dementia. The Arts in Psychotherapy, 38(4), 221-228.

*This study investigates the effects of songwriting oriented activities on the cognitive functions of the aged with dementia. The music therapy program employing songwriting related activities consisted of three stages: stage 1, preparing songwriting for finding preferred songs, stage 2, doing songwriting, and stage 3, reinforcing songwriting. Experiments were carried out with 30 elderly persons housed in a nursing home for 16 weeks. The subjects were divided into the control group and the experimental group, and each group had 15 subjects randomly allocated. The experimental group underwent the songwriting program for 60 min per week for 16 weeks. MMSE-K was used to assess the cognitive functions of the subjects. The results showed that the MMSE-K score of the experimental group increased by 3.8 points (26.0%) from 14.6 to 18.4 (*p *= 0.001) after intervention. The three sub-items of "language function", "orientation", and "memory" rose significantly (*p *< 0.01) by 40.4%, 22.2% and 15.8%, respectively, whereas "attention & calculation", and "comprehension & judgment" did not improve with significance (*p *> 0.01). In the control group, however, the MMSE-K score decreased a little by 0.87 (5.8%), from 15.00 to 14.13 (*p *= 0.014). The present study supports the conclusion that songwriting oriented activities may be useful in music therapy for improving the cognitive functions of the aged with dementia.*

Hsieh, S., Hornberger, M., Piguet, O. & Hodges, J. R. (2011). Neural basis of music knowledge: evidence from the dementias. Brain, 134(9), 2523-2534.

The study of patients with semantic dementia has revealed important insights into the cognitive and neural architecture of semantic memory. Patients with semantic dementia are known to have difficulty understanding the meanings of environmental sounds from an early stage but little is known about their knowledge for famous tunes, which might be preserved in some cases. Patients with semantic dementia (n = 13), Alzheimer's disease (n = 14) as well as matched healthy control participants (n = 20) underwent a battery of tests designed to assess knowledge of famous tunes, environmental sounds and famous faces, as well as volumetric magnetic resonance imaging. As a group, patients with semantic dementia were profoundly impaired in the recognition of everyday environmental sounds and famous tunes with consistent performance across testing modalities, which is suggestive of a central semantic deficit. A few notable individuals (n = 3) with semantic dementia demonstrated clear preservation of knowledge of known melodies and famous people. Defects in auditory semantics were mild in patients with Alzheimer's disease. Voxel-based morphometry of magnetic resonance brain images showed that the recognition of famous tunes correlated with the degree of right anterior temporal lobe atrophy, particularly in the temporal pole. This area was segregated from the region found to be involved in the recognition of everyday sounds but overlapped considerably with the area that was correlated with the recognition of famous faces. The three patients with semantic dementia with sparing of musical knowledge had significantly less atrophy of

the right temporal pole in comparison to the other patients in the semantic dementia group. These findings highlight the role of the right temporal pole in the processing of known tunes and faces. Overlap in this region might reflect that having a unique identity is a quality that is common to both melodies and people.

Hsu, M., Flowerdew R., Parker M., Fachner J., Odell-Miller H. (2015). Individual music therapy for managing neuropsychiatric symptoms for people with dementia and their carers: a randomised controlled feasibility study. BMC Geriatrics (under review).

Methods: *17 care home residents and 10 care staff were randomised to the music therapy intervention group or standard care control group. The cluster randomised, controlled trial included baseline, 3-month, 5-month and post-intervention 7-month measures of residents' symptoms and well-being. Carer-resident interactions were also assessed.*
Feasibility was based on carers' feedback through semi-structured interviews, programme evaluations and track records of the study.
Results: *The music therapy programme appeared to be a practicable and acceptable intervention for care home residents and staff in managing dementia symptoms. Recruitment and retention data indicated feasibility but also challenges. Preliminary outcomes indicated differences in symptoms (13.42, 95%CI: [4.78 to 22.07; p=0.006]) and in levels of wellbeing (-0.74, 95%CI: [-1.15 to -0.33; p=0.003]) between the two groups, indicating that residents receiving music therapy improved. Staff in the intervention group reported enhanced caregiving techniques as a result of the programme.*

Hulme, C., Wright, J., Crocker, T., Oluboyede, Y. & House, A. (2009). Non-pharmacological approaches for dementia that informal carers might try or access: A systematic review. International Journal of Geriatric Psychiatry, 25, 756-763.

Objective: To review non-drug treatments for dementia; to provide a source of evidence for informal carers who want ideas about non-drug approaches for dementia, that they might try or that they could try to access. The systematic review addresses: what non-drug treatments work and what do they work for? What non-drug treatments might work and what for? What non-drug treatments do not work?

Methods: Literature searches of seven electronic databases (AMED, CINAHL, EMBASE, MEDLINE, PSYCINFO, Cochrane Library of Systematic Reviews and DARE) were carried out in November 2007 using the following search terms (or derivatives): dementia/Alzheimer's AND Review AND non-drug therapies and aimed at finding systematic reviews.

Results: Thirty-three reviews were identified; 25 were judged to be high or good quality. Studies within these systematic reviews were characterised by weak study designs with small sample numbers. Three interventions were found to be effective for use with particular symptoms of dementia: music or music therapy, hand massage or gentle touch and physical activity/exercise.

Conclusions: Whilst informal carers can apply some of the interventions highlighted in the home setting at little or no cost to themselves or to health or social care services, others are likely to require training or instruction. Service providers and commissioners should explore current and future provision of more structured group activities for people with dementia; in particular the provision of group music therapy and group exercise activities that meet the needs of both the person with dementia and their carer.

Janata, P. (2012). Effects of widespread and frequent personalized music programming on agitation and depression in assisted living facility residents with Alzheimer-type dementia. Music and Medicine, 4(1), 8-15.

A music intervention was performed to examine the effects of customized music programming on agitation and depression in a sample of assisted living facility residents (N 1⁄4 38) with moderate-to-

severe dementia. Following a 2-week no-music baseline period, music programs were streamed to the rooms of individuals assigned to a music group (N 1⁄4 19) several hours per day each day for 12 weeks. Ambulatory residents assigned to the control group were incidentally exposed to the music programming in the course of daily life. Reductions in composite scores on the Cohen-Mansfield Agitation Inventory, Neuropsychiatric Inventory, and Cornell Scale for Depression in Dementia were rapid and sustained in both groups. Creating an almost omnipresent musical atmosphere directed at the musical preferences and listening histories of residents in an assisted living facility may reduce average levels of agitation and depression among the residents.

Johnson, L., Deatrick, E. J. & Oriel, K. (2012). The use of music to improve exercise participation in people with dementia: A pilot study. Physical & Occupational Therapy in Geriatrics, 30(2), 102-108.

The purpose of this study was to investigate the effect of music on exercise program participation in older adults with dementia. Participants were attendees of the adult daycare at the Lebanon Valley Brethren Home. A within subjects cross over design was used with an intervention and control condition. Participants initially assigned to the control condition performed an exercise program without music, while participants in the intervention condition performed the same exercise program with music. Age appropriate songs were specifically selected and the exercise sequence was standardized for both groups and lasted 30 min per session. After 3 weeks the conditions for the groups were switched. Participation was analyzed using videography and a tally system to document exercise program engagement. Results indicated that participation was significantly greater (p = 0.028) during the intervention (exercise with music) than during the control condition.

Kreutz, G., Bongard, S., Rohrmann, S. et al. (2004). Effects of Choir Singing or Listening on Secretory Immunoglobulin A, Cortisol, and Emotional State. Journal of Behavioural Medecine Volume 27, Issue 6, 623-635

The present study investigates the effects of choir music on secretory immunoglobulin A (S-IgA), cortisol, and emotional states in members of a mixed amateur choir. Subjects participated in two conditions during two rehearsals 1 week apart, namely singing versus listening to choral music. Saliva samples and subjective measures of affect were taken both before each session and 60 min later. Repeated measure analyses of variance were conducted for positive and negative affect scores, S-IgA, and cortisol. Results indicate several significant effects. In particular, singing leads to increases in positive affect and S-IgA, while negative affect is reduced. Listening to choral music leads to an increase in negative affect, and decreases in levels of cortisol. These results suggest that choir singing positively influences both emotional affect and immune competence. The observation that subjective and physiological responses differed between listening and singing conditions invites further investigation of task factors.

Kumar, A. M., Tims, F., Cruess, D. G., Mintzer, M. J., Ironson, G., Loewenstein, D., et al. (1999). Music therapy increases serum melatonin levels in patients with Alzheimer disease. Alternative Therapies in Health Medicine, 5(6), 49-57.

CONTEXT: Music therapy is known to have healing and relaxing effects. Although these effects appear to be mediated by release of neurotransmitters and neurohormones, the specific neurohormonal systems involved have not been fully investigated.

OBJECTIVE: To assess the effects of a music therapy intervention on concentrations of melatonin, norepinephrine, epinephrine, serotonin, and prolactin in the blood of a group of patients with Alzheimer's disease.

DESIGN: Blood samples were obtained before initiating the therapy, immediately at the end of 4 weeks of music therapy sessions, and at 6 weeks follow-up after cessation of the sessions.

SETTING: Miami Veterans Administration Medical Center, Miami, Fla. PATIENTS: 20 male inpatients with Alzheimer's disease. INTERVENTION: 30- to 40-minute morning sessions of music therapy 5 times per week for 4 weeks.
MAIN OUTCOME MEASURES: Changes in melatonin, norepinephrine, epinephrine, serotonin, and prolactin following music therapy.
RESULTS: Melatonin concentration in serum increased significantly after music therapy and was found to increase further at 6 weeks follow-up. A significant increase was found between baseline values and data recorded after the music therapy sessions as well as at 6 weeks follow-up. Norepinephrine and epinephrine levels increased significantly after 4 weeks of music therapy, but returned to pretherapy *levels at 6 weeks follow-up. Serum concentration of prolactin and platelet serotonin levels remained unchanged after 4 weeks of music therapy and at 6 weeks follow-up.*
CONCLUSION: Increased levels of melatonin following music therapy may have contributed to patients' relaxed and calm mood.

Ledger, A. J. & Baker, F. A. (2007). An investigation of long-term effects of group music therapy on agitation levels of people with Alzheimer's disease. Aging & Mental Health, 11(3), 330-338.

This study aimed to investigate the long-term effects of group music therapy on agitation manifested by nursing home residents with Alzheimer's disease. A non-randomised experimental design was employed with one group receiving weekly music therapy (n = 26) and another group receiving standard nursing home care (n = 19). Agitation levels were measured five times over one year using the Cohen-Mansfield Agitation Inventory (Cohen-Mansfield, J. (1989). Agitation in the elderly. In N. Billig & P. V. Rabins (Eds.), Issues in geriatric psychiatry (pp. 101–113). Basel, Switzerland: Karger). Although music therapy participants showed short-term reductions in agitation, there were no significant differences between the groups in the range, frequency, and severity of agitated behaviours manifested over time. Multiple measures of treatment efficacy are necessary to better understand the long-term effects music therapy programs have on this population.

Lin, Y., Chu, H., Yang, C. Y., Chen, C. H., Chen, S. G., Chang, H. J., et al. (2011). Effectiveness of group music intervention against agitated behavior in elderly persons with dementia. International Journal of Geriatric Psychiatry, 26(7), 670-678.

This study explored the effectiveness of group music intervention against agitated behavior in elderly persons with dementia. This was an experimental study using repeated measurements. Subjects were elderly persons who suffered from dementia and resided in nursing facilities. In total, 104 participants were recruited by permuted block randomization and of the 100 subjects who completed this study, 49 were in the experimental group and 51 were in the control group. The experimental group received a total of twelve 30-min group music intervention sessions, conducted twice a week for six consecutive weeks, while the control group participated in normal daily activities. In order to measure the effectiveness of the therapeutic sessions, assessments were conducted before the intervention, at the 6th and 12th group sessions, and at 1 month after cessation of the intervention. Longitudinal effects were analyzed by means of generalized estimating equations (GEEs). After the group music therapy intervention, the experimental group showed better performance at the 6th and 12th sessions, and at 1 month after cessation of the intervention based on reductions in agitated behavior in general, physically non-aggressive behavior, verbally non-aggressive behavior, and physically aggressive behavior, while a reduction in verbally aggressive behavior was shown only at the 6th session. Group music intervention alleviated agitated behavior in elderly persons with dementia. We suggest that nursing facilities for demented elderly persons incorporate group music intervention in routine activities in order to enhance emotional relaxation, create inter-personal interactions, and reduce future agitated behaviors.

Lipe, A. (1995). The use of music performance tasks in the assessment of cognitive functioning among older adults with dementia. Journal of Music Therapy, 32, 137-151.

The purpose of this study was to determine the usefulness of music task performance in the assessment of cognitive functioning among older adults with dementia. A secondary purpose was preliminary development of a protocol to be used in this type of assessment. Subjects in the study were 32 women aged 57–99 years who resided in a nursing home or attended an adult day care center. Data were collected by means of the Mini-Mental State Exam (MMSE), the Brief Cognitive Rating Scale (BCRS), the Severe Impairment Battery (SIB), and 19 specially designed music performance tasks which emphasized verbal, singing, and rhythm skills. Information on music training, experience, and attitude also was collected. Four research questions were formulated for the study which examined the relationships between training, experience and attitude about music and music task performance; relationships between cognitive and music task performance; differences between individuals with and without dementia with respect to music task performance, and dependability of music task performance items. Minimal relationships were found between music background variables and music task performance, however, strong relationships were found between cognitive and music task performance. Significant differences on music performance tasks between individuals with and without dementia emerged, and music performance tasks were found to be consistent and to have good discriminatory ability. Implications of these findings for the professional credibility of music therapy are discussed, as are recommendations for further development of the music performance protocol.

Lord, T. R. & Garner, J. E. (1993). Effects of music on Alzheimer patients. Perceptual and Motor Skills, 76(2), 451-455.

From a large nursing care facility, 60 elderly patients diagnosed as having Alzheimer disease were randomly separated into three groups of equal size and given tests to measure their mood and mental state. For music Group 1, "Big Band" music from the 1920s and 1930s was played during their daily recreation period while Group 2 were given puzzle exercises during their activity sessions. Members of Group 3 participated in the standard recreational activities of drawing and painting. After six months, the questionnaire was again given to all participants. Analysis of variance showed the individuals in Group 1 were more alert, happier, and had higher recall of past personal history than patients in the other two groups. This suggests that music can be of therapeutic value to Alzheimer patients.

Moussard, A., Bigand, E., Belleville, S. & Peretz, I. (2012). Music as an aid to learn new verbal information in Alzheimer's disease. Music Perception: An Interdisciplinary Journal, 29(5), 521-531.

The goal of this study is to assess whether new lyrics are better learned and memorized when presented in a spoken or sung form. In normal young adults, mixed results have been reported, with studies showing a positive, a negative, or a null effect of singing on verbal recall. Several factors can account for this limited aid of music. First, the familiarity of the melody might play a role. Second, successive learning sessions and long-term retention intervals may be necessary. These two factors are considered here in a case study of a participant who suffers from mild Alzheimer's disease. As expected, initial learning of new lyrics showed better performance for the spoken condition over the sung version unless the lyrics are learned on a familiar melody. After repeated learning episodes, learning sung lyrics – even on an unfamiliar melody – led to better retention of words. Thus, music may provide a more robust aid for consolidation in memory than spoken lyrics alone. The therapeutic implications of these results are discussed

Park H. & Pringle-Specht J. K. (2009). Effect of individualized music on agitation in individuals with dementia who live at home. Journal of Gerontological Nursing, 35(8), 47-55.

Twenty in-home family caregivers were trained in the use of the evidence-based protocol for individualized music. Outcome measures included the modified Cohen-Mansfield Agitation Inventory (Cohen-Mansfield, 1986). A quasi-experimental design was used in which individualized music was implemented two times per week for two weeks. Statistical analysis identified a significant reduction in agitation during the intervention period compared to baseline and post-intervention periods.

Raglio, A., Bellelli, G., Traficante, D., Gianotti, M., Ubezio, M., Gentile, S., et al. (2010). Efficacy of music therapy treatment based on cycles of sessions: A randomised controlled trial. Aging & Mental Health, 14(8), 900-904.

We undertook a randomised controlled trial to assess whether a music therapy (MT) scheme of administration, including three working cycles of one month spaced out by one month of no treatment, is effective to reduce behavioural disturbances in severely demented patients. Sixty persons with severe dementia (30 in the experimental and 30 in the control group) were enrolled. Baseline multidimensional assessment included demographics, Mini Mental State Examination (MMSE), Barthel Index and Neuropsychiatry Inventory (NPI) for all patients. All the patients of the experimental and control groups received standard care (educational and entertainment activities). In addition, the experimental group received three cycles of 12 active MT sessions each, three times a week. Each 30-min session included a group of three patients. Every cycle of treatment was followed by one month of wash-out. At the end of this study, MT treatment resulted to be more effective than standard care to reduce behavioural disorders. We observed a significant reduction over time in the NPI global scores in both groups ($F_{7,357} = 9.06$, $p < 0.001$) and a significant difference between groups ($F_{1,51} = 4.84$, $p < 0.05$) due to a higher reduction of behavioural disturbances in the experimental group at the end of the treatment (Cohen's d = 0.63). The analysis of single NPI items shows that delusions, agitation and apathy significantly improved in the experimental, but not in the control group. This study suggests the effectiveness of MT approach with working cycles in reducing behavioural disorders of severely demented patients.

Raglio, A., Galandra, C., Sibilla, L., Esposito, F., Gaeta, F. et al. (2015). Effects of active music therapy on the normal brain: fMRI based evidence. Brain Imaging and Behavior, 1-5.

The aim of this study was to investigate the neurophysiological bases of Active Music Therapy (AMT) and its effects on the normal brain. Twelve right-handed, healthy, non-musician volunteers were recruited. The subjects underwent 2 AMT sessions based on the free sonorous-music improvisation using rhythmic and melodic instruments. After these sessions, each subject underwent 2 fMRI scan acquisitions while listening to a Syntonic (SP) and an A-Syntonic (AP) Production from the AMT sessions. A 3 T Discovery MR750 scanner with a 16-channel phased array head coil was used, and the image analysis was performed with Brain Voyager QX 2.8. The listening to SP vs AP excerpts mainly activated: (1) the right middle temporal gyrus and right superior temporal sulcus, (2) the right middle frontal gyrus and in particular the right precentral gyrus, (3) the bilateral precuneus, (4) the left superior temporal sulcus and (5) the left middle temporal gyrus. These results are consistent with the psychological bases of the AMT approach and with the activation of brain areas involved in memory and autobiographical processes, and also in personal or interpersonal significant experiences. Further studies are required to confirm these findings and to explain possible effects of AMT in clinical settings.

Raglio, A., Bellelli, G., Traficante, D., Gianotti, M., Ubezio, M. C., Villani, D., et al. (2008). Efficacy of music therapy in the treatment of behavioral and psychiatric symptoms of dementia. Alzheimer Disease & Associated Disorders, 22(2), 158-162.

This study assessed the effectiveness of music therapy in reducing behavioral and psychologic symptoms (BPSD) of dementia.

Fifty-nine persons with dementia were enrolled in the study. All of them underwent a multidimensional assessment including Mini Mental State Examination, Barthel Index and Neuropsychiatry Inventory at enrolment and after 8, 16, and 20 weeks. Subjects were randomly assigned to experimental (n=30) or control (n=29) group. The MT sessions were evaluated with standardized criteria. The experimental group received 30 MT sessions (16 wk of treatment), whereas the control group received educational support or entertainment activities.

NPI total score significantly decreased in the experimental group at 8th, 16th, and 20th weeks (interaction time× group: $F_{3, 165}$=5.06, P=0.002). Specific BPSD (ie, delusions, agitation, anxiety, apathy, irritability, aberrant motor activity, and night-time disturbances) significantly improved. The empathetic relationship and the patients' active participation in the MT approach, also improved in the experimental group.

The study shows that MT is effective to reduce BPSD in patients with moderate-severe dementia.

Ragneskog, H., Asplund, K., Kihlgren, M. & Norberg, A. (2001). Individualized music played for agitated patients with dementia: Analysis of video-recorded sessions. International Journal of Nursing Practice, 7(3), 146-155.

Researchers from Sweden and Norway evaluated the effects of individualized music in reducing agitation in four subjects with dementia. Subjects were video recorded during periods of no music, classical music, and individualized music. Individualized music selections were chosen after interviewing the patients, the patients' next of kin, and the nursing staff. The comparison intervention involved a New Age recording of classical music (Pachelbel) and ocean sounds. Video recordings were analyzed by using the Facial Action Coding System (FACS). Two subjects became notably calmer and two became marginally calmer during individualized music sessions compared to baseline and classical music intervention. The researchers emphasize the importance of correctly identifying the personal music preference on the outcomes of this intervention.

Resano, C. S., Mercadal-Brotons, M., Galati, A. & Castro, M. D. (2011). Quality of life in institutionalized elderly people with moderate-severe dementia: Contributions from music therapy. International Journal of Developmental and Educational Psychology, 4, 231-236.

Different studies show the benefits of music therapy on the Quality of Life of people with dementia, especially on the maintenance of preserved skills, expression, and socialization. The objectives of this presentation are: (1) To present empirical data on the effects of music therapy programs on the quality of life of elderly people with moderate-severe dementia, who live in nursing homes; and (2) To identify and analyze the changes in affect that may take place during music therapy sessions. The design used was quasi-experimental pretest/posttest. The sample included 10 people with moderate-severe dementia. The scale GENCAT on quality of life (Verdugo, 2008) was administered at two different times: At sessions 1 and 12; and sessions 1, 6, and 12 were recorded for "post-hoc" analysis. Data were analyzed with Windows software (version 17) and SCRIBE 4.1, depending on the objectives. Results show no changes in the overall quality of life, but positive changes in the emotional well-being and personal development subscales. Also video observations show positive changes in affect after the music therapy program

Reuer, B., Guy, J., Sturley, A., Soskins, M. & Lewis, C. (2011). Feasibility of conducting a music therapy study with hospice patients with dementia and agitation. Voices: A World Forum for Music Therapy, 11(2).

This study's purpose was to explore non-pharmacological means for decreasing agitation in hospice patients with late stage dementia administered by caregivers. Subjects in the study were patients on service with San Diego Hospice and the Institute for Palliative Medicine, diagnosed with late stage dementia, as determined by a FAST (Functional Assessment Staging) score of 7, and who were known

to become agitated while performing certain tasks (e.g., bathing or eating). A music therapist assessed the subjects using an adaptation of the Music Therapy Assessment (Krout, 2000). The Short Portable Mental Status Questionnaire (SPMSQ) and Blessed Dementia Scale were administered pre- and post- intervention to assess cognitive functioning severity of dementia, respectively. Caregivers were trained to administer the Agitated Behavior Scale (ABS) after performing the stressful task without music (baseline). The music therapist created a CD for each subject based on the following: a) music background/preferences of subject (preferred styles of music, favorite selections or artists), obtained from family/caregiver, and b) subject responses observed during the assessment. Caregivers were instructed to complete the agitated task during the music intervention and immediately following the task completed an ABS evaluation. Out of the 51 patients referred for the study, 11 met inclusion criteria and were consented. Eight subjects completed the study. According to demographic information the majority of subjects were female, had previous music experience, and lived in a skilled nursing facility. The most frequent agitated task was bathing, which caused agitation in 75% of subjects. SPMSQ results indicated all patients had severe cognitive impairment and pre-/post-scores were the same. Pre-music intervention ABS scores were a mean of 23.46 (SD=5.8), and a mean of 20.69 (SD=7.1) for post-music intervention. This indicated that subjects became slightly less agitated overall though the effects were not statistically significant (t (7) = 1.41, p=0.2). Further analysis was unwarranted due to the lack of statistical significance and the small sample size. Two subjects demonstrated decreased agitation levels. Study limitations, implications for further research, and feasibility of research with late stage dementia patients receiving hospice care are discussed by the researchers.

Ridder, H. M. O., Stige, B., Qvale, L. G. & Gold, C. (2013). Individual music therapy for agitation in dementia: An exploratory randomized controlled trial. Aging & Mental Health, 17(6), 667-678.

Objectives: Agitation in nursing home residents with dementia leads to increase in psychotropic medication, decrease in quality of life, and to patient distress and caregiver burden. Music therapy has previously been found effective in treatment of agitation in dementia care but studies have been methodologically insufficient. The aim of this study was to examine the effect of individual music therapy on agitation in persons with moderate/severe dementia living in nursing homes, and to explore its effect on psychotropic medication and quality of life.

***Method:** In a crossover trial, 42 participants with dementia were randomized to a sequence of six weeks of individual music therapy and six weeks of standard care. Outcome measures included agitation, quality of life and medication.*

***Results:** Agitation disruptiveness increased during standard care and decreased during music therapy. The difference at !6.77 (95% CI (confidence interval): !12.71, !0.83) was significant (p ¼ 0.027), with a medium effect size (0.50). The prescription of psychotropic medication increased significantly more often during standard care than during music therapy (p ¼ 0.02).*

***Conclusion**: This study shows that six weeks of music therapy reduces agitation disruptiveness and prevents medication increases in people with dementia. The positive trends in relation to agitation frequency and quality of life call for further research with a larger sample.*

Salimpoor, V. N., Benovoy, M., Larcher, K., Dagher, A. & Zatorre, R. J. (2011). Anatomically distinct dopamine release during anticipation and experience of peak emotion to music. Natural Neurosciences, *14*, 257-262.

Music, an abstract stimulus, can arouse feelings of euphoria and craving, similar to tangible rewards that involve the striatal dopaminergic system. Using the neurochemical specificity of [^{11}C]raclopride positron emission tomography scanning, combined with psychophysiological measures of autonomic nervous system activity, we found endogenous dopamine release in the striatum at peak emotional arousal during music listening. To examine the time course of dopamine release, we used functional magnetic resonance imaging with the same stimuli and listeners, and found a functional dissociation:

the caudate was more involved during the anticipation and the nucleus accumbens was more involved during the experience of peak emotional responses to music. These results indicate that intense pleasure in response to music can lead to dopamine release in the striatal system. Notably, the anticipation of an abstract reward can result in dopamine release in an anatomical pathway distinct from that associated with the peak pleasure itself. Our results help to explain why music is of such high value across all human societies.

Särkämö, T., Laitinen, S., Tervaniemi, M., Numminen, A., Kurki, M. & Rantanen, P. (2012). Music, emotion, and dementia: Insight from neuroscientific and clinical research. Music and Medicine, 4(3), 153-162.

Music has an important meaning in the lives of many elderly persons. Its capacity to evoke emotions and influence mood and arousal is often relatively well preserved also in dementia. Neuroscientific and clinical research has increased our understanding about the mechanisms underlying music enjoyment and its therapeutic effects. This article reviews previous studies that address the neural basis of music cognition and emotion. We also introduce the effects of varying music interventions on emotional and cognitive functioning in dementia. Findings suggest that both traditional music therapy and caregiver-implemented music activities may have the capacity to reduce emotional and behavioral disturbances in dementia, although firm conclusions about the long- term effects of music still remain elusive. The rapid growth of dementia warrants study in the rehabilitative effects of everyday musical leisure activities or hobbies, such as music listening and singing, on well-being in dementia, especially in its early stages.

Sun, Y. L. (2012). The effect of music therapy interventions to increase the psychosocial well-being of older adults living in independent and assisted living communities. Master Thesis, The Florida State University.

The purpose of this study was to examine the effect of group music therapy sessions on the psychosocial well-being of older adults living in assisted and independent living communities. Pre-and posttest was used in two different communities with twenty one participants who engaged in group music therapy sessions for eight consecutive weeks. All sessions included following interventions: music listening, singing, lyric analysis, and music-assisted movements. The researcher tested and compared participants' life satisfaction, happiness, self-esteem, and social interaction by conducting and analyzing pre and posttests. The researcher also examined whether participants' demographic variables such as age and gender would influence their psychosocial well-being. Results indicated that there were significant effect of group music therapy sessions on their life satisfaction, self-esteem, and social interaction. Further analyses of participants' demographic variables on their psychosocial well-being showed that gender indicated significant influence on their self-esteem and social interaction. These findings of the present study have implicated that the group music therapy sessions may increase the level of psychosocial well-being of older adults living in independent and assisted living communities.

Sung, H. C., Chang, A. M. & Abbey, J. (2006). The effects of preferred music on agitation of older people with dementia in Taiwan. International Journal of Geriatric Psychiatry, 21(10), 999-1000.

Sung and colleagues focused on the resident's response to individualized music when implemented by trained nursing staff. The Cohen-Mansfield Agitation Inventory (Cohen-Mansfield, 1986) was used to measure the dependent variable. The sample included an experimental group (n=32) that received individualized music for 30 minutes, twice per week over 6 weeks. The control group (n=25) received usual care without music. Findings showed that the experimental group had a statistically significant reduction in overall agitation ($t = - 2.19$, $p < 0.05$) and physically non-aggressive behaviors ($t = -3.75$, $p < 0.0001$) compared to the control group.

Sung, H. C., Chang, A. M. & Lee, W. L. (2010). A preferred music listening intervention to reduce anxiety in older adults with dementia in nursing homes. Journal of Clinical Nursing, 19(7-8), 1056-1064.

Sung and colleagues conducted a study in Taiwan to evaluate the evidence-based protocol of individualized music on the outcome measure of anxiety. Trained nursing staff implemented the protocol for 23 persons with ADRD, who resided in a long-term care facility. The researchers adapted The Assessment of Personal Music Preference Questionnaire (Gerdner, Hartsock & Buckwalter, 2000) to be culturally meaningful for the Taiwanese and Chinese sample. The outcome variable was measured using the Rating Anxiety in Dementia (RAID) tool. It should be noted that some items such as restlessness overlap with items represented on the CohenMansfield Agitation Inventory (Cohen-Mansfield, 1986). The intervention was implemented biweekly for six weeks. Statistical analysis was conducted using an ANCOVA. Persons in the experimental group had a significantly lower level of anxious behaviors [F=12.15, p=0.001] when compared to the control group who received "standard care."

Sung, H. C. & Chang, A. M. (2005). Use of preferred music to decrease agitated behaviours in older people with dementia: A review of the literature. Journal of Clinical Nursing, 14(9), 1133-1140.

This paper reviews study findings of preferred music on agitated behaviours for older people with dementia and provides implications for future research and practice. The review was undertaken using electronic databases with specified search terms for the period of 1993–2005. The references listed in the publications selected were also searched for additional studies.

Eight research-based articles met the inclusion criteria and were included in the review. The preferred music intervention demonstrated positive outcomes in reducing the occurrence of some types of agitated behaviours in older people with dementia. The findings from these studies were relatively consistent in finding improvement in agitated behaviours although the findings in one study did not reach statistical significance. The small sample sizes and some variations in the application of the preferred music intervention mean that caution is needed in drawing conclusions from these studies. This review highlights that preferred music has positive effects on decreasing agitated behaviours in older people with dementia; however, the methodological limitations indicate the need for further research.

Sung, H-C., Chang, S-M., Lee, W-l. & Lee, M-S. (2006). The effects of group music with movement intervention on agitated behaviours of institutionalized elders with dementia in Taiwan. Complementary Therapies in Medicine, 14(2), 113-119.

This study was to evaluate the effects of group music with movement intervention on occurrence of agitated behaviours of institutionalized elders with dementia in Taiwan.

A randomized controlled trial was used. Thirty-six institutionalized elders with dementia completed the study, with 18 in the experimental group receiving group music with movement intervention twice a week for 4 weeks and 18 in the control group receiving usual care without intervention. Modified Cohen-Mansfield Agitation Inventory was used to assess agitated behaviours at baseline, weeks 2 and 4.

Agitated behaviours were significantly reduced in the experimental group following 4 weeks of group music with movement intervention compared to that of the control group ($p < 0.001$*).*

Sung, H-C., Lee, W-L., Li, T-L. & Watson, R. (2012). A group music intervention using percussion instruments with familiar music to reduce anxiety and agitation of institutionalized older adults with dementia. International Journal of Geriatric Psychiatry, 27(6), 621-627.

This experimental study aimed to evaluate the effects of a group music intervention on anxiety and agitation of institutionalized older adults with dementia. A total of 60 participants were randomly assigned to an experimental or a control group. The experimental group received a 30-min music

intervention using percussion instruments with familiar music in a group setting in mid afternoon twice weekly for 6 weeks, whereas the control group received usual care with no music intervention. The Rating of Anxiety in Dementia scale was used to assess anxiety, and Cohen-Mansfield Agitation Inventory was used to assess agitation at baseline, week 4 and week 6.
*Repeated measures analysis of covariance indicated that older adults who received a group music intervention had a significantly lower anxiety score than those in the control group while controlling for pre-test score and cognitive level (*F *= 8.98,* p *= 0.004). However, the reduction of agitation between two groups was not significantly different.*

Svansdottir, H. B. & Snaedal, J. (2006). Music therapy in moderate and severe dementia of Alzheimer's type: A case-control study. International Psychogeriatrics, 18(4), 613-621.

This case–control study was carried out by qualified music therapists in two nursing homes and two psychogeriatric wards. The participants were 38 patients with moderate or severe Alzheimer's disease (AD) assigned randomly to a music therapy group and a control group.
The study showed a significant reduction in activity disturbances in the music therapy group during a 6-week period measured with the Behavior Pathology in Alzheimer's Disease Rating Scale (BEHAVE-AD). There was also a significant reduction in the sum of scores of activity disturbances, aggressiveness and anxiety. Other symptoms rated by subscales of the BEHAVE-AD did not decrease significantly. Four weeks later the effects had mostly disappeared.

Ueda, T., Suzukamo, Y., Sato, M. & Izumi, S. I. (2013). Effects of music therapy on behavioral and psychological symptoms of dementia: a systematic review and meta-analysis. Ageing Research Reviews, 12(2), 628-641

Behavioral and psychological symptoms of dementia (BPSD) are common problems for patients and caregivers. Although music therapy is considered a non-pharmacological intervention for the management of BPSD, its effectiveness remains unclear. This study aimed to investigate the effects of music therapy on BPSD, cognitive function, and activities of daily living in patients with dementia. A literature search was conducted in the following databases: MEDLINE, CINAHL, PsycINFO, and Igaku Chuo Zasshi. We selected 20 studies, including randomized controlled trials, controlled clinical trials, cohort studies, and controlled trials, and conducted a meta-analysis using standardized mean differences (SMD). The results showed that music therapy had moderate effects on anxiety [SMD, −0.64; 95% confidence interval (CI), −1.05 – −0.24; p *= 0.002] and small effects on behavioral symptoms (SMD, −0.49; 95% CI, −0.82 – −0.17;* p *= 0.003). In studies of duration >3 months, music therapy had large effects on anxiety (SMD, −0.93; 95% CI, −1.72 – −0.13;* p *= 0.02). The present systematic review and meta-analysis suggests that music therapy is effective for the management of BPSD.*

Other Research

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