



Beating the Drum for Equality:

The Role of Music in Accessibility, Inclusion and
Disability Justice

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Introduction

It is now well known that playing outdoor musical instruments promotes relaxation, alleviates anxiety and nurtures well-being amongst both children and adults of all ages, and music therapy has long been recognized as having a powerful therapeutic effect.¹ Actively engaging with musical instruments has been proven to 'induce multiple responses – physiological, movement, mood, emotional, cognitive and behavioral'² and there are very few other stimuli that have been proven to have such a profound and positive impact on such a wide range of human functions and emotions. This white paper aims to collate some of the existing research that gestures towards the correlative relationship between outdoor musical play and its benefits for people with a wide range of disabilities.

Firstly, we will examine studies that show the ways in which musical engagement and outdoor music positively affect individuals of all ages with developmental disabilities: a diverse range of chronic conditions – encompassing various physical and mental impairments that develop from birth or childhood – that impact individuals to varying degrees. Depending on their severity, developmental disabilities often cause the individuals living with them to experience delays and difficulties in various areas: specifically in the areas of 'language, mobility, learning, self-help, and independent living'.³ The white paper will especially discuss the role that music plays in improving communication and self-expression, and thus its role in enabling community integration and cohesion for children and adults living with developmental disabilities that severely impact their day-to-day life. Next, the white paper will look at the positive impacts of music on individuals whose disabilities affect their education and who thus require additional learning support: specifically, children and adolescents with a range of learning disabilities and sensory processing disorders. Finally, the white paper will consider the ways in which music and musical play can be mobilized to improve accessibility and inclusion for individuals with not only intellectual, developmental, and learning disabilities but also those living with certain physical disabilities: including, but not limited to individuals with mobility issues, chronic pain issues and wheelchair users.

Studies that investigate the impacts of music, musical play and music therapies on adults and children with developmental disabilities, intellectual disabilities and acquired and congenital physical disabilities are growing in number, and it should thus come as no surprise that their findings tend to suggest that engagements with music, music therapies, and outdoor musical play can have significant psychological, social, emotional, and cognitive benefits for those living with these types of disabilities.^{4,5,6,7}

¹ Moula, Zoe, Karen Palmer, and Nicola Walshe. "A Systematic Review of Arts-Based Interventions Delivered to Children and Young People in Nature or Outdoor Spaces: Impact on Nature Connectedness, Health and Wellbeing." *Frontiers in Psychology*, 13, (2022).

² Francis, David 'The Powerful Role of Music in Society.', *Music Magic* (2008).

³ Center for Disease Control and Prevention. 'Developmental Disabilities.' CDC (2022).
<https://www.cdc.gov/ncbddd/developmentaldisabilities/index.html>

⁴ Lantigua, Katherine. "Developing a music-based selective attention training program for toddlers with developmental disabilities." *Music Therapy Perspectives*, 38.1 (2020): 61-68.

⁵ Yinger, Olivia Swedberg, et al. "Universal Design for Learning in a Music Camp: Perspectives and Musical Self-Efficacy of Children With Disabilities." *Update: Applications of Research in Music Education* (2022): 87551233221118905.

⁶ Mino-Roy, Jordan, et al. "Effects of music, dance and drama therapies for people with an intellectual disability: A scoping review." *British Journal of Learning Disabilities* 50.3 (2022): 385-401.

⁷ Rushton, Rosie, and Lila Kossyvak. "The role of music within the home-lives of young people with profound and multiple learning disabilities: Parental perspectives." *British journal of learning disabilities* 50.1 (2022): 29-40.

Music, Communication and Developmental Disabilities

Like physical exercise, music is for all ages, for all people, and has repeatedly been proven to lead to better mental and social health and wellbeing for those who participate in it, as various studies show.⁸⁹ Music helps to facilitate extra-linguistic forms of communication because of the ways in which it is able to transcend language and connect people to each other through pure sound. This experience can initiate powerful emotions for those involved, whether as participants or as spectators. It goes without saying, then, that for individuals for whom linguistic forms of communication (i.e. speech, listening, writing) are particularly difficult – or, perhaps, not even possible – the role played by music in terms of enabling social integration and cohesion can be hugely significant.

Recent scholarship in the field tends to suggest that playing musical instruments can lead to improved communication skills for those who participate and has been proven to be particularly beneficial for individuals with autistic spectrum disorders and for those living with dementia.¹⁰ Improved communication can lead to improved social skills and in addition provides individuals with the means of self-expression which is sometimes missing if verbal communication is difficult or limited. Playing musical instruments also promotes social development because people of all ages and abilities can play together, creating multi-generational interactions and facilitating enhanced community cohesion, communication and integration.¹¹ Some musical instruments are also tuned according to the pentatonic scale, which means that they consist of notes that can be played in any order and still sound harmonious.¹² These complimentary sounds encourage tactile play and creativity because it is impossible to produce 'wrong' notes. The sounds of pentatonically tuned instruments are always harmonious and so maximize the feelings of safety and creative exploration for people who play them and thus allow them greater freedom of expression. In turn, this means that people are likely to become less anxious and are more likely to engage with their peers, meaning that communication channels are opened. For individuals with intellectual or developmental disabilities that seriously affect their capacities for verbal communication, self-expression and co-playing with others through musical play can be a powerful tool.

As is confirmed by studies concerning the role of universal design in outdoor parks and learning spaces for individuals with certain developmental disabilities, the ways in which products and – in this case – outdoor musical instruments are distributed within a park setting also means that there is safe physical proximity between the instruments and so people whose disabilities cause them social anxiety when in close proximity to others are able to engage with other people without their personal space being compromised. This creates a sense of safety within the shared space which also leads to improved communication and this is especially evident in those with autism spectrum disorders,¹³ for example. When individuals who struggle with verbal communication are supported to communicate non-verbally by playing music with others, there is often evidence that their verbal communication improves as a result.¹⁴ For those with developmental delays relating to verbal communication, the contribution that music makes to language development and communication is particularly beneficial. One study, conducted by Kyle Pruett, clinical professor of child psychiatry at Yale School of Medicine, states that 'language competence is at the root of social competence. Musical experience strengthens the capacity to be verbally competent.'¹⁵ Playing musical instruments has been demonstrated to also increase confidence in people who participate, and this results in improved self-esteem.¹⁶ Individuals who live with certain developmental and physical disabilities, some studies suggest, can

⁸ Stegemann, Thomas, et al. "Music therapy and other music-based interventions in pediatric health care: an overview." *Medicines*, 6.1 (2019): 25.

⁹ Gustavson, Daniel E., et al. "Mental health and music engagement: review, framework, and guidelines for future studies." *Translational psychiatry* 11.1 (2021): 370.

¹⁰ See 'Sounds and the Spectrum' white paper at www.percussionplay.com/white-papers/

¹¹ Percussion Play. 'Play, Percussion and 'Post-Age' Pedagogy.' *Percussion Play*, 2021. www.percussionplay.com/white-papers/

¹² Percussion Play. 'One Note to Rule Them All.' *Percussion Play*, 2018. www.percussionplay.com/white-papers/

¹³ Percussion Play's 'Duo' is an instrument which has designed specifically for individuals with autism spectrum disorders.

¹⁴ Brown, LL. 'The Benefits of Music Education.' *PBS* <http://www.pbs.org/parents/education/music-arts/the-benefits-of-music-education/>

¹⁵ Ibid.

¹⁶ See 'Music Matters' white paper at www.percussionplay.com/white-papers/

be placed at greater risk of lower self-esteem and confidence, lower self-cognition (perceptions of how other people view them), and higher likelihood of self isolation than those of their peers: a phenomenon especially prevalent for women with these disabilities. These social impairments also pave the way for structural barriers to these individuals in society in relation to self actualization. Another study, conducted by Margaret A. Nosek and colleagues at the Baylor College of Medicine, demonstrated that women with disabilities who experienced lower self-esteem are also thus more likely to receive 'significantly less education, more overprotection during childhood, poorer quality of intimate relationships, and lower rates of salaried employment'.¹⁷ The role of music in providing an area for safe exploration, experimentation, play, connection, and self-expression therefore cannot be overstated given its proven impacts upon self-esteem, language development, communication and much more. When individuals enjoy success in making music they are empowered, and this can have a huge positive impact on their quality of life as they begin to appreciate all that they can achieve.

Further Benefits of Music for Individuals with Developmental Disabilities

According to MedlinePlus, developmental disabilities can be categorized as 'severe, long-term problems'¹⁸ and can be both physical and mental: sometimes both.¹⁹ Developmental disabilities are said to be 'usually life-long and [likely to] affect everyday living'.²⁰ There are many theorized causes of certain developmental disabilities, including premature birth, prenatal exposure to substances, genetic or chromosome abnormalities and viral infections during pregnancy. Whilst there is not usually a 'cure' — indeed, as many disability advocacy organizations focused on a social model of disability would suggest, disabilities do not require 'cures' but rather more inclusive and accessible environments — therapies including speech therapy, occupational therapy and physiotherapy can help to alleviate some of the most challenging elements of certain disabilities and attending tailored education classes, learning within an accessible and inclusive school setting and receiving psychological counselling to manage social isolation and self-esteem issues can also help. Because music plays an essential role in enhancing human development in the early years,²¹ playing musical instruments can have a pronounced effect on those experiencing developmental delays from very early childhood through into adolescence.

One study led by Susan Hallam, Professor of Education and Music Psychology at University College London, found that active involvement in music making can 'increase self-esteem and promote the development of a range of social and transferable skills'.²² For those experiencing developmental disabilities, opportunities to improve the skills that they do have, and to develop new ones are to be encouraged and music has long been a pathway to overcoming some of the problems that these individuals often face. Furthermore, research by the Dana Foundation²³ discovered that children who received musical education improved their ability to discriminate between sounds and increased their performance in fine motor tasks. When brain imaging was carried out on the children after they had completed 15 months of weekly music lessons it was found that the networks in their brains associated with these abilities had changed.²⁴ By extension, it might also be inferred from this that teenagers and adults who have limited development in these neural areas would also benefit from having regular music lessons and/or music therapy to improve their fine motor skills and auditory recognition. Studies have also shown that vibroacoustic music reduces self-injurious behaviors and aggressive destructive behaviors that can sometimes be

¹⁷ Nosek, Margaret A., et al. "Self-esteem and women with disabilities." *Social science & medicine* 56.8 (2003): 1737-1747.

¹⁸ MedlinePlus. 'Developmental Disabilities.' *MedlinePlus*, <https://medlineplus.gov/>

¹⁹ MedlinePlus is the National Institute of Health's website and is produced by the US National Library of Medicine.

²⁰ Ibid.

²¹ See 'Music Matters' white paper at www.percussionplay.com/white-papers/

²² Hallam, Susan 'The Power of Music: Its impact on the intellectual, social and personal development of children and young people.' *International Journal of Music Education* (2010) Vol 28, issue 3.

²³ A private philanthropic organization that supports brain research.

²⁴ Brown, LL 'The Benefits of Music Education'.

evident in individuals with developmental disabilities.²⁵ Vibroacoustic music is created when musical instruments produce sound vibrations and in recent times vibroacoustic therapy has become more prevalent. Vibroacoustic therapy is based on the principle that 'life is vibration'²⁶ and that because everything (including the human body) is made of matter, vibrations can be utilized to 'bring the body into a state of healthy resonance'²⁷.

One prominent theory as to why this works is because our bodies are composed of about 80% water and this water is set in motion when the body is exposed to sound vibrations. The theory is that as the water is moved by the vibrations, molecules within the water begin to communicate with each other and 'harmony and a healthy resonance'²⁸ are restored in the body as a result. Some outdoor musical instruments such as Percussion Play's 'Tubular Bells, Colossus and Emperor Chimes create strong vibrations when played and when the player stands 'inside' the musical space they find that they can feel the vibrations within their body and can therefore access the powerful benefits of vibroacoustic. The beauty of music is that in addition to helping individuals overcome some of the limitations imposed upon them by their disability, it can also make life meaningful and this is especially evident in those who suffer from poor mental health as a result of their disability. It can be incredibly challenging to live with, or care for someone who is living with a disability or disorder, and so music can provide a joyful interlude where everyone can live in the moment and create positive memories.

From an evolutionary perspective, music's value revolves around its ability 'to help people with cognitive dissonance'²⁹ which is the intense feeling of mental discomfort that arises when a person is unable to access or express their 'true' nature. Cognitive dissonance is often experienced by those with developmental delays and disabilities because there is more likely to exist a conflict between their own understanding of their emotions and behaviors and how these are viewed by their peers who do not have disabilities. Often, behaviors which are useful coping strategies for the individual are viewed as being socially unacceptable by wider society and this creates feelings of discord and mental discomfort which can be difficult to overcome. Music is a medium which enables us to get 'back in touch' with our true, unfiltered selves. By accessing our true natures in this way, we are connecting with our innate humanity and in so doing we can all reach a higher stage of self-awareness and development. For those with developmental disabilities this can help to alleviate mental distress because cognitive dissonance is eliminated in these musical encounters.

Benefits of Music for Individuals with Learning Disabilities

Individuals with learning disabilities or learning difficulties may present with either a wide range of problems or specific issues given the broad spectrum of disability and/or difficulty that these terms cover. For example, in a school setting, some students may experience issues or difficulties with a particular area of learning such as understanding and using letters or numbers, whilst others may have decreased capacity in social and/or behavioral skills. However, despite these difficulties in socialization and communication faced by people with learning disabilities or difficulties, and thus structural barriers to progressing in both their formal academic and social education, there is significant evidence to suggest that many individuals 'show a strong preference for music and are able to understand simple and complex musical emotions'.³⁰ Carl Orff, the German composer,³¹ believed that music was incredibly important to a young child's education and observed that the pentatonic scale seemed to be natural to children and was evident in their playground rhymes and chants.³² Using music and musical play activities to enable children who have certain learning disabilities or developmental disabilities to engage and flourish in a school environment is especially beneficial as music education teaches a whole range of skills and social

²⁵ Lundqvist, L., Andersson, G., Viding, J. 'Research in Autism Spectrum Disorders.' (2008); 3, 390-400.

²⁶ VibroAcoustic Therapy. 'What is Vibroacoustic Therapy?' *VibroAcoustic Therapy*, 2023. <https://vibroacoustictherapy.com/about>

²⁷ Ibid.

²⁸ Ibid.

²⁹ Perlovsky L et al. 'Mozart Effect, Cognitive Dissonance and the Pleasure of Music' (2013)

³⁰ Molnar-Szakacs and Heaton 'Annals of the New York Academy of Sciences' (2012)

³¹ Carl Orff was a German composer who developed an influential approach towards music education for children

³² Pearlman, E 'The Versatile Pentatonic Scale' (2013)

behaviors in a natural, non-confrontational and inobtrusive way. As previously mentioned, the fact that pentatonically tuned instruments in particular are harmonious and cannot make harsh sounds means that even those who may struggle to achieve in other areas of academic or social life can achieve in music and this, in turn, as previously explored, can contribute to a reduction in feelings of self isolation and low self-esteem.

There is also a demonstrable increase in our dopamine levels when we listen to or play music.³³ Dopamine is the chemical in our brain that is activated when we experience pleasure and it plays a vital role in our survival. Individuals with learning disabilities or difficulties are often at greater risk of experiencing decreased dopamine levels³⁴ because their lives are more likely entail more frustrations and they are sometimes unable to access the types of sensory experiences that contribute to increased levels of dopamine. It is essential to note that this is at least partially due to the ways in which modern society is structured in ways that often present structural barriers to people with disabilities in relation to social mobility, communication modes and paths to employment and progression, For this reason, playing musical instruments can be a powerful and very accessible way to increase these feel-good chemicals and enhance the quality of life for those who have learning disabilities and difficulties. Playing musical instruments also provides a sense of achievement for people who may not often experience this feeling. Playing an instrument like the ones produced by Percussion Play presents an achievable goal and playing can be improved with practice which means that skills can easily be improved. Individuals who master even the smallest goal in music will feel pride and a sense of achievement which increases their sense of self-esteem.

Children with learning disabilities often find it difficult to engage in school and an enjoyable subject like music can help to keep the child engaged and interested. Because outdoor musical instruments, such as the instruments produced by Percussion Play are visually varied and have different shapes and forms, children are also encouraged to engage and explore the differences between them which promotes exploration and imagination.

The Benefits of Music for Individuals with Sensory Processing Disorders

A Sensory Processing Disorder (SPD) is 'a condition in which the brain has trouble receiving and responding to information that comes in through the senses'.³⁵ Although sensory processing disorders are becoming more recognized as common afflictions by the medical profession they are still not currently recognized as a distinct medical condition³⁶ which makes diagnosis and accessing treatment difficult. These barriers are particularly significant when one is to consider that research has found that 1 in 20 children in the US experiences symptoms of Sensory Processing Disorder to a degree significant enough that it impacts their ability to participate in everyday life.³⁷ Common symptoms of sensory processing disorders include oversensitivity to things within the environment. Everyday sounds may be painful or overwhelming and even very light touches, for example wearing certain types of clothing, may cause discomfort. Other individuals may exhibit a lack of coordination, a lack of spatial awareness and they may find it difficult to engage in conversation or interact with others socially. Although sensory processing disorders are usually identified in childhood, they tend to be lifelong conditions and so also affect individuals into adulthood.

Sensory processing disorders are often associated with other developmental conditions such as autism spectrum disorders, and like these conditions, they also exist on a spectrum and in some cases affect one sense (like hearing or touch) and in other cases they affect multiple senses. Individuals with a sensory processing disorder can present with both over and under-responsiveness to stimuli. For example, 'the sound of a leaf blower outside the window may cause them to vomit or dive under the table. They may scream when touched. They may recoil from the textures of certain foods'.³⁸ Other children

³³ Salimpoor, Benovy et al 'Anatomically distinct dopamine release during anticipation and experience of peak emotion to music' (2011) Nature Neuroscience Volume 14 (2011)

³⁴ Mental Health Daily website 'Low Dopamine Levels: Symptoms & Adverse Reactions'.

³⁵ 'Sensory Processing Disorder' WebMD Website

³⁶ *ibid.*

³⁷ Bennie, Maureen. 'The DSM-V and Sensory Processing Disorder.' *Autism Awareness Centre*, 2010.
<https://autismawarenesscentre.com/the-dsm-v-and-sensory-processing-disorder/>

may be completely unresponsive to anything around them and fail to respond to extreme pain, heat or cold for example. Because sensory processing disorder isn't a recognized medical diagnosis currently, many families with an affected child struggle to get the support and help that they need. If help is available, the treatment will depend on the individual needs of each child, but it generally involves helping children get used to the things that they can't tolerate and helping them to improve at activities that they find difficult³⁹. The goal of 'sensory integration', as the treatment is known, is to 'challenge a child in a fun, playful way so he or she can learn to respond appropriately and function more normally'.⁴⁰ These challenges are designed to present the child with opportunities to master skills in the areas of relating, communicating and thinking and so playing musical instruments creates the perfect environment in which to develop these skills.

Playing musical instruments, particularly those within an outdoor setting, combines sound with movement in an interactive way and supports the establishment of positive responses to stimuli. This is because children with sensory processing disorders often display 'fight or flight' reflexes to unexpected sensations. Many observers have found that with musical instruments these fights, or flight reactions are very rarely seen.⁴¹ Children are generally calmer because the sensations are pleasant and anticipated and because their whole bodies are engaged in making music, they can access the music holistically which reduces fear and anxiety.

The Benefits of Music for Individuals with Physical Disabilities

There are many benefits to having access to outdoor musical instruments for individuals with physical disabilities: including, but not limited to those who are wheelchair users. Because, in a park, playground, or other outdoor community setting, instruments are generally already fixed and installed within a musical park or outdoor learning space, they do not require assembly, tuning or outside intervention. For individuals for whom their disabilities cause them to rely on others for care, the experience of being able to access, control, and play musical instruments independently and without outside assistance can be extremely beneficial. For this reason, the positioning, spacing out and construction of any musical instruments incorporated into these spaces is essential in order to maximise accessibility and maneuverability. Many of the outdoor musical instruments created by Percussion Play – particularly larger Marimbas such as the Akadinda, as well as various xylophones, metallophones, chimes and bells – have been designed specifically to accommodate wheelchair users and those who have reduced mobility. In addition to providing space around the instruments to navigate a wheelchair, ergonomically designed percussion instruments can also motivate an individual with mobility problems to expand the range of their movements to attain more sounds. This encourages balance and improved spatial orientation. Because, when installed and maintained correctly, outdoor musical instruments are safe and accessible, they can be played with very simple movements and are specially designed to have angles that maximize the ease of play for those in wheelchairs. They do not require strenuous movements to play and so the instruments are ideal for those who are limited physically.

For these reasons, music therapy is often used to assist with pain management,⁴² and the results of this can be very effective. Playing outdoor musical instruments specifically also promotes physical movement and whole-body engagement and so these types of instruments are often used in physiotherapy because they encourage the development of both fine and gross motor skills. The familiar sounds can also promote feelings of security in those who are resistant to change or who experience anxiety. Outdoor musical parks can additionally become environments which encourage social interaction and community integration, where all kinds of amateur musicians can play the same instruments together, regardless of physical ability or accessibility requirements. People from all walks of life are able to congregate in the same space to enjoy the instruments: thus working to break down any perceived social barriers which may exist. Outdoor musical instruments

³⁸ *ibid.*

³⁹ *ibid.*

⁴⁰ *ibid.*

⁴¹ Hall & Case-Smith. The effect of sound-based intervention on children with sensory processing disorders and visual-motor delays.' (2007)

⁴² Thompson, D 'Music Therapy for Pain Management.' Everyday Health, <https://www.everydayhealth.com/pain-management/music-therapy-for-pain-management.aspx>

transform the areas that they are placed in and can contribute to community regeneration through the ways in which inclusion, accessibility, and possibilities for togetherness are built-in to their very structure.

Outdoor musical instruments such as the ones produced by Percussion Play facilitate social interaction because they are colorful, visually stimulating and can thus encourage spontaneity in those who play them. There are no difficult movements required to play them and they can be easily accessed by those with various kinds of physical impairments. Music therapy provides a holistic way to address and manage a range of mobility issues and physical disabilities in a non-threatening, open-ended way. When individuals attending music therapy sessions are encouraged to play on musical instruments in an outdoor setting there is an even greater benefit: it is well known that being outside and connecting to the natural world has a multitude of additional benefits for both mental and physical health.⁴³ We know that movement is particularly beneficial for healthy brain development in infancy and provides the 'stimulation that the brain craves'⁴⁴ and so making music within a park setting where whole-body movement is certainly to be encouraged.

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⁴⁴ Centre of Development. 'Movement is key to learning,' *Paediatric Therapies* (2018)

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