

**The power of
music:
an exploration
of the evidence**

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The wider benefits of music

Initially most research was carried out with children and young people

Recently research has focused on older people and groups with particular challenges

The research has been undertaken in a range of disciplinary fields:

- neuroscience,
- psychology,
- music,
- health

Methodological issues

Different methods have been adopted.

The main issue relates to establishing causality.

Some methods only demonstrate relationships, not causality.

Correlational

Comparisons between musicians and non-musicians

Intervention research demonstrates causality

Systematic reviews take account of methodology

Meta analyses use statistical methods

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graph TD; Music((Music)) --- Top([Aural processing, language, literacy, spatial reasoning and mathematics, memory]); Music --- Left([Societal cohesion, inclusion, conflict resolution]); Music --- Right([Intellectual development, executive functioning, creativity, general attainment, music and studying]); Music --- Bottom([Personal, social and physical development, psychological well-being, physical and mental health]);
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Music

Aural processing, language, literacy, spatial reasoning and mathematics, memory

Societal cohesion, inclusion, conflict resolution

Intellectual development, executive functioning, creativity, general attainment, music and studying

Personal, social and physical development, psychological well-being, physical and mental health

aural processing

- Active engagement with music produces structural changes in the brain related to the processing of sound
- The quality of aural coding is related to the amount of training and the nature of instrumental requirements
- Improved aural processing facilitates phonological awareness, and improved language and literacy skills

Literacy

Phonological awareness is a precursor to early reading.

Decoding is strongly associated with auditory skills.

Reading involves mapping of letters and sounds, culminating in skilled reading, which involves the processing of phrases, sentences and larger multiple sources of information and their integration with relevant background information from the reader's own experiences.

Acquiring rhythmic skills seems to support literacy when children are experiencing difficulties.

Learning to read notation may have direct transfer effects to reading text as many underlying principles are similar for the two activities.

Spatial reasoning

- There is evidence for the impact of active engagement with music on spatial reasoning.
- The effects seem to be stronger when musical training is early and there is a focus on rhythm.
- Early research focused on listening to 20 minutes of Mozart and led to the so called ‘Mozart effect’ which was soon discredited.

Mathematics

The evidence for the impact of musical activity on mathematics performance is mixed.

Holmes and Hallam (2017) showed correlations between music and only some, rather than all, mathematical skills related to spatial reasoning. Changes in mathematical skills reliant on memory were much smaller. This finding suggests that the development of spatial skills may be a moderator between rhythmic instruction and attainment in some types of mathematics.

There is positive evidence from intervention studies where musical concepts are used to support the understanding of fractions

Working, aural and visual memory

- Research has focused on working memory, and auditory and visual memory.
- Musical training has been found to have long-term positive effects on auditory memory.
- The evidence related to visual memory is mixed.
- This may depend on the extent to which training involves learning to read musical notation.

General intelligence

- Those with musical training may have enhanced performance on a range of intellectual skills.
- Intervention studies with children have shown that active engagement with music impacts on IQ scores, particularly on elements related to spatial reasoning.
- If the quality of music tuition is poor and unstructured there is no impact.
- The longer the training the greater the impact

Executive functioning and self-regulation

- Executive functions are concerned with managing oneself and resources to achieve a goal. They cover neurologically based skills involving mental control and self-regulation.
- Executive functions include attentional control, working memory, inhibition, and problem-solving. Many of these are in the prefrontal cortex. There are differences in the frontal cortex of musicians and non-musicians
- Executive functioning may act as a mediator of the impact of musical engagement on intelligence
- Intervention studies have shown greater improvements in children in music groups in some executive functions as compared with controls.
- Participation in formal early music education classes is linked with better self-regulation skills in infants and pre-school children.

Creativity

- Musicians score higher on tests of creativity than non-musicians.
- Music intervention studies with young children have found enhanced creativity; the greater the engagement with music the stronger the relationship.
- The development of creative skills is likely to be particularly dependent on the type of musical engagement.

General attainment

- Some research has shown that across all school subjects except sport children who experience instrumental musical training have advantages even after general intelligence is controlled for.
- Evidence from music intervention studies has tended to show enhanced attainment from participants, although there are exceptions.
- High quality musical activities seem to affect aspirations which enhance motivation and subsequently attainment.
- Research with a range of disadvantaged groups supports this.

Personal development and self-beliefs

- Music plays a role in the development of identity in adolescence
- Positive feedback on musical engagement can impact positively on self-beliefs.
- The reverse is also true.
- Opportunities to perform and receive positive feedback are important in this process.
- Intervention studies have shown that school-based music classes can prevent a decline in global self-esteem measures.

Motivation

Active engagement with music is related to positive attitudes towards school and better attendance.

Musical activities can be effective in re-engaging disaffected students including those in the criminal justice system and those who are not in education, employment or training.

Participants' self-confidence and aspirations are enhanced and they may develop a range of transferable skills.

Music offers the potential for

- enhanced self-efficacy, self-esteem and self-concept;
- improvements in mood;
- reduced anger;
- increased motivation; and
- improved behaviour.

The context within which such projects operate is important in their success as are the musical genres focused on and the quality of the musical facilitators.

Pro-social behaviour and teamwork

Group music making in children and adults supports:

- pro-social behaviour;
- belongingness;
- enhanced relationships;
- collaborative learning; and
- teamwork.

Cross community music education projects have been effective in addressing prejudice amongst young people.

Empathy and emotional intelligence

Participation in active music making can increase the development of empathy and emotional sensitivity in children.

Musicians tend to have higher trait emotional intelligence (a behavioural trait) than others but not ability emotional intelligence (skill in processing emotional information and using it in everyday life).

Physical development

- There is relatively little research on the impact of active engagement with music on physical development
- Neuroscience has shown that instrumental music training affects the anatomy of the brain with greater gray matter volumes in motor-related areas.
- Using rhythmic accompaniment to support physical education programmes can improve performance.
- In a series of studies Costa-Giomi compared the fine motor abilities of children who participated in two years of piano instruction and those who had never received formal music training before and after instruction. A significant improvement in fine motor skills was found only for the children who received the lessons, and a significant difference in the speed of response was found between the two groups at the end of the two years of instruction.

Music and well-being

- Music mainly affects well-being through its impact on our emotions and arousal levels.
- We can use music to change our moods and arousal levels and those of others.
- Music can have a cathartic effect.
- Not all the effects of music are positive.
- Music can have negative effects.

Music and Physical health

- The impact of music is largely through the emotions it evokes.
- Music has a role in the reduction of stress and anxiety and related to this the reduction of pain and the strengthening of the immune system.
- Many health benefits are reported from adult participants in music making. It is likely that these benefits also apply to young people and children.

Mental health

Music has been used to support the treatment of many different kinds of mental health issues including:

- Psychosis, Acute psychosis,
- Eating disorders,
- Addiction,
- Alcohol abuse,
- At risk veterans.
- Obsessive compulsive disorder,
- Social anxiety disorder,
- Electroconvulsive treatment,
- Autism

Societal cohesion, inclusion and conflict resolution

- Music offers opportunities for social bonding and cultural coherence.
- Musical synchrony creates social cohesion and increased affiliation in infants and adults.
- Extended music classes can increase cohesion leading to better social adjustment and more positive attitudes. The effects are particularly marked for low ability, disaffected pupils.
- Group music making contributes to feelings of social inclusion; the more frequent the engagement in social musical activities the more socially included children feel.

Cultural cohesion and reduction in prejudice

- Greitemeyer and Schwab (2014) carried out three experiments examining whether music exposure could reduce prejudice and discrimination.
- Those participants who listened to songs with pro-integration relative to neutral lyrics expressed less prejudice, were less aggressive against others and were more helpful toward an outgroup member.
- These effects were unaffected by song liking as well as the mood and arousal properties of the songs employed, suggesting that it was the pro-integration content of the lyrics that drove the effects.

Conclusions

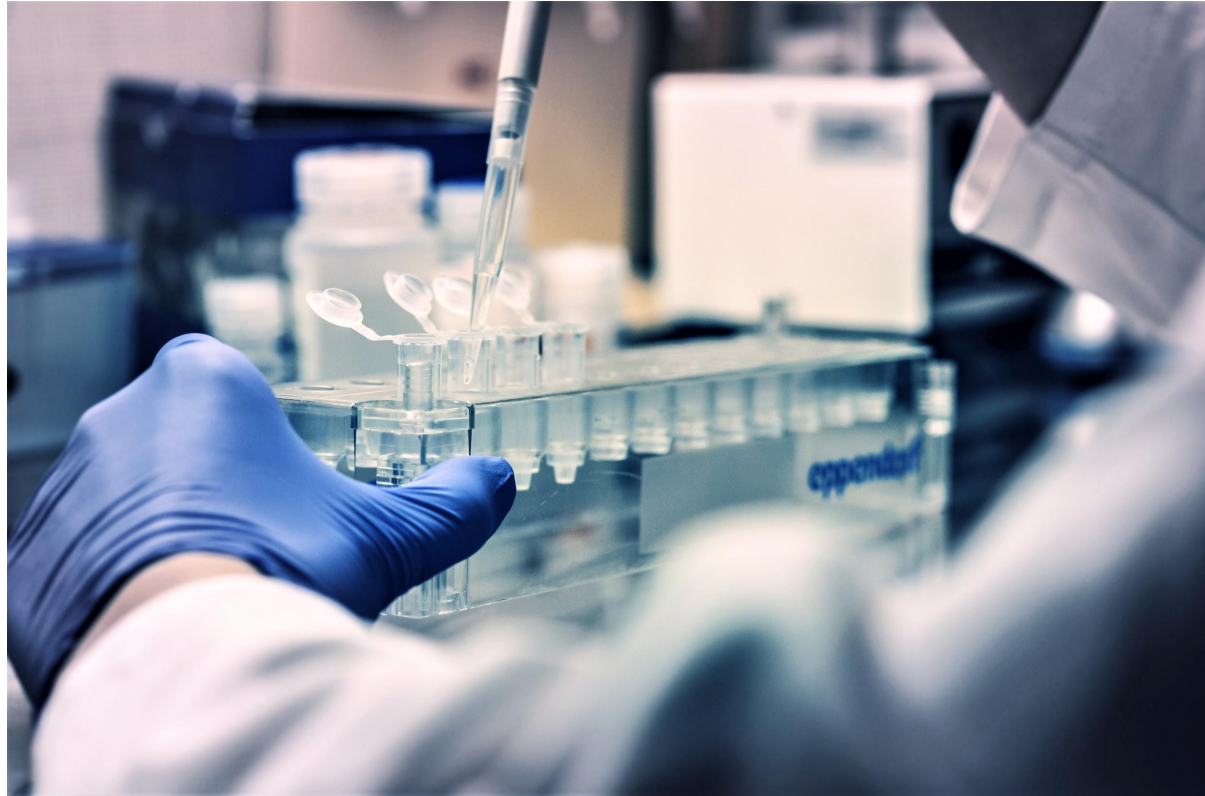
- Actively making music can contribute to the enhancement of a range of non-musical skills.
- Early engagement (before the age of seven), the length of musical engagement and commitment to it, the type of training, and the instrument learned may be important contributory factors in the impact of music on intellectual skills.
- The quality of teaching is crucial as to whether any benefits are realised.
- When teaching is poor there may be no benefits and negative outcomes.
- Music can make a contribution to well-being and physical and mental health through its impact on our moods and emotions, immune system and motor processes.
- Music can make a contribution towards social development and social cohesion at the group and societal level.

metrics...

- Questions
- What we ask
- How we ask
- How we make sense of the answers
- How does this affect policy?



**systematic
approaches...**

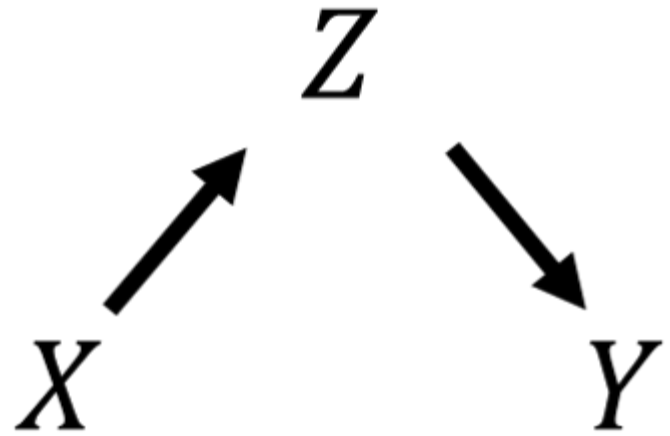


other-than-musical benefits

- do we need to find them?
- do we need to make a case?
- ...



causality



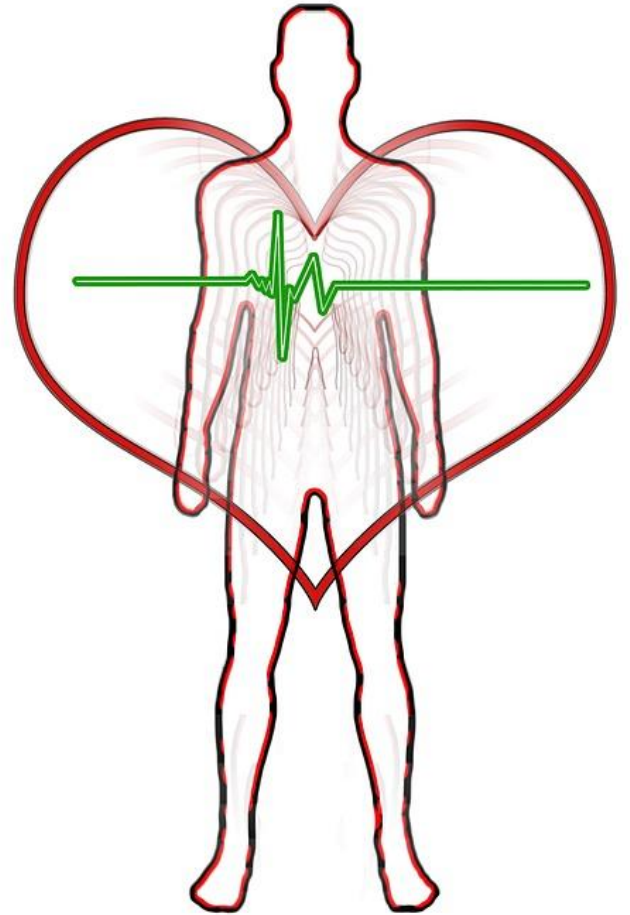
$$r_{XY,Z} = 0$$

research



holistic approach

every day life -vs- pathology



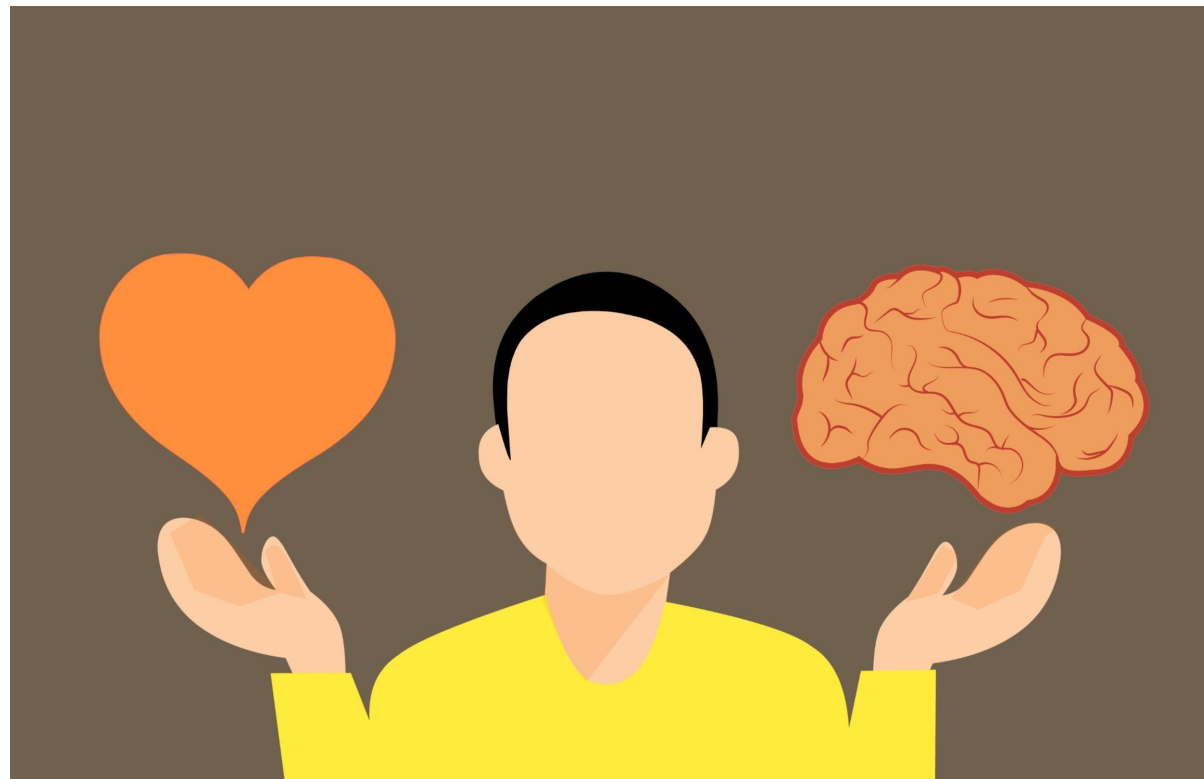
funding



studies



real life



“can”

- Music *can* have a positive impact on many different areas in our lives.
- In a social context, music *can* play a major role in fostering cohesion (but it can also be catalytic in conflict).
- It *can* support cohesion within sub groups, while at the same time it can be used for intensifying bias against other groups.



individual

- aural perception,
- enhanced language and literacy skills;
- spatial
- some elements of mathematics;
- memory functions
- executive functioning
- intellectual development, creativity and academic attainment;
- performance of fine and gross motor skills; and
- support personal and social development.



Coda

It is important to focus on what music and music education "can" do, and not try to measure what they "will" do.

It is crucial to research impact using appropriate methodologies and methods.

It is vital to understand that we are musical by design.

Music is a vital part of our humanity.

Music Education should be one of the most important and celebrated parts of any educational provision throughout the lifespan.

Any questions?

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<https://www.openbookpublishers.com/product/1613>

