

Music and Health: A Short Review of Research and Practice

for BBC Music Day 2019

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Dimensions of Music and Health

The music imperative

Music anthropologists, ethnographers and philosophers attest to an imperative for human beings to commune through music. Music as a shared activity pre-dates recorded history by many millennia. It reinforces cultural, community and self-identity, marks and celebrates rites of passage, motivates, educates, and, importantly, facilitates complex processes of attachment, group cohesion and co-operation.^{1, 2} Indeed, the presence of musical interactions is thought to have been essential for the survival and evolution of our species. ^{3,4,5}

Unlike other survival mechanisms that may have become redundant, such as tracking animals, no known present-day society is without music and the drive to connect to it remains ubiquitous. Many commentators believe that, deprived of music, we would not be fully human:

All humans, not just those we call musicians, are musical to some degree...musicality (the capacity to make and make sense of music) defines our humanity and provides one of the touchstones of human experiences. ⁶

Indeed, music can be rationalised in terms of biophysics. Some speculate that the rhythmic and melodic oscillations that occur in the human body and between every human cell mean that, rather than merely having an external relationship with music, human beings *are* music. ^{7, 8}

Music and the brain

The drive to engage with music may be explained through an emerging understanding of physiology and neuroscience. The late neurologist Oliver Sacks, and neuroscientists, Isabella Peretz Robert Zatorre, and Daniel Levitin, for example, specify that music processing and perception are highly complex neurological functions involving multi-lobal activity across both the right and left hemispheres of the brain. 9, 10 Levitin provides a description of neuro-musical processing, which involves: the most primitive parts of the brain, such as the brain stem, responsible for autonomic functions including breathing; the limbic system, which is the emotional centre of the brain; and the cerebellum, which is responsible for coordinating movement. Listening to music starts with soundwaves hitting the cochlea nuclei structure of the ear in the temporal lobe, and simultaneously recruits areas in the frontal, parietal and

occipital lobes, which are collectively responsible for processing pitch, rhythm, timing, tempo, memory and emotion.

Despite some arguments for environmentally acquired musical competence during foetal development, studies on infant responses to music adds weight to the argument for a neuro-musical genome or blueprint. This is borne out by research on music perception in human infants from different cultures, which indicates the innate presence of neuro-musical networks in the brain. These networks enable new-born babies to process rhythm, and to detect changes in pitch and melodic contours. ^{11,12}

The physiological effects of music

Work by music and health researchers is revealing the effect of music engagement in terms of biochemical processes in the brain which produce impacts on our health and our sense of wellbeing. Engaging in music is, for example, associated with changes to the stress hormone, cortisol, and the stimulation of mood-regulating hormones and neurotransmitters such as serotonin, testosterone, oxytocin and dopamine. ^{13, 14} Each of these have complex and multifactorial actions. For example, significantly in the context of group music-making, oxytocin is also associated with new learning and social bonding. ¹⁵

A dose-response relationship between arts engagement and mental wellbeing in the general population has been found in an award-winning 2015 Australian study. Dr Christina Davies and her colleagues at the University of Western Australia interviewed 702 people about arts engagement, and found that those taking part in recreational creative activity, including music, for at least two hours a week experienced a significant increase in their wellbeing. The positive effect increased as the level of engagement rose above the two hour a week threshold. Drawing on this evidence, the Government of Western Australia has funded the Healthways Arts Program, which provides sponsorship support for arts activities including festivals, concerts, and workshops, with the aim of increasing the participation of priority population groups in healthy activities, changing behaviours and changing environments to improve health. 16, 17 Research conducted over the last two decades by

the Sidney De Haan Research Centre for Arts and Health, Canterbury Christ Church University, on the psychosocial effects of group singing shows that the activity improves both health and overall wellness. One of the earliest, largest and most detailed studies was undertaken with over 1,000 participants in Australia, England and Germany in 2008. 18, 19, 20 Participants reported positive perceptions of the effects of singing on feelings of happiness and wellbeing. These feelings can be explained by research evidence that group singing triggers neurotransmitters and hormones associated with mental and emotional wellbeing, social connectedness, confidence, achievement and worthwhileness, and feelings of overall wellbeing. 21, ²² Studies have also shown that group singing can stimulate Immunoglobulin A, a type of antibody that protects against infections. 23

Dr Daisy Fancourt, Associate Professor of Psychobiology & Epidemiology at University College London, is a leading researcher in arts and health. Her work has shown that group drumming can impact positively on depression, wellbeing and social resilience by acting on cytokines, protein cells that are implicated in infection, inflammation and pain. ²⁴ She has also investigated physiological measures of patients with cancer and their carers during a singing intervention, results of which show positive effect on stress, mood and pain and a boosted immune system. ^{25, 26} An inquiry into the effects of musiclistening in pregnancy on post-natal depression and overall wellbeing shows lower levels of depression and higher wellbeing associated with music-listening in pregnancy. 27

Fancourt led the BBC's national Feel Good Test project which examined the wellbeing effects of arts engagement for almost 50,000 people in England. Of the 10 most beneficial activities, singing was top and playing an instrument was fifth. The project found that people get emotional benefits from even a single session of creativity and there are cumulative benefits from regular engagement. Creative activities are found to be particularly beneficial for the emotions of people facing hardship in their lives. 28

Music and empathy

Music, alongside other forms of creative self-expression, plays an important role in the development of human empathy. Higher levels of empathy are good for both individuals and society: they are correlated with positive life satisfaction and better social relationships, and have been linked, alongside other factors, to longevity. ²⁹

In 2016 the UK Arts and Humanities Research Council published the findings of an 18-month inquiry into cultural value. The inquiry's report paid particular attention to "the ability of the arts and cultural engagement to help shape reflective individuals, facilitating greater understanding of themselves and their lives, increasing empathy with respect to others, and an appreciation of the diversity of human experience and cultures." 30 Looking specifically at the role of music, the inquiry found evidence that:

Music is a powerfully multi-sensory and kinaesthetic phenomenon whose embodied character draws people into fluid and powerful social groups at a range of scales and degrees of (im)permanence, and in doing so helps to enact a kind of empathy. 31

The concept of mentalising is a key underpinning for empathy. Mentalising, according to UCL professor of clinical psychology, Peter Fonagy, is the process of "thinking about thinking." It combines the capability to reflect on our own internal mental states with the ability to perceive other people as individuals with minds like our own. As such, it is an essential requirement for humans to develop into organised groups where people care for one another and develop complex social and cognitive skills. But how does this crucial ability to mentalise emerge during childhood?

In their influential book Communicative Musicality, 32 Stephen Malloch and Colwyn Trevarthen explain that new-born babies have an 'innate intersubjectivity'. As they grow and develop, they take part with trusted adults in "shared consciousness regulated by emotions of affection and enjoyment, expressed and given meaningful form by rhythms of modulated movement." All forms of human interaction depend on common temporal language. As Malloch and Trevarthen put it "Our shared musicality can be harnessed to our intention to reach out to others, and in this we see the powerful healing nature of our desire for companioning others through time."

Neglect, trauma or abuse, particularly in childhood, can cause difficulties in mentalising, and this leads to problems in understanding other people's behaviour, managing emotions and developing altruism. Music can enhance the emotional pathways involved in these processes and can help people to interpret the causes of their emotions and those of others. 33 There is experimental evidence to support the idea that music can play a positive role in increasing empathy levels. For example, an experiment undertaken by Cambridge University psychologists with children aged 8 to 11 years showed that participation in group musical games for an hour a week over nine months significantly enhanced their empathy scores. 34

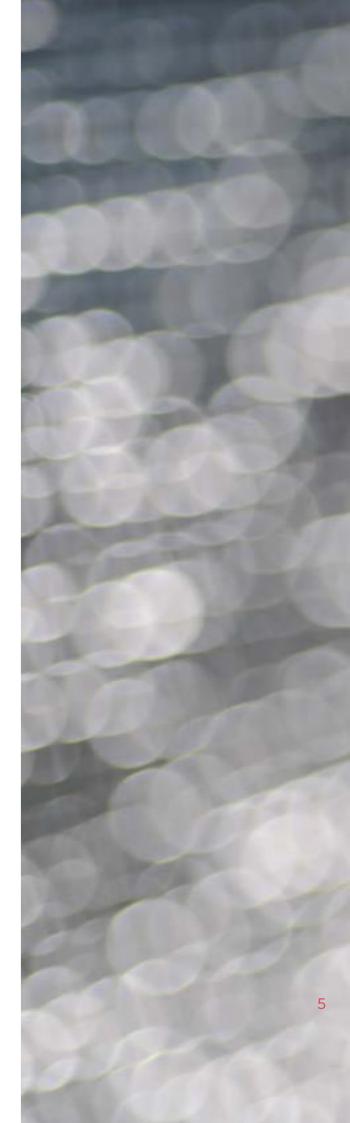
Marcus de Sautoy, Professor for the Public Understanding of Science at Oxford University, likens works of art to "a kind of functional MRI scan to reveal our conscious world and share it with others." He suggests that

true creativity and consciousness emerged at the same time in the human species. Perhaps only when we had consciousness did we start to wonder what was going on in the minds of others and want to share our own internal worlds - and begin to express ourselves creatively. 35

Recent research has demonstrated a statistical association between prehistoric cave art, created up to 40,000 years ago, and acoustically resonant parts of cave systems, suggesting a link between art and pre-music (or "organised sound") dating back to our Palaeolithic ancestors.36

In developing models of how human consciousness has evolved, neuroscientists have demonstrated that the brain uses a process of 'predictive inference' to construct a 'best-guess' of the nature of reality. Professor Anil Seth, Director of the Sackler Centre for Consciousness Science at the University of Sussex, has recently explored the parallels between this 'top-down' process and the concept, popularised in the 1960s by the art critic Ernst Gombrich, that every work of art requires a viewer to 'complete' it by the act of perception. 37

Recognising the significance and importance of the subjective viewpoint of every individual is essential to developing person-centred and empathetic health and care services, and other social structures.

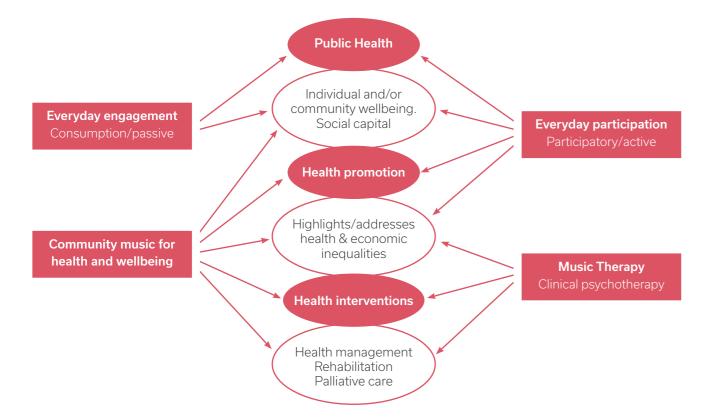


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Modes of musical engagement

Ways in which people engage in music have been shaped over time by the ebb and flow of social, political and health ideologies, national economies and, in recent decades, the unprecedented rise of technology.

Figure 1. Intersecting categories of music engagement and their interaction with health and wellbeing.



Everyday engagement - the passive consumption of music, for example, hearing background music in a shopping mall, listening to music on an iPod or radio or attending a musical performance. Links to public health in terms of individual and community wellbeing. ³⁸

Everyday participation - any informal, structured or formal participatory, creative activity, for example getting together with friends at home for a musical jamming session or singing or playing in a community choir or instrumental ensemble. ³⁹ Links to public health and health promotion in view of the association between creative participatory activities and health and wellbeing and social capital. ^{40, 41} Varying abilities of individuals and groups to access 'everyday participation' opportunities can mirror gaps in health equality. Links to emerging models of social prescribing.

Community music for health and wellbeing -

structured music activities that have specifically intended health outcomes, for example, singing for lung-health groups or Parkinson's-related voice problems, or drumming circles set within a mental health service. Links to public health, health promotion, and health interventions in relation to health management and rehabilitation.

Music therapy - a prescribed clinical intervention to which patients, often with chronic ill-health, are referred. Facilitated by registered music therapists using a progressive and reflective system of predominantly improvised music as a tool for psychotherapeutic treatment. Linked to health promotion, management, rehabilitation and palliative care.

Bringing participatory music to people

Numerous projects have been featured on TV, radio and in other media which illustrate and explore the links between music and wellbeing. Here are just a few examples:

Gareth Malone

The choirmaster and broadcaster Gareth Malone's programmes focusing on singing have helped to accelerate the growth of community choirs across the country over the last decade. In 2007, his reality TV show, The Choir, was broadcast on BBC2, showing how choral music could be taken into challenging situations. In 2011 he fronted the Military Wives choirs whose CD single aimed to become the Christmas number one, as supported by BBC Radio 2 DJ Chris Evans. From the Invictus Choir to Children in Need, Malone has shown how bringing a group of people together to sing leads to benefits. His latest project for children affected by the Grenfell Tower disaster was a moving tribute to all those who took part and who found comfort and relief in singing together. 42 Malone says that "singing bonds people together and makes you feel happy. Singing is an excellent way to combat isolation. There are obvious health benefits, good for posture and breathing, and good for your state of mind. Singing lifts people in a way that no other activity can." 43

The Dementia Choir

More than one million people are expected to have dementia by 2025. TV actress Vicky McClure presented BBC1's The Dementia Choir in May 2019. The choir took part in a study run by Sebastian Crutch, Professor of Neuropsychology at University College London, into how music and visual arts affect people with dementia. Results showed that, "during choral singing, movement and heart rates decreased indicating a feeling of calmness, aiding dementia sufferers who feel agitated and restless. The project has informed extensive research on dementia and creativity." 44, 45, 46 Crutch concludes that "through participating in a shared creative experience, family members or professional carers can come to see people with dementia in a different light. In that sense, I think, there can be some really pretty long-term social benefits to participating.". 47

Grace Meadows and Lauren Leverne

The Commission on Dementia and Music compiled by the Utley Foundation and International Longevity Centre UK in 2018, ⁴⁸ helped to launch the Music and Dementia 2020 campaign, headed by Programme Director, Grace Meadows, and enabled through a partnership with the BBC and Utley Foundation with significant input from music organisations such as Live Music Now and Nordoff Robbins. The campaign, which is fronted by radio DJ Lauren Leverne, is calling for the mass scale upscaling of music in dementia care pathways from diagnosis to end of life (musicfordementia2020.com) .

Julia Jones

Alongside many other positive music and dementia initiatives, the work of Dr Julia Jones, founder and CEO of Found in Music is cited in the Commission on Music and Dementia. Jones is the author of The Music Diet, in which she states that 'consuming' music in some form every day can have multiple benefits on our wellbeing, such as improving fitness, brain power and helping you to live longer. ⁴⁹ It has even been reported in The Sun newspaper that "A diet of daily music through listening, singing, dancing, performing, creating or exercising will produce astounding results.". ⁵⁰ Jones advocates music as a tool for life stating:

'I've spent the past 25 years studying and applying music neuroscience, showing how music can transform lives and businesses across many different sectors.' (foundinmusic.com/the-music-diet).

Roderick Williams

Renowned baritone Roderick Williams has presented both the Choral History of Britain⁵¹ and a Singer's Guide to Britain⁵² on BBC Radio 4, which details our cultural history and how it has evolved through song. He explores topics such as how singing helps us with identity, emotion and connect to our communities, and how singing together is at the heart of being human and how we bond socially.

Up for Arts and BBC Get Creative

Up for Arts is a partnership between Voluntary Arts (the representative organisation for over 63,000 voluntary arts groups across the UK and in Ireland) and BBC Radio. It uses the power of local radio to raise the profile of cultural participation and inspire more people to get involved in music and other creative activities. The annual BBC Get Creative Festival is the UK's biggest celebration of have-a-go creativity, with over 1500 events taking place all around the country.

Research in practice

Lullaby Project

The Lullaby Project is a song-based programme centred on vulnerable infants in nurseries in some of the poorest and most diverse communities in London. A musician composes a short, culturally sensitive lullaby for each child including information collected from an interview process. This song, with catchy chorus and musical phrases significant in the child's home, is recorded and introduced to the child's class and quickly becomes a regular feature of nursery life. A 2015 evaluation of the Lullaby Project found the programme made significant contributions to children's sense of identity, feelings of security and confidence. The songs boosted family relationships, aided language development and communication and established new and fruitful contacts between hard-to reach families and nurseries. ⁵⁴

The project's longer-term impact was investigated in 2019. The now nine-year olds remembered their lullabies well. Whilst now not often sung, key phrases, characters, tunes and tone from 'their' songs were instantly recalled. Carers evidenced each song's contribution to developing understandings of continuity and family love. More than this, adult and child participants consistently attested to the continuing impact of these personalised and shared songs in expressing and enhancing affirmative attitudes like security, interconnection and confidence. In the words of one grandparent/carer "if I'd had a song like this, it would have changed my life." 55

Singing with Refugees

In 2015 a team of musicians worked for two sessions each in 'Initial Accommodation Centres' for asylum seekers in East Dulwich, Dover, Wakefield, Liverpool, Birmingham and Cardiff. Accompanied by guitar they introduced simple, repetitive songs. A sense of pulse was maintained between each song and in spoken instructions and introductions. The evaluation stated:

Three enthusiastic males drove the energy of the room, quickly joining in with the songs, improvising and responding to the musician's leadership with gusto and joy. ...a Kurdish man stood and linked arms with some others and danced and sang a Kurdish song and was immediately joined by two Eritreans and a Sudanese. At another point he translated our song about looking forward and never turning back for the Kurdish women in the group. Frequent smiles across the room, general looks

of happiness and relaxation, frequent applause, shouted suggestions and comments, playful engagement in mimicking animals, making hand and arm movements and wordless engagement across the room across cultural boundaries, were powerful indicators of the immediate feelings of well-being generated by singing.

An Afghan Doctor wrote an invitation to the rest of the inmates saying, 'the simple purpose of these song sessions is 'happiness.' It is difficult to imagine another setting in which warm friendly interactions could so quickly be established across cultural and linguistic divides – where else in the world would four Kurds and three Eritreans be dancing together within 20 minutes of meeting together?

The result of each session was an observable and clear state of happiness and contentment among the group. People become more open and communicative with each other during the session. They were demonstrably engaged in mind heart and body, showing a palpable affirmation of shared human values like community, hope, love, family, spirituality and culture. English language was enjoyably practiced using rhythm, pattern and memory and for a brief time, practitioners could offer friendly and inspirational support through music to fellow humans in a period of intense personal struggle.

BBC Choir of the Year

An evaluation of the mental wellbeing and health effects of participating in the Choir of the Year competition 2014 was undertaken with a sample of 104 competition participants.⁵⁶ The results of a quantitative online survey and face-to-face and telephone interviews, showed that the competition, which involved 149 choirs and 5,737 singers, supported:

- Physical wellbeing improved energy, stamina (vocal and physical), lung health and posture;
- Social wellbeing intense group connectedness, camaraderie, new connections;
- Mental wellbeing and health improved mood, enthusiasm, excitement, purpose, productivity (new learning), confidence, and feeling special - being part of a prestigious event;
- Lifelong learning raising standards both personally and as a choir; constructive criticism and opportunities for reappraisal;
- Diversity and cultural wellbeing a 'mirror and a guiding light' for best practice in inclusion of diverse groups; recognition/affirmation of musical and non-musical identity, formal celebration of choirs' exemplary services to their communities.

Around half of the participants preferred competitive singing because it provided positive mental stimulation and added motivation and excitement. Singers who preferred 'less stressful', non-competitive singing tended to come from non-auditioning community choirs. Some negative effects were reported, e.g. fatigue, challenge of learning complex repertoires, disappointment when knocked out of the competition at an early stage, but these were outweighed by the positive effects. The evaluation showed that, for singers electing to take part in the competition, the effects on their health and wellbeing was overwhelmingly positive.

Silver Song Clubs and Golden Oldies

Silver Song Clubs were established in 2005 and have been the subject of the first ever randomised control trial on singing and older people in 2011. The results showed measures of health among 200 research participants were consistently higher in the singing group, with improvements to mental health, physical and social wellbeing, compared with the control group who did not sing. 57 Golden Oldies were set up in 2008 to: reduce social isolation and increase social contact; provide an environment for participants to make new friends; and to encourage participants to have activities and things to look forward to. An evaluation found that between 73 and 98 per cent of participants agreed or strongly agreed that the Golden Oldies contributed to their self-development, health, and sense of community. There was found to be a statistically significant increase in self-reported health from the period prior to participation to the time of the study.⁵⁸

People living with dementia

The Alzheimer's Society has promoted Singing for the Brain groups across the UK since 2003. A study of the initiative in 2014, found evidence of increased social inclusiveness and improvements in relationships. memory and mood for both people with dementia and their family carers. As well as enjoying the music sessions, participants found that attending Singing for the Brain helped in accepting and coping with dementia.⁵⁹ Other studies have shown the benefits of music engagement for people with dementia relate to improved communication, self-expression and validation of self in the here and now, physical and emotional capacity, carer-cared-for relationships and connectedness, and improvements in behaviours that indicate distress, such as the 'sundowning' 1 phenomenon 60, 61, 62, 63, 64. One study on music and sundowning showed improvements in social behaviour, such as participants sitting and walking together, giving one another repeated eye contact, moving to the music, as well as reminiscing with one another. There was also a significant decrease in non-social behaviour, as measured by observations in participants actively mumbling, sitting or wandering alone.

¹ 'Sundowning' is a period of disorientation and/or agitation that occurs among people with dementia as the day grows darker.

A study from Finland found that caregiver-implemented musical leisure activities, particularly singing, are cognitively and emotionally beneficial especially in the early stages of dementia. Singing was found to be beneficial for working memory, executive function, and orientation especially in people with mild dementia and those under the age of 80, whereas music listening was associated with cognitive benefits only in people with a more advanced level of dementia. Both singing and music listening were effective in alleviating depression especially in people with mild Alzheimer's-type dementia. 65

Whilst some form of musical interaction is acknowledged as positive for most people across the range of dementias, 66,67 Bowell and Bamford (2018) found that only 5% of residents living with the condition in care homes had access to music. A Choir in Every Care Home was a large-scale initiative launched in 2015, led by the charity Live Music Now. The initiative aimed to bring about a sea change. Funded by the Baring Foundation, a unique collaboration between 30 leading national organisations from adult social care, music and academic research explored how music and singing can feature regularly in care homes across the country. A substantive literature review formed part of the project. 68 This showed that, despite some concerns about the quality of some existing research, the overriding finding emerging from nearly every study was that singing and musicmaking improves quality of life in people with dementia and those around them.

Live Music Now are currently co-leaders of the Musical Care Taskforce, working closely with the Utley Foundation on their national strategic partnership to place music as an essential element in dementia care. 69

Singing and Chronic Obstructive **Pulmonary Disease**

Studies have shown that 'singing for better breathing', using singing techniques to improve breath control, can aid people living with Chronic Obstructive Pulmonary Disorders (COPD) and asthma. A Brazilian study from 2009 found significant improvements in expiratory pressure following singing for COPD patients relative to a decrease in the control group. Improvements may reflect the muscle strengthening effects of singing.⁷⁰

In a 2013 UK study, 106 patients were recruited via the British Lung Foundation and Breatheasy groups to take part in six community singing groups meeting weekly for 10 months. Results were encouraging, showing significant changes in standard spirometry measures following singing, and significant improvements on selfassessed health status.71

Sing to Beat Parkinson's

Music activities for people with Parkinson's are known to be effective in regulating walking, balance and strength; 72,73 supporting lung function; 74 improving compromised neurochemical activity (such as dopamine and oxytocin levels), which are central to motor efficiency and experiences of pleasure and motivation (stimulating the brain's reward circuit); 75 improving speech and communication; 76, 77 and increasing a sense of wellbeing and quality of life.78

In response to the growing research evidence, music groups for people with Parkinson's are growing in number. This includes Sing To Beat Parkinson's (STBP), a network of singing groups run by the charity Canterbury Cantata Trust (CTT). The initiative was founded in 2010 by Roger Clayton, who is living with Parkinson's, and Prof Grenville Hancox, MBE, long-term trail blazer for singing and health and Artistic Director for CCT. There are now over 21 STBP groups across the country. Most adopt the name Skylarks and are run in partnership with local Parkinson's UK branches or clinical services for people with Parkinson's.79

Summary of Findings

- Every known human society has music. Researchers suggest that music emerged in our early human ancestors as a survival mechanism which went on to play a crucial role in human evolution. Unlike some other survival mechanisms, which have largely become redundant in modern society (such as the ability to track animals), music continues to play an important part in our lives.
- Research has linked music to: effective attachment in infants; the development of empathy in childhood; the regulation of our moods; and strategies for coping with stress. Beyond these factors, music can have a role in addressing or ameliorating specific health issues for example in post-natal depression, in dementia, in lung health, and in Parkinson's disease.
- Australian researcher Dr Christina Davies has found a dose-response relationship between arts engagement and mental wellbeing in the general population. In her study people taking part in recreational creative activity, including music, for at least two hours a week reported a significant increase in their wellbeing. The positive effect increased as the level of engagement rose above the two hour a week threshold. The Government of Western Australia's Healthways Arts Program draws on this research to increase the participation of priority population groups in arts activities as a means of improving public health.
- 4 An increased role for music and wider arts engagement in UK health policy is emerging through the Government's current investment in "social prescribing" - where GPs direct patients to positive activities rather than giving them medicine. This initiative puts primary prevention and support for healthy lifestyles at the heart of health planning and encourages more holistic, person-centred and community-focused approaches to looking after our health and wellbeing.

- The mechanisms that underpin the relationship between music and human wellbeing are complex and multifaceted, and the experiences of participating in or consuming music are by their nature subjective ones, influenced by a combination of personal preferences and social and cultural factors. These complications mean that the evidence for music's impact on our health and wellbeing can be harder to analyse and interpret than the effects of, for example, prescription medicine. However, the processes at work are increasingly studied, analysed and understood, and the evidence of positive impact is unambiguous.
- In parallel to its effect on the health of individuals, music also acts as a kind of "social glue", encouraging bonding within groups. Whilst this is often a positive process, forging common understanding and mutual support, bonding can at times have the effect of excluding outsiders and reducing overall social cohesion. However, music can also act as a bridge between groups: a medium of exchange that extends cultural understanding and improves relations between diverse communities.
- Musical modes matter. Research shows that active engagement in music-making tends to have a more positive impact on wellbeing levels than passive consumption of musical product. This finding supports the thinking behind BBC partnership projects such as Up for Arts and the Get Creative Festival, both of which aim to encourage people in becoming more creative. But although music for consumption is ubiquitous and cheap to access, research shows that participating in active creative music-making tends to be correlated with educational advantage and economic privilege. There are multiple barriers to access to music-making and other creative activities for people from less privileged socio-economic groups - and it is these groups that tend to be more exposed to health inequalities.
- In order to increase individual wellbeing and social benefit, engagement for everyone, regardless of background, demographic or social group, in music and other creative activities for at least two hours a week should be promoted by public agencies, alongside regular exercise and a healthy diet, as part of a healthy lifestyle.

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