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The Power of Music

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The digital revolution means that the manner in which people obtain and listen to music has changed radically since the early 1990s. Legal and illegal websites make it possible to obtain a massive range of music within moments. These sites are complemented by a panoply of digital radio, TV, and internet-based stations broadcasting 24/7. Perhaps more dramatic still is the changing means by which people listen to music. High capacity portable digital music players are commonplace, which means that we can, and often do, carry our entire music library with us.

All this has an important implication. North, Hargreaves, and Hargreaves (2004) and Sloboda, O'Neill, and Ivaldi (2001) produced quantitative evidence that people's everyday use of music is goal-directed, using it to achieve a particular mood state, pass the time, enhance interpersonal interactions, or any of many other possible tasks. The sheer *range* of music available to us at any point in our everyday life means that, in the digital era, people have access to precisely the kind of music that would help them to achieve whatever specific goals they are trying to meet. This in turn has a further implication for psychologists. If the opportunity widely exists to, and a significant number of people actually do, use music to achieve a wide range of goals, there is a need for an applied psychology of music.

In our recent book, *The Social and Applied Psychology of Music* (North & Hargreaves, 2008), we attempted to map out what this field might look like. We argued that the digital revolution and subsequent emphasis of music researchers on the *implications* of musical behaviour means that the paradigm in which many conduct their

research has shifted over the past 20 years. During the 1970s and 1980s, research on listening to music was dominated by cognitive issues, such as memory, attention, and understanding of musical syntax. It is tempting to view this dominance as resulting from the less-contextualized manner in which listening typically occurred at the time. Under these less-contextualized circumstances, the music would, of course, more likely be the focus of attention. As such, rather than considering the social, external world, it made more sense to focus on the listener's inner mental world. Moreover, this cognitive focus and lack of consideration of the interaction between musical behaviour and the context in which it took place led to highly reductionist, experimental procedures. This approach contrasts sharply with much of the present-day research which, although it certainly does not ignore cognitive factors, focuses on the reciprocal influence between these and contextualised, real life musical behaviours.

We will not attempt here to repeat our coverage from *The Social and Applied Psychology of Music*, and summarise the nature of this more recent research on music and its interaction with the contexts in which it occurs. Rather, this special issue of *The Psychologist* highlights several very specific areas that all address these to some extent. Moreover, at least two of the articles here reflect the long-standing interest within the field, dating back to Ancient Greece, in clinical- and health-related issues among particular sub-populations: the remainder of our article therefore addresses three other health-related implications of music that lie outside those that have been studied traditionally.

Rock music and self-injurious behaviour

The rise of heavy rock with supposedly pro-suicide lyrics in the 1970s and 1980s led to legislation (e.g., attempts to ban sales of CDs featuring a 'parental advisory' sticker), public protest (e.g., by the Parents' Music Resource Center, or PMRC), and many apparently bizarre local actions (e.g., the suspension of a Michigan high school pupil for wearing a t-shirt promoting Korn that featured no lyrics or words apart from the band's name). The assumption on which these were based, namely that the music *causes* self-injurious thoughts and actions, is not so far-fetched as might seem, as several studies suggest at least a correlation between music and suicide. For example, Stack, Gundlach, and Reeves (1994) found a link between suicide rates among teenage Americans and variations in subscriptions to a heavy rock magazine; and North and Hargreaves (2006) found that fans of rock and rap were more likely than others to consider suicide and to self-harm. Other research though is less suggestive of a link. North and Hargreaves (2006) also found that thoughts of suicide and self-harm preceded an interest in rock, so that the latter can't have caused the former. Similarly, North and Hargreaves (2005) found that merely describing a song a 'suicide-inducing' or 'life-affirming' led to listeners perceiving it as such: by labelling music as suicide-inducing, campaigners and legislators may be helping to create the problem they aim to eradicate. Other research (North & Hargreaves, 2006; Scheel & Westefeld, 1999; Schwartz & Fouts, 2003; Stack, Gundlach, & Reeves, 1994) shows that the correlation between suicidal tendencies and an interest in rock is mediated by family background and self-esteem, which raises the issue of which of the latter is the better predictor of the former.

Pain, stress, and immunity

Other research paints a more positive picture of the relationship between music and health. Although music therapy is stereotyped as addressing psychological problems, some recent studies have demonstrated its role in treating conventional physical disorders. The most convincing evidence comes from Standley's (1995) meta-analysis of 55 studies concerning the effect of music on 129 medically-related variables. The 10 health-related factors showing the greatest effects of music are shown in Table 1. The mean effect size over all 129 variables was .88, meaning that the impact of music was almost one standard deviation greater than without music.

- Table 1 about here -

Arguably the largest single body of literature concerns the impact of music on chronic pain, pain experienced during and after treatment, and pain experienced specifically by cancer patients and those undergoing palliative care (e.g., MacDonald, Mitchell, & Dillon et al, 2003; Mitchell, MacDonald, & Brodie, 2006). Research suggests that music can mediate pain in these cases by distracting the patient's attention from it and / or by increasing their *perceived control* over the pain (since if patients believe that they have access to music as a means of pain control then this belief itself decreases the aversiveness of pain). Similar research on stress has yielded the not entirely unsurprising conclusion that it may be reduced by music; but also that the amount of stress reduction varies according to age, the stressor, the listener's musical preference, and their prior

level of musical experience (e.g., Pelletier, 2004). More interestingly still, this reduction in stress manifests itself through physical measures such as reduced levels of cortisol, and this has a very provocative further implication. Lower levels of stress are associated with greater immunity to illness of course, and several studies have indicated effects of music listening on physical measures of immune system strength such as salivary immunoglobulin A (e.g., Brennan & Charnetski, 2000). Although the mechanism by which this occurs is not well understood, the implication is clear: music contributes directly to physical health.

This allows us to make a strong case for music therapy, since it has implications for finance-related variables such as the amount of drugs that patients require and the amount of time they spend in hospital. Furthermore, pain, immunity, and stress are implicated in such a range of physical problems that the health effects of music might be much wider-ranging than the present research suggests. Perhaps we should not be surprised, for instance, that both Lai and Good (2005) and Tan (2004) showed that music can improve sleep quality, and that Kimata (2003) showed that music can alleviate allergic responses, each of which have further health implications of their own.

Animal welfare

The impact of music on well-being may not be limited to humans. Ethological research on the functions and learning of bird-song is well-known; and there is research concerning human perception of music that has considered how non-humans do so (see Hauser and McDermott, 2003; Panksepp and Bernatzky, 2002; Wallin, Merker, and

Brown, 2000). However, there is a growing body of evidence concerning specifically music and animal welfare.

Perhaps the clearest example is provided by Wells, Graham, and Hepper (2002) who played classical music, heavy metal music, pop music, human conversation, and a control to 50 dogs housed in an animal rescue shelter. Classical music was therefore arguably the most soothing, and it is interesting that it led to the dogs spending more time resting, more time quiet, and less time standing. In contrast, arguably the least soothing music, heavy metal, led to more time barking. In a similar unpublished study, North, MacKenzie, and Hargreaves played fast and slow tempo music to dairy cows in their winter enclosures. Milk yield, indicative of the cows' well-being, was higher in the slow than the fast music condition, suggesting that the slower music led to lower stress. Similarly, McCarthy, Ouimet, and Daun (1992) found that exposing rats to stress-inducing rock music could reduce their ability to heal wounds; and Peretto and Kippschull (1991, p.51) played music to mice over two weeks and found that "(1) classical music produced more interaction, including aggression ... and (5) rock tended to increase aggression". Just as research on humans shows that we select calming music to reduce the impact of a stressful environment on us (e.g., North & Hargreaves, 2000), so it seems that this same calming music has just the same effect when played to non-humans.

Again the potential implications of this are extensive and provocative. Most obviously, what do we mean by 'musical taste' and 'expert composition' when we are confronted with evidence that a dog enjoy Beethoven? Does the possibility that a cow may be calmed by classical music mean that it shouldn't be thought suitable for the dinner menu? Are these kinds of effect widespread and identifiable among a variety of

species, such that all animals respond similarly to the same music on the basis of the same neurophysiology, and if so then would this mean that music should be regarded as less or more of an art form than at present? Of course, a cynic could claim that the effects of music we have described here are in fact just *functional* behaviours that are not truly 'aesthetic'. That may well be true of course, but as we have seen already, much of humans' everyday musical behaviour is similarly functional. Is there really much difference between a tired man listening to a soothing song on the car stereo during the drive home, and a dog in a shelter being calmed by background classical music?

In conclusion, some might be tempted to dismiss the applied psychology of music as 'nothing new', pointing out, for example, that music therapy has a centuries-long tradition, or that research on the impact of music on employee's productivity goes back to the production lines of the Second World War (e.g., Kirkpatrick, 1942, 1943a, 1943b). We have provided a few brief illustrations here, however, of how the applied psychology of music has recently begun to demonstrate numerous and varied interactions between music and the context in which it is experienced, such that it is breaking new ground quickly. Similarly, it would be facile to characterise the field as trivial by asking why, for example, anybody should care about what music will help to sell baked beans in a supermarket? In response, we would argue that, as the research described here illustrates well, the applied psychology of music has direct financial implications that safeguard music and musicians from budget cuts imposed by politicians and accountants. It also has a far 'meatier' implication, namely that the field, and those examples of it described here, call into question the very nature of how we conceive 'musical behaviour'. The implications of digitisation and our changing relationship with music mean that our

understanding of 'musical behaviour' and the very nature of music psychology itself must change also.

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Table 1 – Health-related factors showing the greatest effects of music (adapted from Standley, 1995)

Effect of music	Effect size
Podiatric pain	>3.28
Paediatric respiration	3.15
Pulse (in dental patients)	3.00
Use of analgesia (in dental patients)	2.49
EMG	2.38
Use of analgesia (in dental patients)	2.36
Blood pressure (in dental patients)	2.25
Pain	2.11
Medication in paediatric surgery patients	2.11
EMG	2.10