

**THE MUSIC INSTINCT: HOW MUSIC WORKS AND WHY WE CAN'T DO WITHOUT IT, PHILIP BALL (2011)**

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**IF MUSIC ISN'T A LUXURY, WHAT IS IT?**

*Reviewed by Henkjan Honing, Institute for Logic, Language & Computation, Universiteit van Amsterdam*

The title of the newest and fourteenth book by science writer Philip Ball leaves no doubt: this is a counter-attack on claims made by Steven Pinker in his publications *The Language Instinct* (1994) and *How the Mind Works* (1997). Pinker characterized music as 'auditory cheesecake' (1997: 534): a tasty bonus but, from an evolutionary point of view, no more than a by-product of much more important mental functions such as language 'music could vanish from our species and the rest of our lifestyle would be virtually unchanged' (1997: 528). In his books, Pinker also frequently reduces art to what – biologically speaking – is an irrelevant phenomenon, one that utilizes functions that can be called 'evolutionarily adaptive', such as the experience of pleasure. The provocation these claims represented some fifteen years ago continues to resonate: countless books referring to Pinker have appeared since (such as *The Art Instinct* (Dutton 2009), *The Belief Instinct* (Bering 2011) and *The Pleasure Instinct* (Wallenstein 2009)). And now, not entirely unexpectedly, here is *The Music Instinct*. The aim is clear.

And so this book begins with a discussion of the importance of music, the possible role of music in evolution and the claim that music is not a luxury. It is a topical discussion currently being pursued in numerous scientific journals and at symposia.

At least three schools of thought can be identified in the scholarly search for an evolutionary role for music. Despite Pinker's criticism, the first school remains intent on proving that music is indeed an adaptation. Though some view the scientific study of the evolution of cognition, including music cognition, as an absolute impossibility, doomed forever to remain nothing more than a good story, several researchers are presently developing strategies to empirically underpin the cognitive and biological role of musicality. In particular, there is a lot of support for Darwin's suggestion that sexual selection must have played a role in the origin of music. In this view, music serves as a sexy tuft of feathers, developed not as an adaptation for survival but as an adaptation to impress potential partners. Geoffrey Miller expands on this idea in his book *The Mating Mind*, where music is considered one of the many effective ways people use to try to impress other members of their species.

But there are also alternative views within this school, such as the one that sees music as a game played with our cognitive functions, resulting in an evolutionary advantage. In this case, rather than being viewed as a product of natural selection – an adaptation – musicality is thought to be a trait resulting from exaptation, that is, without special selection having taken place. Once this trait exists, it is further perfected by natural or sexual selection and as such passed on to successive generations.

The second school believes music plays a secondary or indirect role in evolution, namely as a means of strengthening the social cohesion of the group. Here, music is seen as the ‘social glue’ that keeps the group together, promotes cooperation and consequently strengthens the group feeling. As the ‘language of emotion’, it is also thought to play a crucial role in the vitally important bonding between parent and newborn, and is frequently associated with the musical language (*infant-directed speech*) parents speak with their newborn babies. In short, music strengthens the social and emotional bonds within the group and is selected evolutionarily as a result.

The third school views music as a ‘transformative invention’: a skill or function that is not adaptive, but that has had and continues to have a major impact on our biology and culture. The idea of ‘music as invention’ can be compared with the irreversible effect that making fire had on such things as our eating behaviour and culture, as argued recently by Richard Wrangham in his book *Catching Fire*. There is growing evidence for the hypothesis that music greatly influences both our behaviour and our brains, and can even alter them, as reflected especially in the latest neurocognitive literature.

In *The Music Instinct*, Ball adopts an alternative position that in fact declares the whole discussion a non-issue: music simply *is* ‘It might be genetically hard-wired, or it might not. Either way, we can’t suppress it, let alone meaningfully talk of taking it away’ (5). This is an unfortunate and – given the book’s title – unusual strategy because there really is something to be said about the other views without dismissing them as irrelevant.

Let me give a concrete example: a growing number of publications focus on the effects that making music and listening to music can have on the development and plasticity of the brain and on the intimate relationship between music and the deeper and – in terms of evolution – older parts of the brain related to memory and emotions. Ball pays little attention to this research in his book, making only passing reference to it on a few pages in the ninth chapter, such as ‘when we listen to music all the lights are apt to come on at once – pretty much the whole brain may become active’ (241), an allusion to the colours that light up in the brain scans accompanying so many neuroscientific articles.

The discussion about music and evolution is only mentioned early on in the book, clearly suggesting the opening chapter and title were added at a later stage. In this sense, the book promises more than it delivers. Ball’s original working title, *How the Mind Makes Music*, would have been much more appropriate.

With reference to the working title, I can only say how wholeheartedly I agree with Ball’s interpretation of the recent literature. I am impressed by how easily a relative outsider – Ball has written nearly twenty books on topics related mostly to physics – has managed to grasp such a relatively new discipline as music cognition.

He passionately defends a number of very clear hypotheses, among which are those that say music is more than just sound, that it fundamentally differs from language, and that musicality is much more widespread than is commonly thought. These are insights each of which in their own right have only recently been given an empirical basis and which offer alternative visions to the older, largely psychophysically oriented research into the psychology of music.

Yet despite having successfully distilled several of the most important insights from the recent specialized literature, most of Ball’s examples are taken from the literature of the 1970s and 1980s, when the effect of the cognitive and neurocognitive sciences was still limited.

This will become clear if you look at some of the books on the psychology of music from those years. There is a good chance they will begin with a chapter on acoustics, accompanied by graphs of sine tones and a Pythagorean monochord. A diagram of the anatomy of the ear will also be included. Such books suggest that the physical qualities of music (and of hearing) are fundamental both to understanding music and to the listening experience. But there is a major difference between hearing and listening. As Ball rightfully states: '[...] music is not a series of acoustic facts, in fact it is not acoustic at all' (33). Acoustics and the physiology of hearing have little to do with music, since they turn out to have much less influence on the way music is heard, experienced and made than is commonly thought.

Despite this, Ball devotes dozens of pages to taking us yet again through acoustics, from Pythagoras to Helmholtz. This is an understandable approach for a physicist, but in adopting it Ball maintains the illusion that music is measurably embedded in the sound signal itself, something he so clearly refutes earlier in his book.

What is more, such an approach to music as a physical and mathematical phenomenon occasionally tends to become a sort of number theory as well as acoustic theory. As if nature determines what is harmonic, beautiful or 'correct' music. It seems to echo the classical Greek concept, recurring in so many guises, of a 'harmony of the spheres', the idea that the mathematical structure of music may reveal something about nature itself. Or the opposite idea: that an elegant formula that can successfully break the code of eminent composers' music and expose the underlying numerical structure can show us how beautiful and 'natural' that music is. Yet, despite Pythagoras's ideas about consonance in terms of integer ratios, only very few people today experience a carefully, though in no way 'justly' (i.e. based on integer ratios), tuned piano as 'false'. This is the age-old discrepancy between music as number and music as empirical fact (cf. Pythagoras versus Aristoxenus). Or, as Ball claims, in my view rightfully: music resides not in sound or numbers but in the listener's mind, 'music is made in the mind' (409). This is a concept even contemporary science historians have difficulty embracing.

Ball further observes that the differences between the way musicians and non-musicians listen to music are not as great as is often believed. Unfortunately, although considerable research has been conducted on this in recent years and there is a lot to be said about it, Ball makes only scanty reference to it. In this sense, *The Music Instinct* reflects the older, predominantly psychophysically oriented literature more than the neurocognitive approach of the last ten years. Other popular books on the subject, such as *This is Your Brain on Music* by neuropsychologist Dan Levitin, *Musicophilia* by neurologist Oliver Sacks and *Guitar Zero* by developmental psychologist Gary Marcus, do more justice to recent developments and insights in the cognitive sciences and to what they have to tell us about the importance of music.

On the whole, *The Music Instinct* is a convincing book. Ball clearly has a passion for music, as reflected in his detailed and often highly personal descriptions of his numerous music samples, taken primarily from the classical repertoire. But it remains regrettable that he places so much emphasis on the first half of the subtitle of the book – the architecture and effect of music – and thus focuses mainly on the music-theoretical aspects of music. The result is that much of what there is to be said today about the second half of the subtitle – the biological significance of music and why we cannot do without it – is neglected.

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## CONTRIBUTOR DETAILS

Henkjan Honing holds a KNAW-Hendrik Muller chair in Music Cognition at the University of Amsterdam and conducts his research under the auspices of the Institute for Logic, Language and Computation (ILLC) and the University of Amsterdam's Cognitive Science Center Amsterdam (CSCA). Honing has authored over 150 peer-reviewed publications in the area of music cognition and music technology. He recently published a book on music cognition for the general public entitled *Musical Cognition: A Science of Listening* (Transaction Publishers, 2011).

Contact:

E-mail: honing@uva.nl

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