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Music and its meaning, how has the last 30 years of music psychology research progressed our knowledge?¹

ABSTRACT: There are three different types of scholarship, primary, secondary, and meta-scholarship. This paper applies a meta-approach to the question of musical meaning, which involves some assessment of where the enterprise as a whole has come from and is heading, its value and external impact. Three aspects of meaning are discussed: referential, functional and socially transformative. Referential meaning refers to our ability to apprehend a musical object as pointing beyond itself. Functional meaning refers to valued personal outcomes that musical engagement engenders. Transformative meaning refers to effects on the wider society. Consultative data from an expert panel is used to frame the discussion. This data shows multiple ways in which recent psychology research has advanced our understanding of how music acquires referential and functional meaning. To date, stronger theoretical clarity has been achieved in the area of referential meaning than in functional meaning. The strongest socially transformative effect of music psychology research has been on the discipline of musicology itself. Weaker, but still significant, effects are found in the wider society, relating to understandings of the benefits of musical engagement, and the acceptance universality of musical capacity as an inherent human attribute.

KEYWORDS: musical meaning, scholarship, music psychology research, referential meaning, functional meaning, socially transformative meaning

Scholarship and meta-scholarship

Most of the business of scientists – as reported at scientific meetings and in scientific publications – is highly detailed and specific. Investigators report on the outcome of an experiment or some other form of detailed investigation. This is science and scholarship at the coal face. It may be called ‘primary original scholarship’.

¹ Revised version of a paper first presented at a colloquium, ‘Music and the Sciences of the Mind’, Academie Royale de Belgique, November 2010.

Additionally, most scientists undertake exhaustive literature reviews, detailing and organising the literature of a topic or sub-area as a whole. This might be called ‘secondary scholarship’.

But there is a third type of activity, rather more rare, which is not attempted, or expected to be attempted, by every practitioner. This involves a standing back from the whole enterprise and trying to get a sense of where a discipline as a whole is heading or has come from. This might include trying to apply some judgements about the utility or value of what has been achieved, and the extent to which the work has had an impact outside its own scholarly world. There is no commonly accepted name for this kind of activity, but one might call it ‘meta-scholarship’.

Meetings of scholarly societies, and special editions of journals, are some of the places in which meta-scholarship is found, and even encouraged. Previous contributions by the present author to meta-scholarship have all arisen in the specific context of the growth of a vigorous European community of researchers focused on scientific aspects of music, to which Polish scientists have been prominent contributors.

Among the most significant developments in this community over the last decades has been the foundation in 1991 and subsequent growth of the European Society for the Cognitive Sciences of Music (ESCOM). Andrzej Rakowski was a founder member of ESCOM’s Executive Committee, remaining on the committee until 2007, and serving as President in 2001-3. The year of his ‘Jubilee special issue’ follows a similar special issue of ESCOM’s journal, ‘*Musicae Scientiae*’ in honour of Irene Deliege,² ESCOM’s founding permanent secretary, and founder Editor of ‘*Musicae Scientiae*’.

This paper references and updates three earlier contributions to “meta-scholarship” stimulated by ESCOM and its leadership, of which Andrzej Rakowski has been an influential part. Each contribution arose, like the present paper, from a presentation to a scientific meetings (respectively in 1985,³ 1998,⁴ and 2004⁵), and later published separately in revised form,⁶ and then brought together in a compendium collection.⁷

² John A. Sloboda, Geraint Wiggins and Michel Imberty (eds.), ‘Understanding Musical Structure and Form: Papers in Honour of Irene Deliege’, *Musicae Scientiae* special issue (2004).

³ Meeting of the Belgian Psychological Society, Brussels, 1985.

⁴ Joint symposium on Musical Meaning, co-organised by ESCOM and the European Society for Philosophy and Psychology, Barcelona, 1998.

⁵ Eighth International Conference on Music Perception & Cognition (ICMPC). Evanston, Illinois, 2004. Organised in collaboration with ESCOM.

⁶ John A. Sloboda, ‘Cognitive Psychology and Real Music: the Psychology of Music Comes of Age’, *Psychologica Belgica* 26/2 (1986), 199-219; John A. Sloboda, ‘Does Music Mean Anything?’, *Musicae Scientiae* 2/1 (1998), 21-32; John A. Sloboda, ‘Assessing the Benefits of Music Psychology Research’, in *Proceedings of the Eighth International Confer-*

Different types of meaning

Musical meaning was a central theme of the earlier papers referenced above. In the English language, the term “meaning” has an ambiguity which allows it to be discussed in three separate ways.

First, meaning relates to the capacity of a piece of music to point outside itself, and refer to something else. When we apprehend a piece of music our minds are filled with contents which go beyond a simple copy of the sounds we hear. This kind of meaning may be called **referential meaning**. It addresses the question of what a sequence of musical events points to, suggests, represents, reminds of, which goes beyond itself. Sloboda⁸ addressed this type of meaning.

Second, and somewhat less obviously, meaning often relates to the values and outcomes we achieve through our engagement with music. When a person says ‘music means a lot to me’, this can often be interpreted as ‘music enhances my life – it goes better as a result of my engagement with music’. Music is construed as a tool for better quality of life, which can be used in different ways. This kind of meaning may be referred to as **functional meaning**. It addresses the question of the ways in which engagement with a sequence of musical events can have beneficial effects on cognition, emotion and other affective states, social and cultural life. Sloboda⁹ addressed this kind of meaning.

But, in the context of this Jubilee which celebrates not so much music itself, as scientific research into music, there is a third aspect of meaning, which is the effects that research itself may have on the musical life. It might seem rather strange to ask ‘what is the meaning of music psychology research?’ But if we consider this in a functional rather than referential way, then the question becomes clearer. Has music psychology research had a significant impact outside its own scholarly world of conferences and journals? Has it influenced musicians in the way they go about their musical activities? Has it influenced public discourse and debate about music, and its place in our society? Has our research enterprise had **socially transformative meaning**? Sloboda¹⁰ substantively raised the need to address this kind of question.

This latter question is, perhaps, the least addressed question of the three, despite its importance.

ence on Music Perception and Cognition, (North Western University - Illinois, 2004), eds. Scott D. Lipscomb, Richard Ashley, Robert O. Gjerdingen and Peter R. Webster <http://www.icmpc8.umn.edu/proceedings/index.htm>, 527.

⁷ John A. Sloboda, *Exploring the Musical Mind: Cognition, Emotion, Ability, Function* (Oxford, 2005), chapters 5, 8 and 23.

⁸ Sloboda, ‘Cognitive Psychology and Real Music’; Sloboda, ‘Does Music Mean Anything?’

⁹ Sloboda, *Exploring the Musical Mind*. Chapters 18-23.

¹⁰ Sloboda, *Exploring the Musical Mind*. Chapters 23.

The approach of this paper

The three previous papers took an individualistic perspective on these issues. On this occasion, a more democratic and consultative exercise seemed appropriate. Each contributor to the special issue of 'Musicae Scientiae'¹¹ was written to as follows:

I am inviting you to nominate at least one work (or series of works by the same author(s)) with a publication date between 1980 and 2010 which, in your view, has contributed in a major way to developments of our understanding "musical meaning". For each work that you nominate I would be grateful for a brief description of the content of this work (including, in the case of empirical work, a summary of its findings) and a brief account of what makes this work so important, in your view.

Nine responses were received, from Ian Cross, Zohar Eitan, Reinhard Kopiez, Jukka Luohivuori, Adam Ockelford, Mark Reybrouck, Barbara Tillman, Geraint Wiggins, and Aaron Williamson. This group will be referred to as the 'expert panel' in the remainder of this paper.

Table 1 lists the works nominated. Interestingly the replies were very diverse in their topic and focus. Not a single person nominated any work which another respondent nominated. It would be interesting to know how many more experts one would need to sample before coming across even one cited work in common. Does this rather small sample indicate a somewhat fragmented and un-unified field with no clear focus, or is there actually an underlying common theme between the cited works? The discussion below suggests perhaps more unity than a superficial examination might suggest.

Table 1. Works nominated by an expert panel.

Author	Work	Meaning
Blacking (1976)	How Musical is Man (1976)	transformative
Nattiez (1975)	Fondements une Sémiologie de la Musique	referential
Bharucha (1987)	Music cognition and perceptual facilitation: A connectionist framework	referential
Castellano, Bharucha, & Krumhansl, (1984)	Tonal hierarchies in the music of North India	referential
Laske (1977)	Music, Memory and Thought. Explorations in Cognitive Musicology	referential

¹¹ Sloboda, Wiggins and Imberty, 'Understanding Musical Structure'.

Lerdahl & Jackendoff (1983)	A generative theory of tonal music	referential
Camboropoulos (2001)	Melodic Cue Abstraction, Similarity, and Category Formation	referential
Koelsch et al. (2001)	Music, language and meaning: Brain signatures of semantic processing	referential
Huron (2001)	'Tone and Voice: A Derivation of the Rules of Voice-leading from Perceptual Principles	referential
Marks (2001)	Synesthesia: Strong and weak	referential
Schellenberg (2004)	Music lessons enhance IQ	functional

The invitation to the expert panel did not interpret the term ‘musical meaning’. The great majority of citations were relevant to referential meaning, with only one each in the other two categories. But each category was represented, which does lend some prima-facie validity to the distinctions made.

This paper now reviews some issues of substance in each of the three categories of meaning, referential first, functional second, and socially transformative last.

Referential meaning

Sloboda¹² highlighted the emergence of what was seen as a ‘new paradigm’ – based on a common concern which was “To explain the structure and content of musical experience”. Central to this paradigm was Lerdahl and Jackendoff’s ‘Generative Theory of Tonal Music’ (GTTM),¹³ cited by the expert panel.

It is perhaps hard for today’s younger scientists to recapture the excitement and new possibilities that GTTM seemed to open and encapsulate. The experimental music psychology of the 1960s and 1970s was dominated by a rather atomistic approach. Meticulous and highly controlled experimental work was the norm, where participants were generally confronted by a large number of short, rather musically uninteresting, experimenter-composed fragments, on which they were required to perform operations such as similarity judgements or memorisation tasks.

GTTM appeared to offer the field a theoretical framework in which to investigate how we apprehended entire musical works, including entire classical sonata-form movements lasting many minutes.

Alongside this, the emergence of the affordable microcomputer meant that it became possible to gather and pre-analyse data as music unfolded in real time. Some of the earliest and most successful attempts of this sort

¹² Sloboda, *Cognitive Psychology and Real Music*.

¹³ Fred Lerdahl and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge, 1983).

related to performance research. Now that many researchers enjoy easy access to Midi technology, we need reminding that nothing of this was available in the 1970s and only the most well-equipped labs got functioning systems up in the 1980s. It was actually Shaffer who built the first prototype Midi Grand piano in the mid-1970s and this allowed one of his then students, Todd, to show in 1985 that the timing variations used by pianists helped listeners to segment entire pieces of music in exactly the ways predicted by GTTM.¹⁴

Irene Deliege's work made full use of these new theoretical and technical possibilities. Her work helped us understand how listeners formed an internal map of a work of music, by dividing the work mentally into smaller and larger segments. Within this map there were prominent landmarks, which she called cues.¹⁵ We began to have a more detailed understanding of how listener underwent a dynamic journey through points of greater or lesser tension and release, or prominence, from cue to cue.

But what has all this to do with referential meaning? Several works cited by the expert panel exemplify that what a musical surface points to is a multidimensional structural description of that surface. An experience of meaning arose in part because that description was not the surface itself, but a web of relational mental materials derived from that surface – which, if turned into words might crudely be represented by sentences such as:

This note is subservient to that

This chord is the tonic, that one leans towards it, or pushes away from it

This element is close to A, distant to B

This section resembles that section

Here tension builds up

Musical experience is both a discovery or construction of this description, and also a journey through it over time. And it is notable how laden with metaphor the language is that one uses to describe all this – there are spatial metaphors (e.g. close, next to) of activity, power and energy (tension, dominance, push). This metaphorical profligacy is arguably one of the main engines for the attachment of referential meaning to music.

A central theme of recent research has been to try and understand which of these music-derived mental materials arise as a function of basic wired-in perceptual functions, and which as a function of our learned knowledge of the

¹⁴ Neil Todd, 'A Model of Expressive Timing in Tonal Music', *Music Perception* 3/1 (1985), 33-58.

¹⁵ Irene Deliege, 'Grouping Conditions in Listening to Music. An Approach to Lerdahl and Jackendoff's Grouping Preference Rules', *Music Perception* 4/4 (1987), 325-359.

music of our culture. This explains why, since the 1980s, the comparative study of different groups of musical listeners has become so central.

In the 1970s and before almost all music cognition research was carried out on adult western listeners. It is significant that the expert cites the 1984 paper by Castellano, Bharucha and Krumhansl,¹⁶ as seminal. This was a powerful call to the research community to examine music cognition in different musical cultures around the world. The expert panel member put it thus:

This is perhaps the first paper successfully to explore a complex, cross-cultural issue in music cognition, combining experimental rigour with a sensitivity to cultural context and significance. However, its true importance may lie in the way in which it engendered debate in the literature and spurred the development of statistical models of music learning and processing that can be related to the operation of generic, and prospectively universal, cognitive mechanisms.¹⁷

Work such as this opened the door for those researchers who decided to explore a distinct cultural group much closer at hand, the young human - from pre-birth through to adolescence. Seminal work of this sort emerged from Trehub's laboratory.¹⁸ Her work opened the door to a whole industry of careful and ingenious studies which showed that the human infant is well capable of detecting (and making choices between) some of the key parameters which underlie the relationships that adult listeners detect in music.

A central strand of recent research has been the increasingly comprehensive mapping of features of the musical surface which have power to create mental relationships. This is an activity which has a symbiotic relationship with musical analysis. Psychological research confirms and clarifies concepts that have been previously enunciated in analytic literature (such as the expert-panel cited work of Huron on voice-leading in polyphonic music¹⁹).

Why does music have such strong metaphorical resonance, in ways which appear to transcend culture or training? What is the basis on which these metaphors are just natural to human beings? One important clue comes from another respondent on the expert panel who cited the work of Marks²⁰ as critical:

¹⁶ Mary A. Castellano, Jamshed J. Bharucha and Carol L. Krumhansl, 'Tonal Hierarchies in the Music of North India', *Journal of Experimental Psychology: Genera*, 113 (1984), 394-412.

¹⁷ Personal communication from Ian Cross, 1 September 2010.

¹⁸ Hsing-Wu Chang and Sandra E. Trehub, 'Auditory Processing of Relational Information by Young Infants', *Journal of Experimental Child Psychology* 24 (1977) 324-331.

¹⁹ David Huron, 'Tone and Voice: A Derivation of the Rules of Voice-Leading from Perceptual Principles', *Music Perception* 19/1 (2001), 1-64.

²⁰ Lawrence E. Marks, 'Synesthesia', in *Varieties of Anomalous Experience: Phenomenological and Scientific Foundations*, eds. Etzel. Cardena, Steven J. Lynn and Stanley C. Krippner (Washington, 2000), 121-149.

These studies have revealed systematic perceptual interactions between auditory dimensions (pitch, loudness and timbre) and dimensions of other modalities, including visual lightness and brightness, size, shape, and visually perceived height. They reveal, for instance, that higher pitch rapidly and subconsciously associates with brighter light, angular shape, smaller size and higher spatial position. They.. discuss related theoretical issues, including possible sources of the interactions (experience, language, abstract a-modal magnitude mapping, neural interconnections) and their level of processing. I find this line of research highly relevant to issues of musical meaning since it suggests a basic perceptual source for music's relationships with the "extra-musical" non-auditory world of space, vision and touch.²¹

If it is natural for humans to form these cross-modal connections, then we have a very clear signal that music cannot be kept inside a pure auditory 'box'. It leaps across sensory boundaries to engage our visual, spatial, kinetic sensibilities. This is reflected in the natural tendency to respond to music with movement and gesture. As soon as an infant can move, it will tend to move in differentiated ways to the music he or she hears.²²

And if music overflows with non-auditory resonances, then it is to be expected that our minds attempt to construct or detect a non-auditory world to which these resonances may point. The one neuroscience work cited by the expert panel²³ shows that a musical sequence can prime neural response to a verbal stimulus in a very similar way to the priming caused by another verbal stimulus. This provides a small demonstration at a neuro-physiological level of music's power to jump outside itself and influence non-musical cognition.

A second exercise of meta-scholarship by Sloboda²⁴ focused more on these ways in which music is capable of allowing us to create virtual worlds, and particularly virtual people, in our heads. The pioneering studies of Hevner in the 1930s²⁵ established that people tend to agree on the emotional character of musical segments. This is particularly true for the more basic emotions of happiness, sadness, anger, fear, tenderness. More recent research, for example, the study of Watt and Ash²⁶, shows that people also can agree on a much

²¹ Personal communication from Zohar Eitan, 10 September 2010.

²² Marcel Zentner and Tuomas Eerola, 'Rhythmic Engagement with Music in Infancy', *Proceedings of the National Academy of Sciences* 107/13 (2010), 5768-5773.

²³ Stefan Koelsch, Elisabeth Kasper, Daniela Sammler, Katrin Schulze, Thomas C. Gunter and Angela D. Friederici, 'Music, Language and Meaning: Brain Signatures of Semantic Processing', *Nature Neuroscience* 7/3 (2004), 302-307.

²⁴ Sloboda, *Does Music Mean Anything?*.

²⁵ Kate Hevner, 'Expression in Music: a Discussion of Experimental Studies and Theories', *Psychological Review* 42 (1935), 186-204.

²⁶ Roger J. Watt and Roisin L. Ash, 'A Psychological Investigation of Meaning in Music', *Musicae Scientiae* 2/1 (1998), 33-54.

wider range of dimensional labels for musical extracts – e.g. hot-cold, light-dark, big-small, even good-evil.

In this way music can support elaborate non-auditory mental contents, which we can take as signifying moods, people, narratives, gestures. Because there are so many possible connections of this sort, we need to talk of multiple meanings that can be derived from a piece of music, rather than a single unified meaning structure. The cross-modal resonances of music are multiple, gestural, kinaesthetic, spatial, and, critically, verbal linguistic.

In relation to language, the work of Juslin and his research group²⁷ is of particular importance, showing that there are specific features of human prosody that map rather well onto features of musical sequences. Prosody refers to those elements of human speech and vocalisation which are not the linguistic elements themselves (words, syllables) but the rises and falls in intonation, timing, articulation, that gives language its human qualities. These also include utterances such as laughing, crying, sighing, and all those other things which human beings can do with their voices. Music draws upon, and contains multiple references to all these things. Even when the musical sound contains no actual voices, we are attuned to all the features which would allow us to treat it as if it was a voice, speaking to us with a particular affective character.

To conclude the discussion of referential meaning, we must acknowledge the critical role of expectation in meaning formation. Language research has amply demonstrated that human beings don't passively wait for a sentence to finish before extracting its meaning. From the moment they hear the first word they are actively predicting what might come next, and making a whole host of inferences, based on prior knowledge. This happens in music too, and part of the referential meaning of music relates to musical expectations confirmed or violated. This profound insight was delivered to us in 1956 by Meyer,²⁸ but it took another 30 years before we began to have the tools to empirically investigate his intellectual legacy.

The contribution of Bharucha,²⁹ as cited by a member of the expert panel, has been seminal. He clarified the distinction between “veridical expectation” which is expectation based on the knowledge of a particular piece of music, and “schematic expectation”, which is based on knowledge of the common patterns and relationships found in a musical culture. As a piece of music unfolds these two processes driven from differ-

²⁷ Patrik N. Juslin and Petri Laukka, 'Communication of Emotions in Vocal Expression and Music Performance: Different Channels, Same Code', *Psychological Bulletin* 129 (2003), 770-814.

²⁸ Leonard B. Meyer, *Emotion and Meaning in Music* (Chicago, 1956).

²⁹ Jamshed J. Bharucha, 'Music Cognition and Perceptual Facilitation: A Connectionist Framework', *Music Perception* 5/1 (1987), 1-30.

ent parts of the brain can be in conflict. This allows us to understand how pieces of music that we have heard many times can still appear fresh. Our strong schematic expectations are constantly undermining our veridical ones.

A very important part of this is the detection of identity or similarity. So when we experience surprise, or expectations confirmed, during music engagement, we are comparing something we are hearing now to something we have heard before, either in this piece, or in some other piece, and making the judgement, this is the same as that, this is like that, or this is not like that. The formation of similarity judgements regarding elements within a piece has been identified by Deliege³⁰ as a very important component of building a coherent representation or map of that piece. The work of Camboropoulos,³¹ cited by the expert panel, has given Deliege's insights computational rigour, showing that it is possible to write computer programmes which deliver classifications which match experimental data. And we now have very compelling evidence from neuroscience that detections of violations of expectancy (generally triggered by similarity judgements) occur subconsciously, and very rapidly, often within as little as one second of the event occurring.³²

Functional meaning

Engaging with music helps people to achieve valued non-musical outcomes. This is the basis of music's functional meaning. But we immediately need to note an important distinction. Some non-musical outcomes are self-consciously known and sought out by individuals. Others outcomes may be very real, but the person involved may not be aware that the outcome had anything directly to do with the music.

An example of the former, self-conscious, use of music might be when a person in a depressed mood chooses to listen to a particular piece of music because she knows that this music helps her to regain a more positive mood.³³ In this case, the functional meaning is the music's value to that individual as a positive mood enhancer.

³⁰ Irene Deliege, 'Similarity relations in listening to music: How do they come into play?', *Musicae Scientiae, Discussion Forum* 4a (2007), 9-37.

³¹ Emiliós Camboropoulos, 'Melodic Cue Abstraction, Similarity, and Category Formation', *Music Perception* 18/ 3 (2001), 347-370.

³² Nikolaus Steinbeis, Stefan Koeslch and John A. Sloboda, 'The role of musical structure in emotion: investigating neural, physiological and subjective emotional responses to harmonic expectancy violations', *Journal of Cognitive Neuroscience* 18/8 (2006), 1380-1393.

³³ John A. Sloboda, Susan A. O'Neill, Antonia Ivaldi, 'Functions of Music in Everyday Life: an Exploratory Study Using the Experience Sampling Methodology', *Musicae Scientiae* 5/1 (2001), 9-32; Annelies van Goethem and John A. Sloboda, 'The Functions of Music for Affect Regulation', *Psychology of Music* 15/2 (2011), 208-228.

An example of the latter, non-conscious outcome is provided by those studies which show that engagement with musical activity over a long period of time (e.g. weeks or months) can lead to measurable improvements in mental functioning, such as IQ.³⁴

Another example comes through the oft mis-cited 'Mozart effect'³⁵ which shows that there are short-lived increases in spatial IQ after exposure to a specific piece of music.

In such cases, the person concerned may not necessarily be aware of the improvement in mental functioning brought about by the music, and even if they are aware of it, may not be able to directly attribute this improvement to the music. In such circumstances it would seem strange to talk of these outcomes being part of the meaning (or importance) of the music to that person. On the other hand, if this relationship was drawn to their attention, such that their future engagement with music was in part driven by the desire to achieve these particular improvements, then the outcome might be said to acquire functional meaning for that person.

An important contribution to the understanding of the functional meaning of music is DeNora's 'Music in Everyday Life'.³⁶ She was not the first to examine how music figures in cultural and social life. Indeed, the discipline of ethnomusicology has extensively studied this topic. DeNora's contribution was to map some of the ways in which music is self-consciously used by individuals (rather than groups) as a resource for their personal and social lives, in contexts as disparate as shopping for clothes, going to a gym, or managing their personal relationships. This research was precursor to a considerable amount of research activity tracking the fine grain of musical use, in everyday settings.

This research demonstrates, interestingly, that much of the experience which delivers functionality is fragmentary and can sometimes be based on quite superficial characteristics of the music, or music half-attended to while doing something else.

Paradoxically, this finding moves research away from GTTM, with its notion of an entire complex work as being represented in the mind as a structurally unified entity. It suggests instead, that for many people, and for much of the time, music is experienced in time-limited slices, with intense concentration at some moments, inattention or daydreaming at others, deep processing at some points, superficial processing at others. But unlike the fragments that traditional experimental psychologists studied in the pristine and controlled

³⁴ Glenn Schellenberg, 'Music Lessons Enhance IQ', *Psychological Science* 15/8 (2004), 511-514.

³⁵ Frances H. Rauscher, Gordon L. Shwa and Katherine Y. Ky, 'Music and Spatial Task Performance', *Nature* 365 (2003), 611.

³⁶ Tia DeNora, *Music in Everyday Life* (Cambridge, 2001).

environment of the laboratory, these fragments arise in the chaos of real life with its complex and unpredictable influences.

And as a result, the functional meaning can be far more idiosyncratic and context-dependent than the referential meaning. Research has made good progress on beginning to map out some of the major mechanisms that yield referential meaning. We are much further from being able to do the same for functional meaning. But it is good that more scientists are now getting involved in this area.

Socially transformative meaning

Music Psychology researchers can care deeply about their research. But this does not automatically mean that their work been socially transformative in the wider world. The analysis provided by Sloboda³⁷ was quite sceptical in this respect, seeing little convincing evidence of social benefit.

The paper issued a strong challenge:

Suppose all the music psychology in the world had never been written, and was expunged from the collective memory of the world, as if it had never existed, how would music and musicians be disadvantaged? Would composers compose less good music, would performers cease to perform so well, would those who enjoy listening to it enjoy it any less richly?

This challenge has been commented on a number of times in print,³⁸ but no-one has set out to comprehensively explore and project music psychology's full social benefit, as some kind of defence or rebuttal to this challenge.

It is, however, possible to be more positive. It is important to be specific about the effects of our work, particularly in a global environment where there are signs that money will be diverted away from both the arts and scholarship concerning the arts. In this context the best arguments for continuing our work need to be put forward.

If one were to nominate any activity outside music psychology itself as having been significantly and thoroughly transformed by our work, then it would have to be the world of academic musicology itself. 40 years ago musicologists and psychologists had almost nothing to say to each other professionally. Now, many music departments and conservatoires employ psychologists on their staff, undertake many activities which are informed by psychology research and tools, and provide courses on music psychology for their

³⁷ Sloboda, *Exploring the Musical Mind*. Chapter 23.

³⁸ Eric F. Clarke, Nicola Dibben and Stephanie Pitts, *Music and Mind in Everyday Life* (Oxford, 2010).

students. Increasingly, research studies are undertaken which are equal collaborations between musicians and psychologists.

A particularly seminal example of this was the year-long research seminar conducted at Stanford in 1993-4 under the convenorship of Krumhansl involving three psychologists (Krumhansl, Palmer, Bharucha) and three musicologists (Lerdahl, Narmour, Gjerdingen) working together on one movement of one Mozart Sonata from differing but complementary perspectives, publishing their results in a special issue of the journal 'Music Perception'.³⁹ A different example is a three-year research project on fingering strategies of pianists, involving, as equal partners, a world class pianist and conservatoire teacher (Raekallio), a musicologist heading a major UK music department (Clarke), a computational modeller (Parncutt), and a psychologist (Sloboda).⁴⁰

Thirty years ago such collaborations would have been inconceivable. The intellectual and institutional groundwork had not been done.

A book which epitomises this socially transformative effect of music psychology research is 'Empirical Musicology'.⁴¹ Some are already using this title as the name of an emerging sub-discipline. The books authors span systematic musicology, psychology, ethnomusicology, and sociology. But perhaps equally transformative are new teaching texts for music students, and musicology students, which embody and transmit psychologically oriented thinking to new generations of music graduates, not as an optional extra, but as a central part of what they should be expected to know.⁴²

Has music psychology research had equivalent influence outside academia in the wider world? Certainly more individuals and organisations are explicitly aware of music's specific functional outcomes now than 30 years ago.

For instance, somewhat confused media representations of the Mozart effect led to several states in the USA passing legislation requiring classical music to be supplied to mothers of newborn babies and day-care centres.⁴³ Research on the psychological and physical benefits of singing have also received wide media attention, particularly through the transformative effects

³⁹ Carol L. Krumhansl (ed.), 'Special Issue: Analysis of the First Movement of Mozart's Piano Sonata K. 282', *Music Perception* 13/3 (1996).

⁴⁰ John A. Sloboda, Eric F. Clarke, Richard Parncutt and Matti Raekallio, 'Determinants of Finger Choice in Piano Sight Reading', *Journal of Experimental Psychology: Human Perception & Performance* 24/1 (1998), 185-203.

⁴¹ Eric F. Clarke and Nicholas Cook (eds.), *Empirical Musicology* (Oxford, 2004).

⁴² John Paul E. Harper-Scott and Jim Samson (eds.), *An Introduction to Music Studies* (Cambridge, 2009).

⁴³ Adrian Bangeter and Chip Heath, 'The Mozart Effect: Tracking the Evolution of a Scientific Legend', *British Journal of Social Psychology* 43 (2004), 605-623; John A. Sloboda, 'Mozart in Psychology', *Music Performance Research* 1/1 (2007), 66-75.

choral singing has had on disadvantaged or problematic groups (e.g. homeless men).⁴⁴ A third example comes from the increasing marketing of music compilations for specific outcomes (e.g. Stress Busters) shows a global awareness of music's effects, which is underpinned by the research that the music psychology community undertakes.

As scientists, we may be concerned, even alarmed, by some of the crude and over-simplistic conclusions that the wider society may draw from a superficial reading with our work, but we at least know that something our discipline has produced is having an effect!

Finally there is one important social change, which arguably has been influenced by what music psychologists do. John Blacking's seminal book *How Musical is Man?*⁴⁵ was cited by one member of the expert panel as an early and influential plea for us to take a close look at the musical world of cultures far less materially advantaged than our own that nonetheless displayed incredibly impressive levels of musical engagement and accomplishment, not by a special caste of trained musicians, but by everyone. His groundbreaking study of the Venda people of the Transvaal showed how some of the ways we think about music and musical ability in our own culture are limited and unhelpfully ethnocentric. He would probably be rather pleased to learn of what music psychologists have been discovering.

Taken together, the research reviewed here helps us conclude that a great deal of the mental equipment required to make sense of, and engage humanly with, music – does not rely on special or lengthy musical training, but is an inherent function of the way the human being is constituted, and its manifestations are present almost from birth.

For a variety of reasons, vast numbers of people in Western society have believed themselves to be unmusical, and incapable of even modest musical achievement. It has sometimes seemed as if professional musicians, and the institutions that train them, have a vested interest in maintaining the widespread cultural belief that musical achievement is only for the few. Psychology research adds strong weight to the argument that musical achievement is for the many.

A number of good popular books about music psychology have now started to appear. These are based on a good understanding of modern research, read by the general public, and inform shorter articles and pieces in newspapers, magazines and broadcasting outlets which reach an even larger audience. Without our work, such writing would not have happened.

⁴⁴ Betty A. Bailey and Jane W. Davidson, 'Adaptive Characteristics of Group Singing; Perceptions from Members of a Choir for Homeless Men', *Musicae Scientiae* 6/2 (2002), 221-256.

⁴⁵ John Blacking, *How Musical is Man?* (London, 1976).

Typical of this new generation of popular books is *The Music Instinct* by Philip Ball, a British Science Journalist.⁴⁶ Ball and popularisers like him will probably directly influence many more people than any individual scientist. As such it may be appropriate leave the last words to him, but bearing in mind that these are words which could not have been convincingly uttered without the research of music psychologists around the world, and without the support of scholarly institutions behind them:

Music is a whole-brain activity. You need logic and reason, and also primitive 'gut instinct'. You need unconscious, mechanical processes for sorting pitch and classifying rhythm and metre, as well as bits of the mind that govern language and movement. Some of these functions are improved by training, but the fact is that everyone, if not hampered by physiological dysfunctions, possesses them. And everyone acquires them to some degree or another. There are, without doubt, people who have either cultivated or perhaps been born with exquisite musical sensibility, and there are many who have developed the most astonishing performance skills. And let's be grateful for that. But nearly everyone has musical ability.⁴⁷

⁴⁶ Philip Ball, *The Music Instinct: How Music Works and Why We Can't Do without It* (London, 2010).

⁴⁷ *Ibid.*, 410.

