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Review article

Metaphor and music emotion: Ancient views and future directions

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ABSTRACT

Music is often described in terms of emotion. This notion is supported by empirical evidence showing that engaging with music is associated with subjective feelings, and with objectively measurable responses at the behavioural, physiological, and neural level. Some accounts, however, reject the idea that music may directly induce emotions. For example, the 'paradox of negative emotion', whereby music described in negative terms is experienced as enjoyable, suggests that music might move the listener through indirect mechanisms in which the emotional experience elicited by music does not always coincide with the emotional label attributed to it.

Here we discuss the role of metaphor as a potential mediator in these mechanisms. Drawing on musicological, philosophical, and neuroscientific literature, we suggest that metaphor acts at key stages along and between physical, biological, cognitive, and contextual processes, and propose a model of music experience in which metaphor mediates between language, emotion, and aesthetic response.

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1. Introduction

It is commonly held that listeners perceive music as both expressive (Gabrielsson & Juslin, 2003; Juslin, 2013) and evocative of emotions (Dowling & Harwood, 1986), and that this property is music's primary purpose (Cooke, 1959), and man's primary motive for engaging with it (Juslin & Laukka, 2004). The pervasiveness of this notion is illustrated by the widespread use of music in contexts in which the effectiveness of music to induce emotional states is taken for granted – e.g. film (Cohen, 2001), marketing (Bruner, 1990), or therapy (Bunt & Hoskyns, 2002). In what follows, we examine how theoretical and empirical evidence supports and/or challenges this notion. Specifically, we first discuss ancient philosophical views, recent empirical evidence, and current debate surrounding the existence of a causal link between music and emotion. We then consider potential pitfalls in the discourse on music and emotion, and highlight the conceptual distinction – despite occasional coincidence, hence danger of conflation – between two dimensions: emotion expression-perception, and emotion induction-experience. Based on the evidence that the emotional response to music does not always coincide with the emotional label attributed to it, we go on to suggest that music might move the listener through an indirect, mediated mechanism. Our central proposition is that one potential mediating mechanism between music and emotion is metaphor.

We support our suggestion by tracing back the discourse on metaphor to antiquity, and highlighting metaphor's long-acknowledged significance as a device that promotes an awareness of relations between objects. We then consider how this relational property makes metaphor directly relevant to human communication and cognition, and examine how the notion of metaphor as a comparison has recently been incorporated in modern conceptual theory. Building on the evidence reviewed, we propose and outline an empirically testable model aimed at characterising the precise role of metaphor in the relation between music and emotion. Specifically, the model presents and discusses the implications of two alternative (but compatible) configurations, in which metaphor may either mediate between music and emotion, or arise from emotion directly. Throughout the discussion, 'emotion' and 'feeling' will be used to denote two interrelated but distinct entities, the latter being a component of the former, as proposed in componential appraisal theories (see Grandjean, Sander, & Scherer, 2008; Sander, Grandjean, & Scherer, 2005).

2. Music and emotion

2.1. Ancient views

The ability of music to please and move has been presumed for centuries. In More's *Utopia* music is characterised as providing a bodily pleasure of its own kind, as it 'arises neither from our receiving what the body requires, nor its being relieved when overcharged, and yet, by a secret unseen virtue, affects the senses, raises the passions, and strikes the mind with generous impressions – this is, the pleasure that arises from music' (More, 1516/1901, unpaginated). Hence, in More's view, music is valuable not only for being a source of pleasure, but also by virtue of its ability to 'affect the senses, raise the passions, and strike the mind'. The affective implications of music are further highlighted in the notion that 'music, both vocal and instrumental, renders and expresses natural feelings' (More, 1516/2003, p. 102). Given the centrality of music in man's social and affective life, More's Utopians 'after supper [. . .] play music' (More, 1516/2003, p. 50), and, in Utopia, 'no evening meal passes without music' (More, 1516/2003, p. 58).

The existence of a causal link between music and emotion has been discussed at least since Antiquity. Associations between modes and emotions are found in ancient texts from the Indian, Middle Eastern (e.g. Persian), and far eastern (e.g. Japanese) traditions (Randel, 1986/2003). The *Nātya Śāstra* (treatise on dramaturgy from the 5th century BCE), for example, prescribes certain modes and musical forms for the *expression* of particular emotions, which, in turn, are expected to *elicit* particular aesthetic feelings (Capwell, 1986/2003, p. 813). Similarly, in ancient Greece it was widely believed that exposure to different kinds of music could affect human health and character, and promote the development of virtues such as calm, balance, harmony, and order. On the basis of this belief, both Plato (429?–347 BCE) and Aristotle (384–322 BCE) issued guidelines about the appropriate kind of music for the education of the young to good citizenship. In *The Republic*, for example, Plato holds certain modes as best suited for the representation of particular feelings or states (Plato, *Republic*, Book 3, 398b and ff.). These considerations are echoed in Aristotle's remarks about the different ways in which listeners are affected by different melodies (Aristotle, *Politics* 8.1340a-b). Both Plato and Aristotle saw the link between music and affective states as an expression of a more generalised and pervasive influence of various aspects of music – including mode, rhythm, and melody – on the overall human character. Plato, for example, believed that 'good rhythm wait[s] upon [. . .] good and fair disposition of the character and the mind' (*Republic* 3.400e). Similarly, Aristotle argued that 'rhythms and melodies contain representations of anger and mildness, and also of courage and temperance' (Aristotle, *Politics* 8.1340a-b). The belief that music could influence human character and emotions had serious moral and pedagogical implications. Plato's preoccupation

with potential ill-effects of certain kinds of musical poetry led him to issue a series of proscriptive injunctions, whereby poets ought to be 'supervise[d] and compel[led] to embody in their poems the semblance of the good character or else not write poetry', and forbidden to 'represent the evil disposition [...] that our guardians may not be bred among symbols of evil' (*Republic* 3.401b). Aristotle agrees with Plato's view on the potential danger of exposure to certain 'harmonies', which he considers 'violently exciting and emotional' (Aristotle, *Politics* 8.1342a-b) (cf. Plato, *Republic*, 399a), but disagrees with his censoring method, preconising instead a selective approach, whereby 'we should [...] use the most ethical [harmonies] for education, and the active and passionate kinds for listening to when others are performing' (Aristotle, *Politics* 8.1342a-b). Despite the surface disagreement, Aristotle's selective deployment of music's power to affect emotion resonates with Plato's view of music not only as a threat, but also – and especially – as a precious educational resource, which ought to be harnessed and channelled in the right direction since childhood: 'education in music is most sovereign, because more than anything else rhythm and harmony find their way to the inmost soul and take strongest hold upon it, bringing with them and imparting grace, if one is rightly trained' (*Republic* 3.401d). On a similar note, Aristotle compares the role of music to that of bodily exercise, 'music being capable of producing a certain quality of character just as gymnastics are capable of producing a certain quality of body' (*Politics* 8.1339a), and concludes that 'from these considerations [...] it is plain that music has the power of producing a certain effect on the moral character of the soul' (Aristotle, *Politics* 8.1340a-b).

2.2. Contemporary evidence and debate

Aristotle's conception of the pervasive influence of music on the human body and mind appears to receive at least partial support from contemporary empirical research. Since early phenomenological studies of emotional experience of music (e.g. Pike, 1972), subjective reports of music-induced affective states have been documented in adolescents (Behne, 1997) and adults (DeNora, 2000; Sloboda & O'Neill, 2001), with music being ascribed modulations of mood and behaviour (Kenealy, 1988). These subjective reports are corroborated by objective psychophysiological observations of music-induced changes (e.g. Bartlett, 1996; Krumhansl, 1997; Nyklíček, Thayer, & Van Doornen, 1997) including effects on cardiorespiratory activity (Vaitl, Vehrs, & Sternagel, 1993; Witvliet & Vrana, 2007), sexual arousal (Mitchell, Dibartolo, Brown, & Barlow, 1998), and psychomotor performance (Pignatiello, Camp, & Rasar, 1986). Music structure has been shown to play an important part in emotional evocativeness (Sloboda, 1991), and exposure to emotionally evocative music has been shown to elicit a variety of bodily and mental effects, including changes in the activity of facial muscles (Witvliet & Vrana, 2007) and the attainment of altered states of consciousness (e.g. trance, Becker, 2004). Music-induced effects have also been observed on action tendencies, such as willingness to help others (Fried & Berkowitz, 1979; North, Tarrant, & Hargreaves, 2004), readiness to participate in social activities (Wood, Saltzberg, & Goldsamt, 1990), intention to purchase (Bruner, 1990), writing speed and decision time (Kenealy, 1988), as well as tendency to engage in emotion regulation (Gabrielsson, 2001). Further effects of emotionally evocative music have been observed on evaluative judgements, such as estimations of distance (Kenealy, 1988), probability of success or failure (Teasdale & Spencer, 1984), evaluation of advertisements (Gorn, Pham, & Sin, 2001), judgement of physical attractiveness (May & Hamilton, 1980), as well as the ability to interpret the emotional quality of facial expressions (Bouhuys, Bloem, & Groothuis, 1995). In addition to behavioural and physiological changes, music-related effects have been reported at the neural level, where exposure to pleasant and unpleasant music has been associated with activity in limbic (Koelsch, Fritz, von Cramon, Müller, & Friederici, 2006; Menon & Levitin, 2005) and paralimbic regions (Blood, Zatorre, Bermudez, & Evans, 1999; Brown, Martinez, & Parsons, 2004), as well as in structures thought to be implicated in the processing of reward and emotion (Blood & Zatorre, 2001). The combined evidence from different strands of empirical research, whereby emotions to music could be induced consistently across subjects (Koelsch, 2005) and through different mediums (Panksepp & Bernatzky, 2002), has been taken to support the view that there is a 'general consensus' that music is a kind of 'language of emotion', whose ability to influence mood, relieve stress, release feelings (e.g. Behne, 1997; Juslin & Laukka, 2004; Sloboda & O'Neill, 2001), and arouse 'deep and significant emotion in those who interact with it' (Sloboda, 2005, p. 203), is its primary purpose and the ultimate reason why humans engage with it.

The notion that music may evoke emotions, however, is controversial. Early reviews of aesthetic theories of musical meaning (e.g. Budd, 1985), have denied that music may derive its artistic value from its relation to emotions. Others (e.g. Noy, 1993) have suggested more nuanced accounts, allowing for the possibility that music's aesthetic appeal may be rooted in its ability to induce emotion, but arguing that the emotions evoked by music are 'not identical with the emotions aroused by everyday, interpersonal activity' (p. 137). Expanding upon this argument, a dichotomy has been proposed (Scherer, 2004) differentiating aesthetic emotions (e.g. emotions induced by music) from what is commonly referred to as 'basic emotions'. Support for this distinction comes from the observation that music seems to have no implications either for survival or for goal pursuit (Kivy, 1990). This makes it unlikely that music may trigger 'everyday emotions', such as fear, sadness, happiness, and anger, whose elicitation is typically understood in terms of adaptive response (Konečni, 2008; Scherer, 2004). Indeed it has been shown that music can induce more complex emotions than those evoked by everyday life events, and that, contrary to affective responses induced by everyday life events, affective responses to music are characterised by a more fine grained range of positive emotions than negative ones (Zentner, Grandjean, & Scherer, 2008). The range and complexity of the emotions attributed to music has been linked to a process of anthropomorphisation, whereby the listener hypothesises the existence within the music of a 'fictional or virtual persona', which is then experienced as an 'agent expressing genuine emotions' (those expressed by the music) (Robinson & Hatten, 2012, p. 71). The theorisation of – and attribution of emotion to – a fictional agent would facilitate the interpretation of the emotional quality expressed in the music, as music's complex and

dynamically evolving structure over time would be perceived as reflecting and dramatising human multifaceted and mutable emotional states, and their development within the narrative trajectory of a psychological journey. Hence, although some have argued that engaging with music may have had some evolutionary significance, for example by promoting the evolution of language (Wallin, Merker, & Brown, 2000), cooperation, and social cohesion (Cross & Morley, 2008; Koelsch, Offermanns, & Franzke, 2010), the overall evidence in support of the view that music can directly induce emotion in the listener is considered 'recent and unconvincing' (Konečni, 2008, p. 115). The richness and subtlety of music-related emotions, as well as their hypothesised attribution to fictive intermediaries, suggest that the mechanisms through which they arise is indirect, and includes a complex combination of perceptual and cognitive aspects.

2.3. Perception versus induction

Empirical evidence seems indeed to suggest that the relation between music and emotion might be of a complex and mediated nature. Support in this direction comes from the so-called 'paradox of negative emotion', whereby music described in terms of negative emotions (e.g. sadness, grief, despair) is often judged as enjoyable. The listener's response to 'sad' music, for example, appears to 'lack the beliefs that typically go with sadness' (Davies, 2003, pp. 185–186). The discrepancy between these two types of sadness (that which the listener ascribes to the music, and that which the listener manifests in response to the music) has been taken to suggest a distinction between the 'perception' of emotion, i.e. a sensory or cognitive process of recognition and identification of a certain emotional quality in the music, and the 'feeling' of emotion, i.e. a direct, personal emotional involvement (Harré, 1997). Although perceived and felt emotions may occasionally coincide, they are clearly distinct phenomena, and the former does not necessarily entail the latter, since perception of emotions may proceed in the absence of any emotional involvement (Gabrielsson, 2001).

Since ancient Greece, it has been known that music may both express or represent emotions (that are perceived by the listener) and induce them. Expression of emotion in music is a sonic-based phenomenon, tightly linked to auditory perception, and consisting in the listener's attribution of emotional quality to music. Induction of emotion by music is a listener-centred phenomenon, consisting in the personal experience of emotion as a result of (or otherwise in connection to) listening to music (Scherer, 2004). Expression and induction of emotion are therefore clearly distinct phenomena. In the case of music, emotion perception and emotion induction have also enjoyed different degrees of credibility: whilst the former has been widely acknowledged as far back as Plato (with speculation that this expressive power might lie in acoustic cues shared with the sound of emotive voices, Kivy, 1990), the latter has been more controversial. The debate surrounding music's ability to express and induce emotion is illustrated by the 'cognitivist versus emotivist' dichotomy, the latter purporting that music induces affective states, the former holding that it merely represents or expresses them (Kivy, 1989; see also Schubert, 2013 for a review of the literature and proposes theoretical perspective on the dichotomy). Expression and induction have been shown to differ in their interpersonal variability: whilst expression, being largely driven by music-based bottom-up contributions, tends to exhibit high inter-subjective reliability (i.e. individuals tend to agree as to what emotion the music expresses) independently of musical training (Heinlein, 1928), general intelligence (Hevner, 1935), or culture (Fritz et al., 2009), induction, being more heavily determined by top-down contributions, is more susceptible to vary with contextual and individual preferences (Gabrielsson, 2001; Rentfrow & McDonald, 2010).

2.4. Potential conflation, possible mediation

The distinction between perception and induction is relevant here because it raises the issue that the terms used to qualify, describe, and characterise the affective quality of a given piece of music may refer either to the emotion *perceived* by the listener as being *expressed* by and in the music, or to the emotion *experienced* by the listener as being *induced* by the music. Hence, in the discourse surrounding human experience of music emotion, the two dimensions of expression-perception and induction-experience are potentially conflated. The so-called 'paradox' of negative emotion may be viewed as a manifestation of this conflation. So is the ancient notion that different modes are associated with different emotions, and that exposure to certain modes affects the listener's character traits, an idea resting on 'the supposition that pieces of music have character or are similar to character and that they stamp this character into the minds of their listeners resulting in a change of character' (Sörbom, 1994, p. 44). All these conceptions are founded on the conflation of expression and induction, or at least on the assumption of a causal linear relation from the former to the latter. If, however, proper allowance is made for the notion that perception and induction are distinct phenomena, and that music perceived as *expressing* a given emotions (e.g. sadness) might also be experienced as *inducing* another (different) emotion (e.g. enjoyment) (see e.g. Zentner et al., 2008), the discrepancy between affective terms can be accommodated, and the so-called 'paradox' of negative emotion ceases to be one.

There is therefore a fundamental difference between perceiving something being expressed in music, and experiencing it. The experience of music involves not only the ability to perceive it, but also to hear music 'as form', i.e. as a combination of perception of sensory inputs and their interpretation as a 'token' of more general concepts, whose existence is independent of the specific sounds (Cook, 1990). Describing music as expressive of certain emotion involves assigning an affective label to a largely perceptual phenomenon centred on an external object (the music); experiencing that emotion oneself involves appraising the perceptual aspect in the context of one's own individual cognitive and emotional expectations. The discrepancy between affective descriptors and affective experience, whereby the emotional response to music does not always

coincide with the emotional label attributed to it, suggests that music might move the listener through an indirect, mediated mechanism. We propose that one potential mediator in this mechanism is metaphor.

3. Metaphor and emotion

3.1. Ancient views

Ancient thought had significant insight into the use of figurative language (see, for example, Lakoff & Johnson, 1999; Turner, 1997 (especially Part III), Gibbs, 2008). Classical rhetoricians noticed that linguistic patterns are anchored to conceptual ones. Amongst the conceptual patterns central to rhetoric are the Greek notions of $\sigma\chi\tilde{\eta}\mu\alpha$ [*schema*] – with its Latin rendition as *figura* – and of *trope* (see, for example, Quintilian's *Institutio Oratoria*, Book 9, chap. 1, Sections 1–5). According to Quintilian, a trope involves a transfer of meaning: 'The name of *trope* is applied to the transference of expressions from their natural and principal signification to another' (Quintilian 9.1.4). A metaphor is a particular kind of trope, and it too involves a transfer of meaning: 'the substitution of one word for another is placed among *tropes*, as for example in the case of *metaphor*' (Quintilian 9.1.5). Quintilian's conception of metaphor in terms of transfer echoes Aristotle's insight.

Aristotle discusses metaphor at length in his *Rhetoric* (Book 3), and in the *Poetics* (1457 ff.). He observes that metaphor acts through a transference, a carrying over – *meta pherein* – of meaning: 'Metaphor is the application of a strange term either transferred from the genus and applied to the species or from the species and applied to the genus, or from one species to another or else by analogy' (Aristotle, *Poetics* 1457b). Crucially, this passage also seems to suggest that in Aristotle's account this transfer is not only linguistic, but also conceptual (e.g. mapping species onto genus) (for a counterargument see Lakoff & Johnson, 1999, pp. 383 and 547).

In Aristotle's account, 'the orator persuades by means of his hearers, when they are roused to emotion by his speech; for the judgements we deliver are not the same when we are influenced by joy or sorrow, love or hate' (*Rhetoric* I.ii.5). (This intuition is corroborated by the contemporary experimental findings reviewed above, showing that judgements – be they spatial estimations (Kenealy, 1988), guessed chances of success (Teasdale & Spencer, 1984), evaluations of physical attractiveness (May & Hamilton, 1980) or facial expression (Bouhuys et al., 1995) – are indeed heavily modulated by emotionally evocative contextual cues, and in particular by emotional music.) Importantly, in Aristotle's account, metaphor is a central player in the orator's own unique ability to captivate, rivet, and 'move' the audience: 'It is metaphor above all that gives perspicuity, pleasure, and a foreign air, and it cannot be learnt from anyone else' (*Rhetoric* III.ii.8): metaphor is 'by far the greatest thing' and 'the token of genius' (*Poetics* 1459a). Much of metaphor's power lies in its combining intellectual pleasure with moderate challenge, 'for metaphor is a kind of enigma' (*Rhetoric* III.ii.12), which, when properly conceived (i.e. when neither too easy nor too difficult) both stimulates and satisfies. Consider the following passage: 'Easy learning is naturally pleasant to all, and words mean something, so that all words which make us learn something are most pleasant. Now we do not know the meaning of strange words, and proper terms we know already. It is metaphor, therefore, that above all produces this effect' (*Rhetoric* III.x.2). Aristotle goes on to cite Homer, who compared old age to stubble, and praises the rhetorical effectiveness of the juxtaposition between these two concepts, which 'teaches and informs us [...] for both [i.e. old age and stubble] have lost their bloom' (*Rhetoric* III.x.2). Hence, in Aristotle's account, a well-constructed metaphor should both please and educate. If a metaphor is 'obvious to all and need[s] no mental effort' (*Rhetoric* III.x.4) it will fail to educate; if, on the contrary, it is opaque and 'not understood' (*Rhetoric* III.x.4), it will fail to please. In both cases, people do not acquire new knowledge. Good metaphors, however, display a careful balance of familiar concepts and novel information, which makes them 'understood the moment they are stated', whilst at the same time their meaning is 'not clear at first, [but rather] comes a little later' (*Rhetoric* III.x.4). From this combination of ease and effort, whereby 'the mind seems to say, "How true it is! but I missed it"' (*Rhetoric* III.x.6), a 'kind of knowledge' (*Rhetoric* III.x.4) results, which produces an 'impression of smartness' (*Rhetoric* III.x.3). It follows that good metaphors, like 'clever riddles' (*Rhetoric* III.x.6), are agreeable because something is learnt. And what is learnt through metaphor is first and foremost a previously unexamined correspondence between two different concepts. The ability to create metaphors requires 'an eye for resemblances' (*Poetics* 1459a), and the 'power of detecting "identity in difference"' (*Poetics* 1459a, footnote 1 in Fyfe edition). Hence, although Aristotle's theory of metaphor appears to be largely concerned with describing the importance of metaphor in lending power and beauty to poetry, its larger purpose may be that of explaining how metaphor promotes an awareness of relations between objects (Levin, 1982, p. 25).

3.2. Contemporary evidence and debate

The Aristotelian notions of 'transference of meaning' and 'identity in differences' are key to modern theory of metaphor. Despite some dissenting voices claiming that metaphor is a purely stylistic device, bearing no great consequence, and, in most cases, unable to teach anything (Bréal, 1897, see especially chap. XII, pp. 135–147), Aristotle's view echoes through much of contemporary theory, in which the implications of metaphors are thought to extend beyond mere matters of style. The principled study of metaphor has undergone significant developments in the last thirty years (see, for example, the extensive survey in Turner, 1997, and the various contributions to Gibbs (Ed.), 2008). The prevailing view is that, notwithstanding its conspicuous presence in literature and philosophy, metaphor is not merely a stylistic device, but rather an

essential tool for communication (Ortony, 1975), as well as for thought and action (Lakoff & Johnson, 1980a). Linguistic evidence suggests indeed that human conceptual system is metaphorical, with language often employed in systematically figurative way (Lakoff & Johnson, 1980b). The regularities in figurative language are thought to reflect regularities in conceptualisation (Lakoff & Johnson, 1980b). Specifically the Conceptual Metaphor Theory (CMT, Lakoff & Johnson, 1980a, 1980b, 1980c) conceives of metaphor as a process of 'mapping' from a source domain to a target domain. This notion of 'mapping' implies a correspondence between concepts and ideas, which is not dissimilar from the Aristotelian view of metaphor as extracting 'identity in differences'. Some (Kirby, 1997) have indeed suggested that elements of CMT (e.g. Lakoff, 1987, 1993; Lakoff & Johnson, 1980b; Lakoff & Turner, 1989; Turner, 1987) can clearly be traced back to Aristotle. In CMT, as in Aristotle's account, production and perception of meaning relies upon analogy-making (Hofstadter & Sander, 2013), that is, upon the conceptual mappings between domains and analogies. Based on this notion, metaphor emerges as an important player in thought and communication, and a fundamental mechanism of human cognition. Hence, it is Aristotle who framed the terms of the debate on metaphor (Kirby, 1997), and elaborated the view of metaphor as comparison, which has subsequently been integrated into cognitive theories, e.g. CMT. We suggest that this notion of metaphor as a comparison, shared by Aristotle and CMT, ascribes to metaphor not only a comparative quality, but also a mediating action playing an important role between music and emotion.

3.3. Metaphor and emotion in music

In an attempt to elucidate the possible processes underlying the ability of music to evoke emotion, a model has been proposed based on six mechanisms (Juslin & Västfjäll, 2008), which are complementary (i.e. non mutually exclusive), and unspecific to music (i.e. they pertain to general cognition, and are co-opted by the music processing system), and range from purely physiological processes (e.g. brain stem reflexes), to high-level cognitive functions (e.g. musical expectancy). A seventh mechanism, not explicitly discussed, but implicitly built into the model, is cognitive appraisal. Other mechanisms have been evoked, such as semantic association (Fritz & Koelsch, 2008; Steinbeis & Koelsch, 2008) and synchronisation (Bharucha & Curtis, 2008). Amongst the high-order mechanisms, a frequently reported experience related to music playing or listening is the emergence of visual imagery (Juslin & Västfjäll, 2008; Quittner & Glueckhauf, 1983), which often takes the form of CM related to time (Epstein, 1995), space (Bonde, 2007), embodiment (Osborne, 1981), and movement (Johnson & Larson, 2003), including physical gesture (Giacco, 2011; Spampinato, 2008, 2015). Time and space have been defined the 'essence' of music (Clifton, 1983), and spatio-motor concepts, in particular, have been shown to be profoundly embedded in the Western musical thought, where sonic features (e.g. pitch and intervals) are often conceptualised in reference to space (Cox, 1999; Parkinson, Kohler, Sievers, & Wheatley, 2012; Spitzer, 2003), and motion through space (Rigas & Alty, 2005), e.g. height, depth, ascent, descent. These space- and gesture-related CM play a central role not only in music listening and performing, but also in music education (Guck, 1981), where they are considered an especially effective theoretical and pedagogical tool (Guck, 1994). Musicological writings are dominated by the notion of music as a continuous, unidirectional, forward movement across space (Cumming, 2000), i.e. a 'stream' of sound constantly 'passing' the listener, occasionally moderated by other types of motion (e.g. ascending, descending, rocking, swaying) but ultimately dominated by a linear, onward motion, commonly described as 'unfolding', 'leading to', 'heading towards' (Lochhead, 1989–1990). Music has been shown to evoke motion in the listener not only in relation to strong rhythms, which induce clear motor responses (e.g. finger snapping or foot tapping), but also to more subtle ones, which elicit more complex spatial trajectories that may or may not be acted out (Shove & Repp, 1995). Additionally, when confronted with the experience of sound changes, other bodily metaphors are at play as well, in which concepts of motion alternate with other metaphors, e.g. of heat, light, weight, and tension (Adlington, 2003).

Importantly, studies have shown that the various kinds of music-evoked imagery can enhance the emotional response to music (Band, Quilter, & Miller, 2001; Västfjäll, 2001). The musical phenomenon is indeed thought of as a complex interplay between sonic (physical) and emotional components (Clifton, 1983), where the latter are not merely extra-musical elements to which the music (notes) refers in a symbolic way, but rather are 'modes of consciousness' characterising one's experience of music. Elements of musical expression (e.g. tonal stress and rhythm) have been shown to mirror motor and neural responses associated with human emotion, leading to the idea that, through this motion and neural connection, the emotional states portrayed by music can be universally understood (Ferguson, 1960). Some have argued that the metaphorical and CM relationship between music and motion is so engrained within the physicality and embodiment of human experience of music that it should be regarded as a perceptual one (Clarke, 2001). On the other hand, the interpretation of musical structure in terms of CM (e.g. time, space, motion) requires imagination on the part of the listener, its meaning being dependent upon the cultural context (Krantz, 1987) (e.g. the understanding of pitch in terms of height is typically found in Western thought, but not necessarily in Eastern music discourse). This observation is consistent with a multi-layered conceptualisation of musical expression of emotions, whereby a (relatively culturally invariant) 'core' of *basic emotions* interacts with (context-dependent) additional layers enabling the expression and perception of complex emotions (Juslin, 2013). The resulting consideration is that CM is central to music (Zbikowski, 2008) on account of its combining physiological (universal) and cultural (contextual) aspects of music experience, which it achieves by acting both as a 'cognitive process', and as a 'cultural process' (Mac Cormac, 1985, pp. 5–6). Hence, metaphors may be viewed as a mediator between cognition and culture.

4. Metaphor as mediator between music and emotion

Building on the previously reviewed literature, we therefore suggest that the various mechanisms through which music evokes emotion may be subsumed under the two overall categories of bottom-up (predominantly driven by sonic properties and physiological responses) and top-down (largely driven by cognitive and contextual contributions), both of which operate along the meaning-making chain that enables emotion expression, perception, experience, and description. We further propose that metaphor and CM contribute to this meaning-making chain by acting at different key nodes along the series of perceptual, cognitive, and affective events characterising human engagement with music (Fig. 1). Firstly, CM, among other phenomena, may intervene at the *interpersonal* level, by contributing to the communication of musical and affective meaning across individuals, for example between composer and performer, or between performer and audience. Writing, reading, and interpreting a musical score, performance, and other musical descriptors relies on a shared understanding between the actors involved in the exchange, e.g. composer, performer, audience. Metaphors (e.g. linguistic descriptors and bodily gestures) and CM (e.g. understanding music in terms of time, space, motion, etc.) may provide the interface for this shared understanding (Fig. 1, upper part). Secondly, CM may act at the *intrapersonal* level, by enabling or facilitating, within a single individual-listener, the transition from emotion perception to emotion induction. As discussed above, perception and induction are distinct phenomena, the former based on the ability to recognise and attribute affective qualities to the music (without necessarily experiencing these affective qualities oneself), the latter implying a direct personal emotional experience (contributing to the so-called feeling) in response to one's engagement with music (without necessarily judging the music

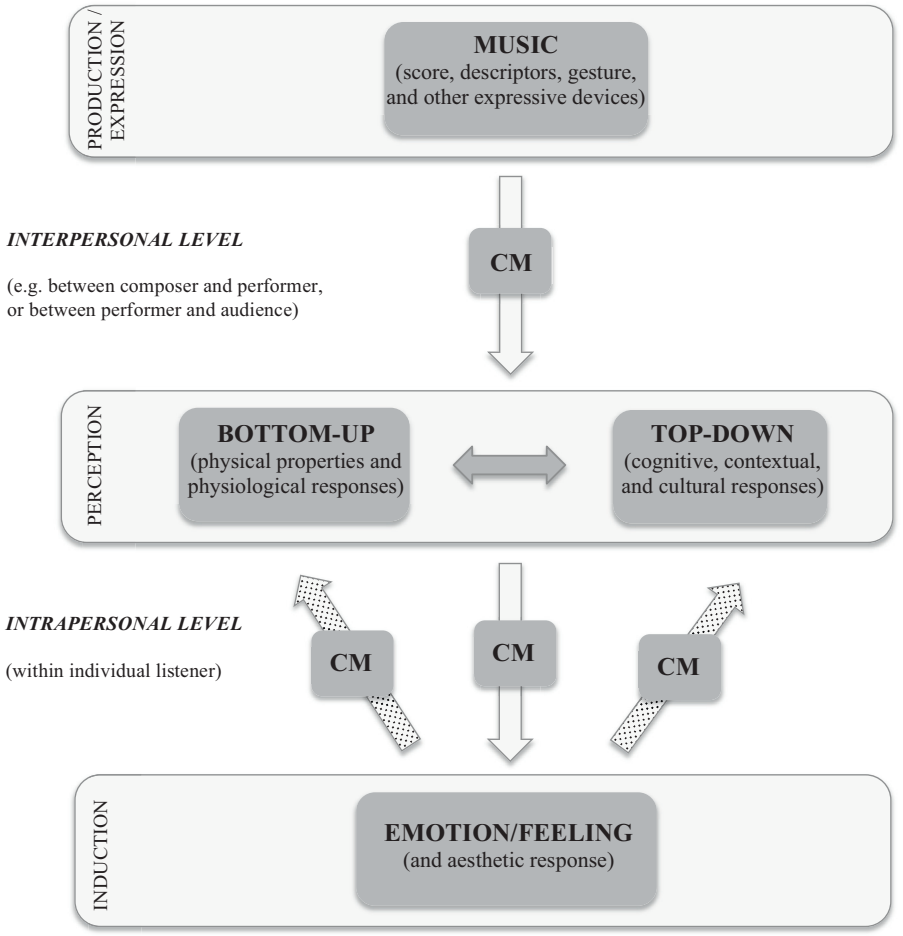

Fig. 1. Model for role of conceptual metaphor (CM) in emotion response to music. CM acts at different key nodes along the series of perceptual, cognitive, and affective events characterising human engagement with music. At the *interpersonal* level (e.g. between composer, performer, and audience), CM provides an interface for shared understanding of music in terms of time, space, motion, gesture, etc. (upper part). At the *intrapersonal* level (within an individual listener), it facilitates the transition between emotion perception and emotion induction, in two non mutually exclusive configurations (lower part): by mediating between sound perception and emotional response (open arrow), and/or by arising as a result of the emotional response, which is itself the mediator between sound perception and CM (dotted arrows).

itself as expressive of those emotions). Metaphors and CM may act as a bidirectional conduit between music perception and emotion experience, contributing to the transition from the former to the latter (e.g. in a listener being moved as a result of perceiving emotion as being expressed in music), or from the latter to the former (e.g. in a composer adopting certain metaphoric or stylistic devices in order that the score may express certain emotional qualities that reflect the composer's own emotional state). In both cases, CM provides a platform for shared understanding of music's affective quality (Fig. 1, lower part). We further propose that metaphor and emotion are tightly intertwined, with no clear-cut causal directionality but rather a cross-talk shaped by different determinants (e.g. knowledge of listener, contextual information). Specifically, we submit that the relation between music, emotion, and metaphor may take two (alternative but not necessarily mutually exclusive) configurations: one possibility is that CM mediate between the perceptual (bottom-up) component of music and the emotional and aesthetic response to it. In this scenario, CM arising from the perceptual experience of given sounds provide the representations that induce and/or amplify the emotional experience, and ultimately the aesthetic response to music (Fig. 1, open arrows). An alternative possibility is that CM arise from the emotional experience, which is itself the mediator between sound perception and the metaphorical representation in response to music. In this latter scenario, emotions are elicited directly by the sonic properties of music (including those related to the acoustic features of the sound, physical phenomena such as resonance, the structure of the score, and the choice of the performer), and are themselves the origin of the metaphorical representation (Fig. 1, dotted arrows). Although still theoretical and speculative, these two alternative configurations of the relation between music, emotion, and metaphor are conducive to being empirically tested. Potential testing methods include the use of behavioural and brain imaging techniques, statistical tools based on a Brunswikian approach (e.g. Brunswik, 1956; Grandjean, Banziger, & Scherer, 2006; Hammond & Stewart, 2001; Scherer, 2003), as well as music analysis. This latter point deserves attention because, although emotional responses can develop in response to a variety of phenomena other than music, music seems to offer special resources for representing emotional states as they develop and modulate over time (Zbikowski, 2010). Based on this observation, it has been argued that 'musical passages which are particularly remarkable are so in part because of the ways in which they correlate with the progress and change of emotions' (Zbikowski, 2010, p. 38). One interesting possibility is that the human aptitude to capture the unfolding of emotion in music relies upon a system of dynamic emotional judgments, whereby the quality of the perceived or felt emotion depends upon acoustical parameters, musical structures, associated metaphors, and the complex interplay between these three domains (Torres-Eliard, Labbé, & Grandjean, 2012). These scenarios open up a role for music analysis as an interpretative tool through which the correlations between music and emotion can be exposed (see, for example, how music analysis is applied to examine the expressive qualities of Domenico Scarlatti's Sonata in A major, K. 208, in Zbikowski, 2010), hence, more generally, as a potential theoretical apparatus through which music's emotional meaning can be unlocked. Future systematic empirical investigations may elucidate the relation between CM and musical emotion, and in particular the mediatory role of metaphorical representations in human aesthetic response to music.

5. Conclusions

Music is often talked about in emotional terms, but the evidence for the extent and modalities to which music expresses and induces emotion is debated. Part of the difficulty of interpretation lies in the coexistence of multiple layers of meaning, ranging from physiological responses to the physical properties of sound (bottom-up) to cognitive and contextual contributions (top-down), all of which contribute to human interaction with music in non linear ways. Acknowledging the complexity of the music-emotion dynamics, and building on the insights afforded by previous accounts from the Classical tradition and contemporary empirical research, we suggest that the overall emotional experience surrounding human engagement with music arises as the net outcome of multiple layers of interpretation, including perceptual, cognitive, and affective components, and propose that metaphor may play a central role at different key nodes within this meaning-making process.

It has once been claimed that 'of the thousands and thousands of pages written about metaphor, few add anything of substance to the first two or three fundamental concepts stated by Aristotle' (Eco, 1983, pp. 217–218). There is truth in this admittedly radical statement: although the insights from Classical thought are not the only ones worth examining (notions developed during later eras, for example the early modern period, are valuable as well), here we chose to focus on Classical thought because of its originality and influence on subsequent discourse (one could cite, for example, the impact of (idealistic) Platonic and (realistic) Aristotelian views of knowledge on Descartes' philosophy (e.g. in the juxtaposition of (thinking) mind and (extended) body) (Lakoff & Johnson, 1999, pp. 391 ff. and 547), the weight of Aristotle's thought on the origins and development of the modern discipline of logic (pp. 375 and 446 ff.) and of the traditional theory of metaphor (p. 122), as well as on analytic philosophy at large (p. 547). It therefore stands to acknowledge that 'the issues raised by Aristotle [...] are still with us today' (p. 388).

Our aim here has been to probe this intellectual legacy, and explore potential connections between ancient philosophical intuitions and contemporary empirical evidence, in order to identify the contribution of metaphor to human experience of music. Based on this combination of theoretical notions and neuroscientific findings, we suggest that one way in which metaphor contributes to human experience of music is by acting as the hinge between language, emotion, and aesthetic response.

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