

## Comment

# The meanings of musical meanings

## Comment on “Towards a neural basis of processing musical semantics” by Stefan Koelsch

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Stefan Koelsch has chosen a hard problem in exploring the responses of listeners to aspects of meaning in western common-practice period tonal-harmonic music. This is a highly culturally-particularized art-music that has accreted strata of discursive significance likely to condition its experience in ways that are intimately bound to the history of western culture. Music rooted in tonal dynamics is interwoven into the fabric of contemporary life in multifarious and disparate strands and in various stylistic manifestations, serving a range of functions from modulation of affective and associative responses in narrative contexts (as in film and advertisements), through framing the timing of joint action (as in dance, or marching in step), through managing and coordinating collective attentional focus and affect (as in singing or playing together), to serving as a focus for subcultural affiliation (as, e.g., in peer-to-peer file-sharing). As an auditory stimulus, it may carry traces of all these functions simultaneously for a listener, and the meanings that it may bear for any individual are likely to be as multifarious as its manifestations and functions.

Philosophers have dealt with this complexity variously; Koopman and Davies [1], to whom Koelsch refers, suggest that music’s meanings are best interpreted as experiential, but that they have some “objective” aspects, largely consisting in [1, p. 264] the “coherent dynamic content the listener discovers by focusing on the music’s formal progress”. They state [1, p. 265] that “Music’s meaning ... is an objective property of the music, because there is agreement in the relevant judgments of suitably qualified listeners under appropriate conditions”. The identity of “suitably qualified listeners” then comes into play in determining who is qualified to weigh music’s meanings; these might range from a few connoisseurs to the entirety of an enculturated population. Koopman and Davies do propose that other types of musical meaning are likely to exist, more variable and subjective than those deriving from music’s “coherent dynamic content”; they postulate that the experience of music gives rise to a kind of private meaning or “meaning-for-the-subject” that is personal and existential and that will be largely individual, though it may be partly shared in social and group contexts where common commitments and motivations allow these personal meanings to converge.

Objective musical meaning—“musical connectedness from point to point” [1, p. 266], or “intra-musical meaning”—is one principal focus of the research outlined here; Koelsch and his collaborators have shown that an ERAN ERP response (with a post-stimulus latency of around 120–200 ms) appears bound to syntactic music processing, while an N5 response (latency of 500 ms) appears to reflect semantic processes that are tied to aspects of music-structural integration. These findings fit well with recent music theories that have been applied to the cognition of tonal music [2], elucidating at the neural level the ways in which constituent elements of that music depend on their

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relationships with each other for their functional identity. The results are also in line with other researchers' findings that formal training is not required for listeners to exhibit sensitivity to tonal musical structures [3], which could be taken to imply that any member of the western musically-enculturated population constitutes a "suitably qualified listener", in terms of abstracting "intra-musical meaning" in the course of listening.

The other principal finding reported here, that of a consistent N400 response (associated with the experience of semantic incongruity) to music, is perhaps more surprising, given the range of meanings that philosophers—rightly, in my view—allow in respect of the individual experience of music. How is it that different listeners' brains respond in the same way when they encounter what others have identified as a match or a mismatch between a musical fragment and an abstract noun such as "wideness"? Koelsch suggests that these responses were motivated by listeners experiencing a relationship of an iconic or indexical type between the words and the music; in other words, the music affords the creation of some sort of associative links with the world of concepts, and some forms of extra-musical meanings can attach themselves to the music.

But, as Koelsch notes, music's meanings appear to extend beyond the intra- and extra-musical, into the "musicogenic" domain (analogous to Koopman and Davies's "music-for-the subject"), where they may be manifested as correlates of physical activity, and as the result of emotional, and self-referential, processes motivated by engagement with music. As he notes, other than in the emotional domain (see [4] for a compendium of recent research and theory on music and emotion), these aspects of music's meanings have received little empirical attention.

Koelsch provides a dense but lucid account of the ways in which music may mean, and his scrupulous and insightful research has illuminated issues that have been the focus of much theoretical attention. However, without compromising the significance of that research, it can be suggested that the three types of meaning that he identifies (intra-musical, extra-musical and musicogenic) constitute a framework for tackling the complexity of music's meanings that is appropriate within a specifically *western* conceptualization of what constitutes music. This approach to understanding musical meaning is derived from, and is being applied to, the highly complex, historically-conditioned, web of activities, artefacts, ideas and beliefs that comprises "music" in contemporary western societies. It is bound up with the emergence of the idea of aesthetic experience in the late eighteenth century, and acquires articulate form in the work of Hanslick in the mid-nineteenth century [5]. Here, music is conceived of as an autonomous realm, understandable as complexly patterned sound (or sonic artefact [6]) only on its own terms and according to principles that are specific—perhaps unique—to music. This view is only seriously countered within musicology in the work of Adorno and others from the mid-twentieth century onwards [7], but still pervades philosophical approaches to music [8,1]. Within this view the paradigmatic mode of engagement with music is listening; as Scruton [9, p. 169] puts it, "... musical understanding is a form of hearing".

But dissent from such views pervades the work of ethnomusicologists throughout the last century [10,11]. From an ethnomusicological perspective, music is embedded in the fabric of everyday lives; it endows with meaning, and picks up meaning from, everyday activities. In general those meanings are culturally particular; their natures and functions lie in the uses and values of music in the activities of particular cultures. Moreover, as [12] notes, in many societies music is as often participatory—involving active and interactive engagement in its simultaneous production and perception—as it is presentational (the privileged mode of engagement with music in the west, where specialist performers and composers present music to the majority population of listeners). Hence from an ethnomusicological perspective the dimension of extra-musical meaning scarcely makes sense, as music's meanings cannot be understood independently of the contexts within which the music occurs. Ethnomusicological views of music and its meanings are multifarious, and tend to be focused on the exigencies of cultural practice and understandings in specific societies rather than exploring aspects that might have cross-cultural applicability. Indeed, the idea that music and its meanings may have universal features has only sporadically received attention over the last half century [13,14,11].

Given its, perhaps predominantly, participatory nature, music might best be thought of not as an autonomous realm but as a mode of human communication that is homologous with aspects of linguistic interaction. As Coupland and Coupland [15, p. 112] note, "... it is demonstrably the case that even our most instrumental, transactional encounters are pervasively organized around multiple interactional goals that go well beyond the transmission and reception of factual information". These multiple interactional goals of speech are not only *transactional*, involving exchanges focused on explicit, consensually agreed, propositional and truth-conditional, meanings, but also *relational*, involving the formation, maintenance or restructuring of connections and affiliations between participants. If we think of music as a mode of communication, it diverges from linguistic interaction in that meanings are not required to be made mutually explicit; each participant can abstract their own meanings from the collective musical act without breaching

its integrity (somewhat similar to Koopman and Davies’s “meaning-for-the-subject”), a feature of music that elsewhere [16] I’ve referred to as “floating intentionality”. Musical interaction can thus be thought of as a mode of relational communication. Viewed from this perspective, some universal aspects of music’s meanings can be postulated [17].

As a communicative medium, it can be suggested that music incorporates features that are shared with the communicative signalling systems of other species (otherwise it would be difficult to account for the fact that music can influence arousal in non-human species [18]), in the form of motivational–structural regularities linking features of the acoustical signal to elicited affect [19]. This dimension of music’s meaning would constrain the range of possible “meanings-for-the-subject”, most likely within an approach–avoidance continuum: for example, a piano pianissimo bass drum note would be unlikely to stimulate a listener significantly, while a fortissimo lullaby would be unlikely to be effective in affiliative engagement with an infant.

It can be further suggested that music incorporates features that are shared with the other principal domain of human face-to-face communication, the linguistic, that derive from physiological and affective constraints that shape human vocal production in ways that render vocal sounds—and gestures—likely to be experienced as indicative of the affective state of the sound producer, or the attitude of the sound producer towards the communicative engagement [20]—the socio-intentional dimension. I conceive of this dimension as embracing aspects of the ways in which the ongoing dynamic temporal flow of musical events is likely to be experienced, and produced as intended to be experienced, as modulating the exchange of social information, in terms of revealing each musical participant’s attitude (or communicative stance) towards each other and towards each other’s musical actions. This is an essentially pragmatic or phatic dimension, interpretable as being involved in making mutually manifest the affective states and attitudes of those involved in ongoing musical interaction.

Hence I would postulate at least two levels of constraint (one species-general, the other species-specific) that render at least partly commensurate the otherwise “subjective” meanings that each participant in a musical act may experience. But in addition to these general constraints on experienced meaning in music, the influence of cultural background and personal history—the culturally-enactive dimension—may act to endow music with the types of meanings—consensual, transactional—that begin to verge on the propositional, truth-conditional meanings that are otherwise interpreted as being the preserve of language. Together, these three dimensions (and probably more) work to afford music its floating intentionality, the sense that it means, but that its meaning can rarely if ever be the subject of consensual agreement (expect, perhaps, insofar as they reflect specific cultural values and beliefs).

To return to Stefan Koelsch’s findings: those that appeared puzzling—the existence of the N400 response to music, and the finding that “...listeners automatically engage social cognition during listening to music”—are perhaps anticipatable from a perspective that views music as a communicative behaviour sharing features inherited from ancestor species as well as features that are common to all human communicative behaviours. Cultural factors—deriving from common contexts of experiences for music—together with motivational–structural and socio-intentional factors may act to afford a consistency of response across listeners, with consensual meanings being cued on the basis of either (culturally-shaped) association, or a fit between the acoustical characteristics of a musical fragment and its inferable communicative function.

I’d suggest that the findings that appear explicable on the basis of music theoretic considerations—the consistent elicitation of ERAN and of N5—are, on the other hand, rendered perhaps even more mysterious and perplexing, when music is considered as fundamentally communicative. The experiments in which these responses were found demonstrated consistent sensitivities to aspects of tonal-harmonic structure, a highly-theorized domain of western music [21–23], but one that appears to be unique to western music of the last 400 years. It would be of considerable interest to know whether or not such findings might be generalisable to other structural parameters of music in other musical cultures, and to be able to trace the developmental trajectory of these phenomena in our own and other cultures.

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