

## Meaning in music and language: Three key differences

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

L. Robert Slevc<sup>1</sup> & Aniruddh D. Patel<sup>2</sup>

<sup>1</sup> Department of Psychology, University of Maryland, College Park, MD 20742

<sup>2</sup> The Neurosciences Institute, 10640 John Jay Hopkins Dr., San Diego, CA 92121

**This is a postprint version of:** Slevc, L. R. & Patel, A. D. (2011). Meaning in music and language: Three key differences. Comment on “Towards a neural basis of processing musical semantics” by Stefan Koelsch. *Physics of Life Reviews*, 8(2), 110-111.

Published in final form at: <http://dx.doi.org/10.1016/j.plrev.2011.05.003>

Koelsch [4] takes a broad view of semantics (unlike, e.g., [3]), and presents a variety of evidence suggesting that, like language, instrumental music can communicate not only emotional or affective meaning, but also iconic, indexical, and symbolic meaning. He concludes that the study of musical semantics and its relation to linguistic semantics can advance our understanding of the neural representation of semantics in general. Koelsch’s paper demonstrates that evidence from neuroscience can inform old debates about musical semantics, and we agree with his point that linguistic and musical meaning may have more in common than has been generally appreciated. However, it is also important to recognize salient differences between linguistic and musical meaning. We point to three key features of linguistic semantics that are distinct from musical semantics: specificity, compositionality, and communication.

As discussed by Koelsch [4], a growing body of evidence suggests that music, like language, can activate aspects of extramusical meaning, as revealed by elevated N400 responses to semantic incongruity. However, the meaning evoked by music is far less *specific* than meaning evoked by language. Units of language denote specific semantic concepts, whereas units of music can (but do not always) pick out semantic concepts at a much coarser grain [1]. Furthermore, music does not obviously activate extramusical meaning any more than various other types of non-linguistic stimuli do, such as environmental sounds or pictures (see [5] for a review).

A second important difference is that, unlike musical semantics, linguistic semantics is *compositional*. That is, words combine in lawful ways to give rise to more complex meanings. For example, a sentence like “Some elephants were playing tennis at the faculty club” expresses not only the meanings of individual lexical items, but also the (presumably novel) propositional meaning of the sentence as a whole. Units of instrumental music, in contrast, cannot combine in this way to convey propositions (Koelsch [4] notes that music does not appear to express propositional meaning).

Finally, and perhaps most importantly, linguistic, but not musical, semantics exists for *communicative* reasons. In ordinary, day-to-day language, speakers produce linguistic utterances primarily to express meaning in a way that can be veridically recovered by their listeners. In contrast, it is an open question if composers or performers even hope to communicate a specific meaning through music. Indeed, because of the relatively unspecific and non-compositional nature of musical semantics, it seems unlikely that a listener could reliably recover a

composer's/performer's intended message (if one exists). Thus instrumental music might better be conceived of as a form of *expression* rather than of *communication*.

These three differences between musical and linguistic semantics (specificity, compositionality, and communicativeness) could explain the asymmetry in the N400/N5 interaction in [6], where the musical N5 was modulated by the linguistic N400, but the N400 was not modulated by the N5. Because linguistic semantics is a relatively richer system that involves specific referents and propositions, these semantic representations are likely to be more salient than the relatively vague semantic representations conveyed by music. One might then expect linguistic semantics to interfere with weaker musical semantic representations, but the relatively unspecific musical semantic representations to exert little influence on linguistic semantic processing.

In sum, we argue that musical meaning lacks the specificity, the compositionality, and the communicative motivation of linguistic semantics. Yet these limitations of musical semantics may be the very things that give music much of its power. The ambiguity and flexibility of musical meaning allows music to mean different things to different people, different things at different times, or even to mean many things at once (cf. [2]). This semantic flexibility and fluidity creates a form of meaning that is part of the uniqueness and importance of music.

#### Acknowledgments

ADP was supported by Neurosciences Research Foundation as part of its program on music and the brain at The Neurosciences Institute, where he is the Esther J. Burnham Senior Fellow.

#### References

- [1] Antović, M. Towards the semantics of music: The twentieth century. *Language and History* 2009; 52: 119–129.
- [2] Cross, I. Music and meaning, ambiguity and evolution. In D. Miell, R. MacDonald, & D. Hargreaves (Eds.), *Musical Communication*, Oxford University Press 2005; 27-43.
- [3] Kivy, P. *Introduction to a Philosophy of Music*. Oxford University Press 2002.
- [4] Koelsch, S. Towards a neural basis of processing musical semantics. *Physics of Life Reviews* 2011; 8(2), this issue.
- [5] Lau, E., Phillips, C., & Poeppel, D. A cortical network for semantics: (de)constructing the N400. *Nature Reviews Neuroscience* 2008; 9(12): 920–933.
- [6] Steinbeis, N. & Koelsch, S. Shared neural resources between music and language indicate semantic processing of musical tension-resolution patterns. *Cerebral Cortex* 2008; 18: 1169-1178.