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Unraveling the origins of musicality: Beyond music as an epiphenomenon of language

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Abstract

The two target articles address the origins of music in complementary ways. However, both proposals focus on overt musical behaviour, largely ignoring the role of perception and cognition, and they blur the boundaries between the potential origins of language and music. To resolve this, an alternative research strategy is proposed that focusses on the core cognitive components of musicality.

Commentary on Savage *et al.* and Mehr *et al.*

Savage *et al.* (this issue) start with making the important distinction between *musicality* as a set of traits that allow us to perceive, produce and appreciate music, and *music* as a social and cultural construct “generated by and for music making” (sec. 1., para. 3). This distinction seems trivial, but it adds a powerful level of explanation to the study of the origins of musicality as a phenomenon with both a cultural and a biological basis (Fitch, 2018; Honing, 2018b). As such, a good starting point for the search for these origins would be musicality, rather than music.

While the cross-cultural study of the structure of *music* (melodic patterns, scales, tonality, etc.) has offered exciting insights (Mehr *et al.*, 2019; Savage *et al.*, 2015), the approach used in these studies is indirect: the object of study here is music—the result of musicality—rather than musicality itself. Hence it is difficult to distinguish between the individual contributions of culture and biology. For example, it is not clear whether the division of an octave into small and unequal intervals in a particular musical culture results from a widespread theoretical doctrine or from a music perception ability or preference.

All this is an important motivation to study the structure of *musicality* (the capacity for music), its constituent components (see Table 1), and how these might be shared with other animals, aiming to disentangle the biological and cultural contributions to the human capacity for music (Honing *et al.*, 2015).

Table 1. Potential candidates for a multicomponent model of musicality (cf. Honing, 2018a).

| Domain | Constituent component |
|--------|--|
| Melody | Relative pitch (pitch interval) |
| | Absolute pitch (fundamental frequency) |
| | Melodic contour (change of pitch direction) |
| | Tonal encoding of pitch (<i>tonality</i>) |
| Rhythm | Isochrony perception |
| | Beat perception |
| | Rhythmic contour (grouping) |
| | Metrical encoding of rhythm (<i>metricality</i>) |
| Timbre | Timbre perception |
| | Consonance perception (<i>harmonicity</i>) |
| | Spectral contour (change of timbre) |

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The two target articles address the origins of music and musicality in complementary ways. Savage et al. (this issue) aim for an overarching theory that proposes music to be a relatively recent cultural invention that then further evolved through gene-culture coevolution. In contrast, Mehr et al. (this issue) present a single hypothesis capturing the biological origins of musical behaviour, suggesting a long evolutionary history.

The first thing to note is that both articles base their arguments on overt musical behaviour (i.e. music production), with little or no attention to the perception and appreciation of music. This is surprising since there is quite a body of work that aims to identify the core constituent components of musicality by focusing on the perception and cognition of music (see Table 1). This is in support of the important realization that we all share a predisposition for music: Even those of us who can't play a musical instrument or claim to lack a sense of rhythm can perceive and enjoy music (Margulis, 2019; Rentfrow & Levitin, 2019). As such, music production is not necessarily a good proxy for the perception and appreciation of music (cf. Trehub et al., 2019).

Second, both target articles struggle with identifying the role of language in how musical behaviour evolved.

Savage et al. (this issue) decided to avoid a strict focus on musicality ("We make no claim that the mechanisms discussed here are entirely specific to music", sect. 6.1., para. 3). This could be considered a methodological weakness. Of course, music and musicality have been and will continue to be influenced by a variety of non-musical factors. Nevertheless, to be able to pinpoint what is essential to musicality, what components we share with other nonhuman animals, and what its potential evolutionary history is, it seems a more fruitful strategy to restrict oneself to those components of musicality for which it can be argued that they are *not* linked or useful to language (for instance beat perception or tonality; see Table 1).

Mehr et al. (this issue) are less explicit in what their hypothesis says about language vs music. A large proportion of the arguments appear to be equally applicable to the origins of speech. In fact, the credible signalling hypothesis is resonating with the idea of a "musical protolanguage" (Darwin, 1871; cf. Fitch, 2013) in interesting ways. Charles Darwin argued that language does not depend on the skill of being able to articulate sounds, but "obviously depends on the development of the mental faculties" (Darwin 1871:54). Hence, the credible signalling hypothesis could be improved by making explicit which core musical building blocks (i.e. those of lesser or no use to language) are linked to which music-specific mental faculties. As such making precise what is special about music.

While the relation between language and music has been a topic of much debate (Arbib, 2013), in the current context it appears to be less relevant what these two domains have in common. What should be the focus is what makes the capacity for music *distinct* from that of language: the study of musicality is in need of its own research agenda.

While both target articles note that some components of musicality overlap with non-musical cognitive features, this is in itself no evidence against musicality as a separately evolved biological set of traits. Theories that suggest musicality to be an epiphenomenon of language (Pinker, 1997)

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have to demonstrate that the components of musicality are *not* domain specific, but each cognitively linked to some non-musical mental ability.

As in language, musicality could have evolved from existing elements that are brought together in unique ways, and that system may still have emerged as a biological product through evolutionary processes. As such there is no need for musicality to show a modular structure (Fodor, 1983). Alternatively, converging evidence suggests music-specific responses along specific neural pathways (Albouy et al., 2020) and it could be that brain networks that support musicality are partly recycled for language (Peretz et al., 2018). This could imply that both language and music originate from musicality. In fact, this is one possible route to test the Darwin-inspired conjecture that musicality precedes music and language (Honing, 2018a).

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