Evolutionary linguistics can help refine (and test) hypotheses about how music might have evolved.

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To appear in *Behavioral and Brain Sciences*, as a commentary on “Origins of music in credible signaling”, by Samuel A. Mehr, Max M. Krasnow, Gregory A. Bryant, and Edward H. Hagen, and “Music as a coevolved system for social bonding”, by Patrick E. Savage, Psyche Loui, Bronwyn Tarr, Adena Schachner, Luke Glowacki, Steven Mithen, and W. Tecumseh Fitch

Abstract

Both the music and social bonding (MSB) hypothesis and the music as a credible signal hypothesis emerge as solid views of how human music and human musicality might have evolved. Nonetheless, both views could be improved (and tested in better ways) with the consideration of the way in which human language(s) might have evolved under the effects of our self-domestication.

Savage and colleagues provide a compelling argument in favor of the coevolution of music and musicality via iterative niche construction driven by their positive effect on human social bonding (the MSB hypothesis). By contrast, Mehr and colleagues argue that music evolved to provide increasingly sophisticated credible signals that are needed to cope with progressively complex social conflicts of interest, like those resulting from multi-level social organization or higher levels of (allo)parental investment. These two hypotheses are presented as somehow irreconcilable. This commentary paper brings language evolution to the forefront with the aim of discussing the plausibility of both views, suggesting potential ways of improving and testing them, and eventually, reconcile them under the light of new views of human evolution.

Recently, the self-domestication hypothesis of human evolution has (re)emerged as a promising account of many of our species-specific traits. According to this view, we evolved similarly to domesticated varieties of mammals. But whereas animal domestication usually results from selection for tameness, our domestication might have been triggered by external factors like changes in our foraging ecology, the rise of community living, or the advent of co-parenting (hence, *self*-domestication) (Hare et al., 2012; Pisor and Surbeck, 2019). These factors are hypothesized to have impacted on the neurobiological mechanisms controlling aggression, resulting in individuals that were less emotionally reactive and more tolerant for strangers, with these changes ultimately favoring the emergence of many of our distinctive features, including our enhanced social cognition, increased cooperation, and extended social networks, and eventually, our sophisticated culture and advanced technology (see Hare, 2017 for details). Our own research supports the view that self-domestication could account as well for most aspects of the cultural niche that enables the sophistication of language structure and use via a cultural mechanism, mostly through the potentiation of the cognitive and behavioral abilities involved in language learning and use. We have equally argued for an intense feedback loop (the “virtuous spiral” mentioned by Savage and colleagues) between self-domestication processes, grammar complexity, and pragmatics sophistication, and ultimately, for a gradual co-evolution of human language (and human languages) under the effects of self-domestication (Figure).

A graphical overview of a model of language evolution under the effects of human self-domestication (see Benítez-Burraco, 2017; Benítez-Burraco and Kempe, 2018; Progovac and Benítez-Burraco, 2019; Benítez-Burraco and Progovac, 2020; Langley et al., 2020 for details)

Most of the evidence discussed by Savage and colleagues supports a potential link between the evolution of musicality and self-domestication mechanisms, particularly, regarding the biological underpinnings. To mention just one instance, they suggest that the positive effect of musicality on social bonding might result in part from the activation of the dopaminergic reward system (their Figure 3a). Interestingly, changes in the dopamine systems have been regularly documented in domesticated animals (Komiya et al., 2014; Sato et al., 2020). Evidence of selection of pathways related to dopaminergic synapse have been found in European samples during the last 6,000 years (Chekalin et al., 2019), a time period when genes involved in animal domestication have been selected too (Benítez-Burraco et al. 2019). Overall, including self-domestication in the equation could help the authors address what they anticipate the key criticism to the MSB hypothesis, namely, the degree to which the evolution of musicality and social bonding are causally linked. One could say that it was our self-domestication, via its inhibitory impact on reactive aggression, that set in motion the ‘virtuous spiral’ involving social bonding and music.

Similarly, the cognitive and behavioral outcomes of self-domestication might have stimulated the evolution of music as a credible signal for cooperating between groups (coalitions) and inside groups (child-adult relationships), as suggested by Mehr and colleagues. In fact, these authors acknowledge that “music does not directly cause social cohesion: rather, it signals existing social cohesion that was obtained by other means” (subsection 4.2.1). Self-domestication could be one (or the most important) of such means, as the reduced levels of reactive aggression brought about by self-domestication might have favored longer, more frequent, and more diverse contacts with others, including strangers and caregivers, setting the scene for the selection of music as a credible signal for cooperative exchanges. Overall, considering self-domestication forces could help reconcile these two divergent views of music evolution. One could hypothesize that music was initially selected because of its contribution to the enhanced social bonding brought about by self-domestication (Stage 2 in the Figure), and later, because of its role as a credible signal, once human groups became larger and more complex as self-domestication reached its peak (Stages 3 and 4 in the Figure).

The evolutionary scenario sketched above could help as well improve the less developed aspect of both papers, specifically, how the different types of music emerged through a cultural mechanism. Both papers expect some sort of link between music complexity and social complexity. Savage and colleagues expect music to be more effective as a social bond mechanism in bigger, more complex human groups, with larger and more hierarchical societies preferring “presentational” music over “participatory” music. Likewise, Mehr and colleagues (seem to) expect more elaborated forms of music in multi-level societies. Considering again the domain of evolutionary linguistics, and briefly summarizing a vast body of research (e.g. Bolender, 2007; Wray and Grace, 2007; Lupyán and Dale, 2010; Trudgill, 2011; Nettle, 2012), one finds that the languages spoken by small, isolated human groups forming close-knit social networks exhibit quite the opposite structural features (from grammar, to vocabulary, to sound patterns) to the languages spoken by large human groups forming extensive and complex social networks with higher rates of cultural exchange (Figure; Stages 3 and 4). These opposite features seemingly

result from the dissimilar amount of knowledge shared by speakers (i.e. the common ground), in turn a consequence of the different nature of the social links, in turn depending on the levels of reactive and proactive aggression, which are at the core of the self-domestication hypothesis (see also Figure). Consequently, our understanding of the cultural evolution of music could benefit from the comparative analysis of the structural and functional features of the types of music produced by these two main types of human societies, looking for the sort of correlations (and causality) found in languages. If musical compositions parallel what we observe in languages, we would expect that the musical compositions created by (let's say) English-speaking or Chinese-speaking societies, which are outstanding examples of languages of the second type, exhibit a more elaborated structure, put more information in the sheet, and are thus more “understandable” by people with different cultural backgrounds, that the music created by (let's say) the Tsimane people (McDermott et al., 2016).

In summary, we regard these two hypotheses as two solid, complementary views of how music/musicality evolved, but they could be improved with the consideration of fresh models of language(s) evolution, particularly, those based on the self-domestication account of human evolution.

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