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

Published online by Cambridge University Press: **30 September 2021**

In response to: **Music as a coevolved system for social bonding**
Related commentaries (24) Author responses

Antonio Benítez-Burraco

Article contents

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.

Type

Open Peer Commentary

Information

Behavioral and Brain Sciences, Volume 44, 2021, e64

DOI: https://doi.org/10.1017/S0140525X20000680

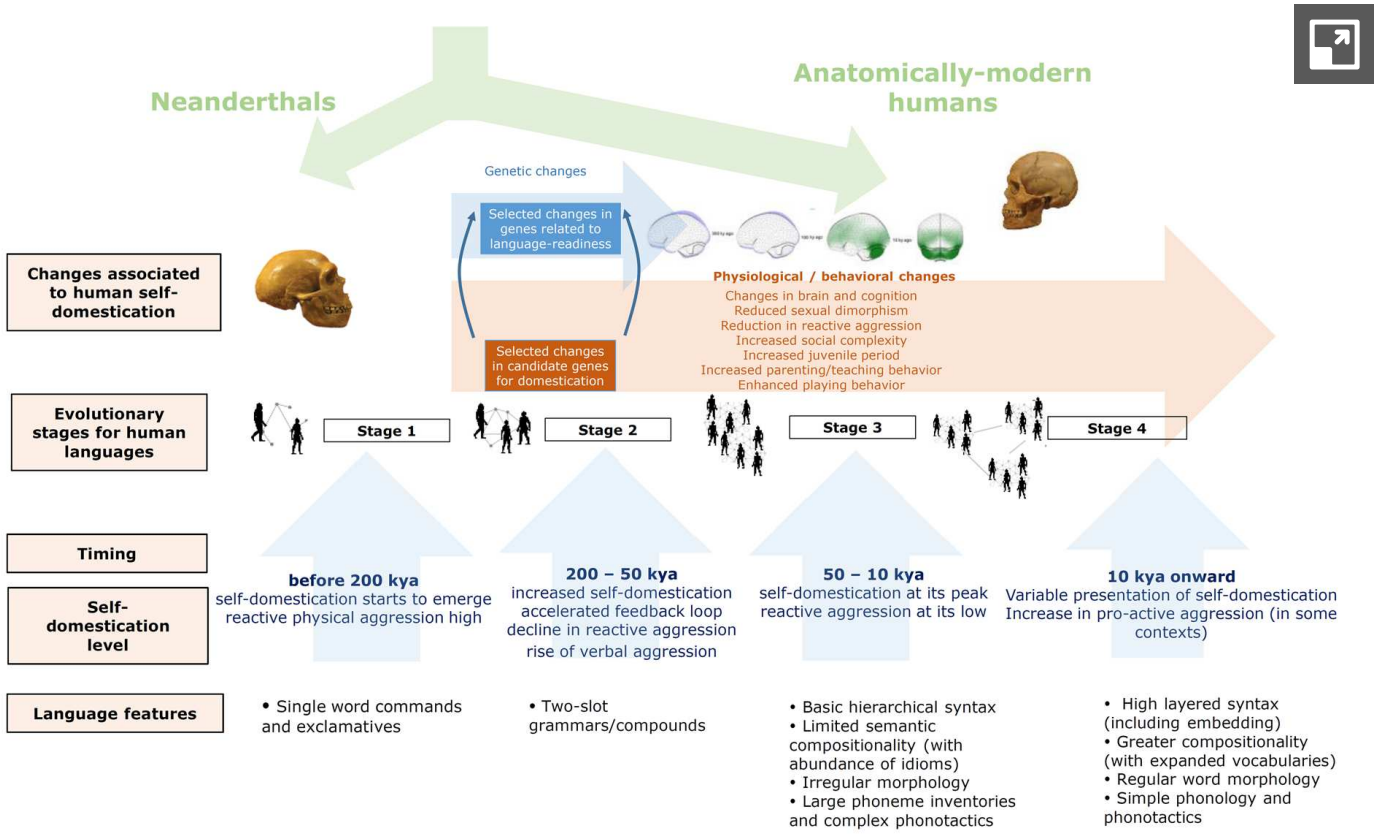
Savage and colleagues provide a compelling argument in favor of the coevolution of music and musicality via iterative niche construction driven by their positive effect on human

social bonding (the music and social bonding [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, although animal domestication usually results from selection for tameness, our domestication might have been triggered by external factors such as changes in our foraging ecology, the rise of community living, or the advent of co-parenting (hence, *self*-domestication) (Hare, Wobber, & Wrangham, 2012; Pisor & Surbeck, 2019). These factors are hypothesized to have impacted 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 (Fig. 1).

Figure 1. A graphical overview of a model of language evolution under the effects of human self-domestication (see Benítez-Burraco, 2017; Benítez-Burraco & Kempe, 2018; Benítez-Burraco & Progovac, 2020; Langley, Benítez-Burraco, & Kempe, 2020; Progovac & Benítez-Burraco, 2019 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 boding might result in part from the activation of the dopaminergic reward system (their Fig. 3a). Interestingly, changes in the dopamine systems have been



regularly documented in domesticated animals (Komiyama et al., 2014; Sato et al., 2020). Evidence of selection of pathways related to dopaminergic synapse have been found in European samples during the past 6,000 years (Chekalin et al., 2019), a time period when genes involved in animal domestication have been selected too (Benítez-Burraco, et al., in press). 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” (sect. 4.2.1, para. 14). 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 Fig. 1), 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 Fig. 1).

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. Similarly, 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; Lupyan & Dale, 2010; Nettle, 2012; Trudgill, 2011; Wray & Grace, 2007), 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 (Fig. 1; stages 3 and 4, respectively). 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 bonds they maintain, in turn a consequence of the levels of reactive and proactive aggression, an aspect that is at the core of the self-domestication hypothesis (see also Fig. 1). 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, Schultz, Undurraga, & Godoy, 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.

Financial support

This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Conflict of interest

None.

References

Benítez-Burraco, A. (2017). Grammaticalization and language evolution: Focusing the debate. Language Sciences, 63, 60–68. https://doi.org/10.1016/j.langsci.2017.03.003. CrossRef Google Scholar

Benítez-Burraco, A., Chekalin, E., Bruskin, S., Tatarinova, T., & Morozova, I. (in press). Recent selection of candidate genes for domestication in Europeans and language change in Europe: A hypothesis. Annals of Human Biology. Google Scholar

Benítez-Burraco, A., & Kempe, V. (2018). The emergence of modern languages: Has human self-domestication optimized language transmission?. Frontiers in Psychology, 9, 551. https://doi.org/10.3389/fpsyg.2018.00551. CrossRef Google Scholar PubMed

Benítez-Burraco, A., & Progovac, L. (2020). A four-stage model for language evolution under the effects of human self-domestication. Language & Communication, 73, 1–17. https://doi.org/10.1016/j.langcom.2020.03.002. CrossRef Google Scholar

Bolender, J. (2007). Prehistoric cognition by description: A Russellian approach to the upper Paleolithic. Biology & Philosophy, 22, 383–399. CrossRef Google Scholar

Chekalin, E., Rubanovich, A., Tatarinova, T. V., Kasianov, A., Bender, N., Chekalina, M., … Morozova, I. (2019). Changes in biological pathways during 6,000 years of civilization in Europe. Molecular Biology and

Evolution, 36(1), 127–140. https://doi.org/10.1093/molbev/msy201. CrossRef Google Scholar PubMed

Hare, B. (2017). Survival of the friendliest: *Homo sapiens* evolved via selection for prosociality. Annual Review of Psychology, 68, 155–186. https://doi.org/10.1146/annurev-psych-010416-044201. CrossRef Google Scholar PubMed

Hare, B., Wobber, V., & Wrangham, R. (2012). The self-domestication hypothesis: Evolution of bonobo psychology is due to selection against aggression. Animal Behaviour, 83(3), 573–585. https://doi.org/10.1016/j.anbehav.2011.12.007. CrossRef Google Scholar

Komiyama, T., Iwama, H., Osada, N., Nakamura, Y., Kobayashi, H., Tateno, Y., & Gojobori, T. (2014). Dopamine receptor genes and evolutionary differentiation in the domestication of fighting cocks and long-crowing chickens. PLoS ONE, 9(7), e101778. https://doi.org/10.1371/journal.pone.0101778. CrossRef Google Scholar PubMed

Langley, M. C., Benítez-Burraco, A., & Kempe, V. (2020). Playing with language, creating complexity: Has play contributed to the evolution of complex language? Evolutionary Anthropology, 29(1), 29–40. https://doi.org/10.1002/evan.21810. CrossRef Google Scholar PubMed

Lupyan, G., & Dale, R. (2010). Language structure is partly determined by social structure. PLoS ONE, 5(1), e8559. https://doi.org/10.1371/journal.pone.0008559. CrossRef Google Scholar PubMed

McDermott, J. H., Schultz, A. F., Undurraga, E. A., & Godoy, R. A. (2016). Indifference to dissonance in native Amazonians reveals cultural variation in music perception. Nature, 535(7613), 547–550. https://doi.org/10.1038/nature18635. CrossRef Google Scholar PubMed

Nettle, D. (2012). Social scale and structural complexity in human

languages. Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 367(1597), 1829–1836. https://doi.org/10.1098/rstb.2011.0216. CrossRef Google Scholar PubMed

Pisor, A. C., & Surbeck, M. (2019). The evolution of intergroup tolerance in nonhuman primates and humans. Evolutionary Anthropology, 28(4), 210–223. https://doi.org/10.1002/evan.21793. CrossRef Google Scholar PubMed

Progovac, L., & Benítez-Burraco, A. (2019). From physical aggression to verbal behavior: Language evolution and self-domestication feedback loop. Frontiers in Psychology, 10, 2807. https://doi.org/10.3389/fpsyg.2019.02807. CrossRef Google Scholar PubMed

Sato, D. X., Rafati, N., Ring, H., Younis, S., Feng, C., Blanco-Aguiar, J. A., … Andersson, L. (2020). Brain transcriptomics of wild and domestic rabbits suggests that changes in dopamine signalling and ciliary function contributed to evolution of tameness. Genome Biology and Evolution, 12(10), 1918–1928. https://doi.org/10.1093/gbe/evaa158. CrossRef Google Scholar

Trudgill, P. (2011). *Sociolinguistic* typology: Social determinants of linguistic complexity. Oxford university Press. Google Scholar

Wray, A., & Grace, G. W. (2007). The consequences of talking to strangers: Evolutionary corollaries of socio-cultural influences on linguistic form. Lingua. International Review of General Linguistics. Revue Internationale De Linguistique Generale, 117, 543–578. Google Scholar

Related content

Published online: 10 January 2013

Chapter

Social-Cognitive Processes in the Development of Antisocial and Violent Behavior

Gregory S. Pettit and Jacquelyn Mize

The Cambridge Handbook of Violent Behavior and Aggression

Published online: 5 June 2012

Element

Evolutionary Perspectives on Religion and Violence

Candace Alcorta and Richard Sosis

Published online: 15 August 2022

Article

Profiles of the forms and functions of self-reported aggression in three adolescent samples

Development and Psychopathology

Published online: 22 July 2014

Book

Culture, Mind, and Brain

Culture, Mind, and Brain: Emerging Concepts, Models, and Applications

Published online: 18 September 2020

Book

The Oscillatory Nature of Language

Elliot Murphy

The Oscillatory Nature of Language

Published online: 20 October 2020

Article

The role of anxiety in the development, maintenance, and treatment of childhood aggression

Development and Psychopathology

Published online: 25 November 2014

Article

Aggressive Behavior in Children: the Role of Temperament and Family Socialization

Paloma González-Peña, Begoña Delgado Egido, Miguel Á. Carrasco and Francisco Pablo Holgado Tello

The Spanish Journal of Psychology

Published online: 28 June 2013

Article

Language and life history: A new perspective on the development and evolution of human language

John L. Locke and Barry Bogin

Behavioral and Brain Sciences

Published online: 9 August 2006