On the Use and Fetichization of Quantitative Methods

Miguel A. García

The diversity of approaches which make up the disciplines focusing on the study of music and sound expressions is far from having full presence in the issues of *El oído pensante* published until now. Approaches which drive research based on the application of quantitative methods and on the search for answers with universal value are among the absent ones. Although large scale quantification and universalist aspiration have been questioned from humanistic and sociological positions, articles have recently appeared –published in high visibility journals– which confer them a central place within their analytical and expository procedures. These papers come both from disciplines which historically made use of quantitative methods and aimed at the search for universal enunciations, and from disciplines devoted to qualitative methods, and elusive of universalisms, which in the last years have succumbed to the charm of advances in informatics in relation to the handling of big masses of data.

The digital humanities, area in process of self-definition around objectives, methods and validation mechanisms derived from different disciplines, and around the expansion of digital processing devices and techniques, offer a platform with increasing institutional prestige for the application of quantitative methods. The results of some research which moves along the paths of that area can be found in the article "The Evolution of Popular Music: USA 1960-2010" (Mauch *et al.,* 2015). Its authors subject to statistical analysis a corpus of 17,094 songs cited in the US Bilboard Hot 100, between the years 1960 and 2010, with the aim to "demonstrate quantitative trends in their harmonic and timbral properties" and revealing if the variety of songs grows or diminishes along that period and if the changes are continuous or discontinuous.[1] Another article which also collects the results of a study carried out by means of the use of quantitative methods and computer tools, bears a title which exposes the universalist and evolutionist inclination of its authors: "Universality and Diversity in Human

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Song" (Mehr *et al.,* 2019). The application of a "systematic analysis" (sic), which involves the utilization of computer procedures to process a sample with error calculation, leads its authors to conclude that "music is a universal fact" and that "tonality is perhaps [also] universal"[1]. They also conclude that singing shows bigger variations inside societies than between them; it is associated to certain behaviors in a regular way; it has acoustic features "systematically" related to the singers' and listeners' objectives; it varies in the formal, excitement –*arousal*– and religious planes in accordance with contexts; and that it appears to be linked to language, motor skills, auditory evaluation and to aesthetic patterns.

A piece of research which differs from the previous ones in that music is not an object of study but a means of representation of a genetic structure, but similarly makes use of logical-mathematical and computer procedures, took place at the Massachusetts Institute of Technology this year. Marcus J. Buehler, a musician and an expert in the study of biological materials with computer techniques, composed a music "work" by using algorithms with the purpose of making audible the amino-acid sequence and the structure of the spike protein of the COVID-19 pathogen. The work, entitled "Viral Counterpoint of the Coronavirus Spike Protein (2019-nCOV)",[2] has a duration of 1 hour, 49 minutes, 48 seconds and has been arranged with sounds of a Japanese chordophone known as *koto*. Buehler explains that the sound conversion of the COVID-19 structure had two objectives: to hear a complexity that the eye cannot discern and to show how the virus deceives our ears in the same way as it deceives our cells –supposedly, the listeners are seduced by the peaceful character of the sound representation, even knowing the dramatic fact that the virus has caused the death of over half a million people at the moment this Editorial is being written.[3]

The three papers mentioned in the paragraphs above differ in various aspects and deserve being explained with bigger detail together with criticism as to their premises, to the dialogue they establish with previous research and, in particular, to the contributions which their results can or cannot make. But, given the brevity and the purpose of this Editorial, I will only refer to what they have in common, which seems to be a strategy that is currently gaining prestige within the field of the humanities: the attempt to understand and represent music expressions, practices associated to

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[1] See previous criticism in García (2015).

[2] It can be listened to at https://soundcloud.com/user-275864738/viral-counterpoint-of-the-coronavirus-spike-protein-2019-ncov

[3] More information at http://news.mit.edu/2020/qa-markus-buehler-setting-coronavirus-and-ai-inspired-proteins-to-music-0402

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them and non-sound phenomena through musical language, appealing to mathematical, statistical and computer procedures. There is no doubt that some questions, even in the field of the humanities, con only be answered through the use of quantitative methods and that, in consequence, they must be part of the resources demanded by the present research scenarios, marked by transformations which have occurred in the functionality of the archives and in the ways of circulation, storage, and uses of music. In the face of the incessant increase in funds, accessibility and connectivity of the archives and to the present ontological status of cultural goods –goods "in transference" through digital networks–, quantitative methods must have a place in the repertoire of the tools of the humanities. However, it must be borne in mind that on occasions the questions which research is trying to answer not only resort to them but are also the product of them. That is to say, methods precede doubt and, therefore, give room to its formulation. This sort of fetichization occurs under the perspectives which consider quantitative methods as infallible devices and generators of axiomatic enunciations. Leaving aside some truly very questionable results, the paper of Mehr *et al.* (2019) exposes another of the risks of that fetichization: the display of a large quantity of calculations to arrive at a knowledge which we can acquire by means of observation, intuition and experience.

Algorithms also deserve being considered. In the field of music they are used in software to process sound, generate instrumental and vocal accompaniments, and even to compose; in the control of digital musical instruments; the creation of virtual characters together with developments of artificial intelligence –as the well-known Hatsune Miku–; the shaping of consumers' profiles to design sales strategies; the prediction of the commercial success of a song; etc. Even though in all these applications the algorithms seem to satisfy the performance level required, its efficacy is questionable in the creation of a musical work from the sequence of amino-acids and the structure of the spike protein of the COVID-19, as Buehler did. The most significant problem lies in that the supposed logical-mathematical preciseness of the procedure fails at one of the most sensitive points of the musical representation of the virus: the correspondences between the genetic code and the sound frequency variations and duration, as well as at the timbre selection –coming from for the plucking of the strings of the *koto*–. The assignment of these correspondences is, in a way, arbitrary, that is to say, there is no justification to assign a frequency and not another, or a duration and not another, to a determined genetic feature. Even if this inconvenience could be attenuated, it cannot be envisaged how sounding can make aspects of the virus understandable in a

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more effective way than biology instruments do, and even less, how the listeners, possessors of an immense variety of experiences and expectations can similarly recognize the deception produced by the virus.

Beyond these criticisms, and others that can be made to the fetichization of quantitative methods, to the persistence of universalist aspirations, and to the uses of computer resources to represent and analyze music expressions and divers practices that accompany them, research as the above mentioned ones is always welcome. This so because the more discrepancies we find between them, the more stimulating and fructiferous the debate will be and, thus, the more we will contribute to realize one of the principal objectives of *El o*ído *pensante*: the promotion of critical thinking capable of dismantling concepts of ordinary use and opening new perspectives.

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