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Correlations between Developing Variation and Genetic Processes in the Analysis of Brahms' *Violin Sonata* Op.78

ABSTRACT

Background

This paper integrates a broad research project intended to systematically study musical variation under analytical and compositional perspectives, based on organic constructive procedures. The theoretical basis of this research is rooted on two complementary principles elaborated by Arnold Schoenberg: *Grundgestalt* (normally translated as basic shape) and developing variation. *Grundgestalt* can be essentially defined as a primordial group of musical elements (specific intervallic and/or rhythmic sequences, harmonic relations, metrical configurations, etc.) from which, at least in an idealized case, all the substance of an organically-constructed piece can be extracted. Developing variation techniques (henceforward, DV) are the means employed for producing this derived material and for structuring it. DV can also be viewed as intense and dynamic derivative processes basically involving variations over variations. The use of DV, a distinctive characteristic of the music of Brahms (Schoenberg 1984; Frisch 1984; Ng 2005; Embry 2007) and Schoenberg himself (Rufer 1954; Frisch 1993; Haimo 1997; Taruskin 2010), provides progressive, organic, and economic growth, consequently being intimately associated to the complementary parameters of coherence and variety, whose balanced interaction is of central importance for musical composition.

The present paper proposes a new discussion about this subject, by evidencing some correlations between DV and biological/genetic processes. Variation, variability and development are central concepts of Charles Darwin's theory of evolution. For Darwin, variation was mainly caused by pressures resulting from sexual and natural selection as well from special conditions of the environment. Only in the 20th century, with the revolutionary discovery of the DNA structure and its multiple implications, it was established that biological variation is actually caused by a myriad of complex intracellular processes, involving microscopic structures and/or chemical reactions and substances, provoked by genetic mutations (see, among others, Dawkins 2000).

Musically speaking, there are striking similarities between developing variation and transmission of genetic mutational transformations (for some studies concerned with the intersection of music and evolutionary aspects, see Almada 2015 and Payeron 2016). We can state that: (1) both are organic processes (in a metaphorically sense, of course, in the case of DV) that are performed and analytically observed along time; (2) they promote considerable changes through addition of (in most cases) very small steps of transformation; (3) their effects are transmitted to the next generations of variants (which became referential forms for further derivation); and (4) they develop according to some direction (which results from selective pressures in biology, and from compositional intentions in music). In sum, it is possible to define both processes as variation in time , whose performance will be regulated by a dynamic balance between change and maintenance of components. In this way, the velocity of transformation measured in a given time span will be directly proportional to the amount of transformation due in detriment to the elements preserved during the process (conversely, the more characteristics are maintained, the lower will be the velocity of variation).

From these considerations, three original concepts are introduced in this study: the axe of global invariance (AGI); transmitted heritage (TH) and residual variance (RV). Concisely, AGI represents the group of musical elements which is maintained along transformations of a given musical idea. TH, the very core of this proposal, corresponds to the material that is effectively and progressively modified (through developing variation procedures), analogously to the genetic information that links a progenitor to its descendants. RV is the material that has no further consequences or motivic implications during the process. The evaluation of the interaction of these elements, as well as their proper mapping and identification in a musical piece, constitute an important improvement of an analytical model (see the section Methods) employed for the exam of organically-constructed music. According to the present proposal, the occurrence of developing variation can be precisely determined by the conjunct action of these three concepts, as schematically shown in Fig.1.

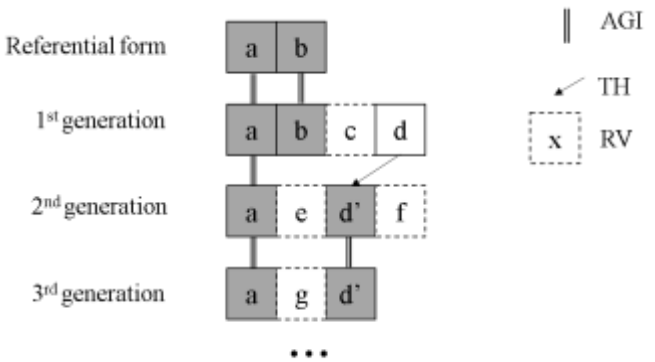

Fig. 1: A modeled process of developing variation departing from a referential form, considering the interaction of AGI, TH and RV (lowercase letters represent isolated musical features).

This model shows the interaction of the three concepts in a process of developing variation of a referential musical idea, composed by features *a* and *b* (which can represent, for example, its intervallic and rhythmic configurations). Three AIGs can be identified in the process (indicated in Fig.1 by doubled lines): (1) the longest one, connecting the replication of the feature *a* along the three generations; (2) connecting the feature *b*, which survives only in the first generation, disappearing from the genetic pool ; (3) connecting the new feature *d*, introduced in the first-generation variant, to its transformed descendants *d'*. This case corresponds to an instance of TH (graphically represented in the model by the inclined arrow). Features *e*, *f* and *g* have no implications, thus are associated to the residual variance (RV) in the process. It is noteworthy to observe that *d*, which is considered a RV in the first generation, changes his *status* in the following one being transmitted as *d'* (it not occurs with its brother *c*, which is eliminated from the process). It allows us to conclude that the functions of the elements that form a DV process can only be precisely determined retroactively after its completion.

Aims and repertoire studied

The final section of the paper presents a practical application of the method (see description bellow) in the analysis of eight thematic ideas present in the first movement of Brahms' *Violin Sonata* Op.78, considering their derivation through gradual and progressive transformation of some elements that form its *Grundgestalt*.

Methods

Almada 2016)

Implications

The results obtained demonstrate the great efficacy of the methodology for a systematical and precise analysis of thematic structures built through DV processes. The discussion about correlations between DV and genetics contribute to an expansion of the theory of musical variation.

Keywords

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