Genius artists: Identification by means of measuring stylistic parameters

Lidia A. Mazhul and Vladimir M. Petrov

State Institute for Art Studies, apt. 11, dom 39, Zemlyanoy val, Moscow 105120, Russia Tel / Fax: +7 495 9164453; E-mail: vladmpetrov@yandex.ru

KEYWORDS : Genius, Artistic creativity, Stylistic parameters, Zeitgeist, Statistics

How to identify genius composers, painters, poets. etc. – using purely formal indicators of their works subdued to measurements? – To do this, it is necessary to compare each 'suspected' genius artist with his ordinary ('rank and file') contemporaries. Such comparison was realized for each of 5 genius composers (from J.S.Bach to Debussy) and 10 painters (from G.Bellini to Rembrandt), as well as groups of their less-gifted contemporaries. The parameters used for comparison, reflected the stylistic orientation of each artist regarding the 'analytic' versus 'synthetic' poles of creativity, which are usually associated with left- or right-hemispheric prevalence, respectively. Findings reveal that the artists within a comparison group were stylistically similar with respect to the nature of their creative processes: they reflected an artistic Zeitgeist for their era. The genius artists exhibited significant deviations from their lesser contemporaries on the many of the parameters measured. The degree of this deviation (**D**) reveals correlation with the artists' eminence (**E**), so the value **D** is treated as the estimation of eminence of each artist.

1. Introduction

The best "raw material" to estimate quantitatively the degree of greatness of a certain artist (composer, painter, poet, etc.), can be provided by measuring the stylistic parameters of works of this artist (symphonies, pictures, poems, etc.). However, the problem arises concerning further processing such data: proceeding from this information – how to come to quantitative results in question?

Meanwhile, as it was recently shown by V.Petrov and P.Locher [1], there exists a certain regularity concerning the 'relationships' between the character of the creativity of each genius artist – and creativity of his contemporaries: rather substantial 'gap' between these two kinds of creativity. Quite similar difference was measured by D.K.Simonton while studies of various kinds of creative activity, e.g., activity of philosophers [2]. The heart of the matter is that in each case genius differs even from rather eminent artists of his epoch – at least on several stylistic parameters. So perhaps this difference is capable of providing the basis for appropriate measurements? Let's describe such a procedure.

2. Raw material: Stylistic parameters

To characterize the creative activity of each artist, it seems reasonable to resort to the help of rather global system of parameters which was derived in the framework of the information approach [3]. This system is based on the opposition of two types of informational processes [4-6]:

a) 'analytic' processes, characterized by the sequential processing of small portions pf information, using fixed paradigms, with high rationality; and

b) 'synthetic' processes, dealing with parallel processing of large volumes of information, accompanied by change of the paradigm used, and characterized by intuition.

These two types of processes are inherent in any system of information processing, including those of a human being, a society, etc. In the case of human beings, these types are associated with the activity of the left or right hemisphere of the brain, respectively. As applied to musical creativity, the following 7 stylistic parameters were singled out, which describe the inclination of each composer to one of the above poles:

- a) Optimism Pessimism;
- b) Rationality Intuitiveness;
- c) Timbre homogeneity Timbre diversity;
- d) Strict form Free form;
- e) Graphic type of music Music with coloristic features;
- f) Prevalence of middle and upper registers Importance of lower register; and,
- g) Strict narrative logic Spontaneous, improvisational type of theme development.

An analogous set of 10 stylistic parameters was derived for painting [1]. Each parameter has the form of a scale, the left pole of which

designates full prevalence of 'analytic' processes, and the right pole relating to 'synthetic' orientation. The style of each artist can be quantitatively estimated over these parameters with the help of 'calibrated' expert scores (each scale consisting of 6 gradations).

3. Raw materials: Samples of genius artists and their comparison groups

To select genius artists, a hierarchy of eminence was used published by P.R.Farnsworth for 100 West Europe composers [7]; it was based on opinions of musicologists. For 23 Russian composers such hierarchy was built by P.Kulichkin [8] on the basis of the lengths of their descriptions in music encyclopedia. Quite analogous hierarchy was built by Kulichkin for 130 Western European painters. We deemed an artist a genius if he belonged to the top of an appropriate hierarchy, i.e., if his rank was in the range 1 to 12. As for less-gifted comparison groups, they were selected from the bottoms of hierarchies: if an artist's rank was 30 or greater for Western composers and painters, or more than 15 for Russian composers.

To conduct comparisons between genius artists and their lesser contemporaries, a cluster of contemporaries was formed for each genius, which consisted of 3 to 8 artists whose year of birth was close to the year of birth of the genius, the difference not exceeding 10 years. (This criterion is connected with the necessity to eliminate possible errors caused by 50-year stylistic waves [4-6].) A set of such clusters for music is presented by Table 1. Analogous clusters for painters concern Rembrandt, Rubens, Michelangelo, Raphael, Zurbaran, Ribera, Duerer, Velazques, GBellini, and Titian [1].

Genius composer and year of his birth	Eminence rank	Less-gifted contemporaries, years of their birth, and eminence ranks
J.S.Bach, 1685	1	Rameau, 1683 (41); Telemann, 1681 (65.5); Tartini, 1692 (98.5)
Brahms, 1833	5	Dvorzhak, 1841 (37); Bruckner, 1824 (39); Bizet, 1838 (47); Grieg, 1843
		(58); Saint-Saens, 1835 (64); Smetana, 1824 (75); Wieniawski, 1835 (>100);
		Massenet, 1842 (>100)
Handel, 1685	6	Rameau, 1683 (41); Telemann, 1681 (65.5); Tartini, 1692 (98.5)
Debussy, 1862	7	Puccini, 1858 (35); Sibelius, 1865 (40); Wolf, 1860 (56); Janachek, 1854
		(82.5); Leoncavallo, 1858 (>100)
Glinka, 1804	5	Dargomyzhsky, 1813 (15); Verstovsky, 1799 (18); Varlamov, 1801 (20)

Table 1. Genius composers and their comparison groups

4. Experimental results: Stylistic characteristics of the comparison groups - and genius artists

The mean value (M) of each parameter for each comparison group was calculated by averaging over all artists within the group, as well as the standard deviation (*STD*). To estimate the homogeneity of each comparison group, the share of the parameters was calculated falling within the range of most probable values, i.e., from *M*–*STD* to *M*+*STD*. In all cases this share occurred to be close to theoretical prediction for Gaussian distribution (68.3%); the mean value of this share was about 71% for composers' comparison groups and about 66% for painters' ones. These findings indicate that there is a high degree of homogeneity within comparison groups, which suggests that the artists within each group are stylistically similar with respect to the nature of their creative processes and products. The homogeneity of all comparison groups provides evidence that they do, in fact, reflect something like a zeitgeist of their epochs, both in music and painting.

Meanwhile for 5 genius composers there are 20 deviating cases out of 35 values constituting the data set for the 7 parameters; if the distribution were Gaussian such deviations would be observed in only 11 cases – the difference statistically significant at 5%-level (chi-square criterion). For the 10 genius painters, 56 deviating values occurred for the total of 100 values, instead of 32 cases expected by chance – the difference significant at .5%-level. For the entire massif of 15 geniuses, the difference is statistically significant at the level better than .05%.

5. Conclusions

Hence, the number of deviating stylistic parameters D can become an indicator of ascribing an artist considered, to genius ones. To confirm this statement, several kinds of additional results were obtained, e.g., the relations between the artists' hierarchy on eminence (E) and their hierarchy on the number of deviations (D). Spearman coefficient of rank correlation between E and D for 33 painters is significant at the level better than 1%. For 10 'top' painters the mean value of D is 5.6, whereas for less-gifted painters this value is about 1.9 – difference significant at the level better than .05%. So the value D is treated as the estimation of eminence of each artist.

REFERENCES

- 1. Petrov, V., and Locher, P., "Genius: A son of his time or a Rara Avis?" Empirical Studies of the Arts, Vol. 29, No. 2, 2011 (in press).
- Simonton, D.K. "Philosophical eminence, beliefs, and zeitgeist: An individual-generational analysis," Journal of Personality and Social Psychology, Vol. 34, pp. 630-640, 1976.
- 3. Golitsyn, G.A., and Petrov, V.M., "Information and creation: Integrating the 'two cultures," Basel; Boston; Berlin: Birkhauser Verlag, 1995.
- 4. Maslov, S.Yu., "Asymmetry of cognitive mechanisms and its consequences," Semiotika i Informatika, No. 20, pp. 3-34, 1983 (in Russian).
- Petrov, V.M., "Creativity in art: Stylistic waves and monotonic evolutionary trends (Information approach)," Bulletin of Psychology and the Arts, Vol. 2, No. 1, pp. 30-33, 2001.
- Mazhul, L.A., Petrov, V.M., and Mancone, S., "Asymmetry of creative activity: Product-based iterative measurement procedure," Measurement Technology and Intelligent Instruments IX (Volume 437 of "Key Engineering Materials"), pp. 520-524, 2010.

- 7. Farnsworth, P.R., "The social psychology of music." Iowa State University Press, 1969.
- 8. Kulichkin, P.A., "Evoluiton of artistic life and style of thinking (A trial of quantitative investigation)," Thes. Doct., Moscow (in Russian).