Social Structure of Jury of Chopin Competition[1]

Hot emotions have already subsided after the end of the 18th Chopin Competition, where excellent jurors assessed the great artists and selected the winners. Now let us revert the situation and look at the jurors themselves in a cold, statistical way! Which of them judged similarly to others and which differently? Is it possible to distinguish groups evaluating compatibly? What are the relationships between the jurors, can we trace them in a simple manner? The policy of open evaluation, rightly practiced since 2015, not only gives the generally understood transparency of the competition procedure, but also allows for drawing very interesting and non-obvious conclusions.

The announced scoring lists from stages I-III[2] (the order in the final was decided in a non-point way) look as in table 1, where we can see the grades (in the range of 1-25) awarded to individual pianists by the jurors' indicated with initials.

In our analysis, for the sake of clarity, we omit jurors who were absent at any of the stages (SC and KJ), and pianists who were students of the jurors. We also combine the grading tables from stages I-III, resulting in one large array of 15 columns and 100 rows. A table of this type contains a complete information on the evaluation, while its enormity of numbers does not allow us for noticing certain regularities – it is difficult to "grasp" them. However, one can do a very simple and standard analysis to find the "hidden relationship". It is natural that some jurors have similar opinions, and others - more divergent. Suppose, for example, that we are interested in the similarity between AE and DTS. So we go down the scoreboard in table 1 and sum up the point differences (strictly, their absolute values) from individual pianists, in particular Mei gives 17-16 = 1, Mun 20-18 = 2, Nehring 23-22 = 1 etc. After adding up the differences in ratings for a given pair of jurors over all the pianists, we divide the score by the number of pianists to get the mean.[3] The obtained number is a mathematical measure of the discrepancy between the judges' grading. If it is

small, the judges assessed similarly, and if it is large, they differ significantly in their opinions. In an extreme hypothetical case, if two jurors assessed the performances of all pianists identically, our measure would be strictlly 0. We repeat the procedure for all the pairs of jurors, which yields table 2. We can see that the measure of discrepancy in judges' ratings is around 2, which means that the average deviation of the scores by a pair of jurors for a pianist at a given stage is approximately 2. PP and WŚ are the closest to each other (discrepancy 1.3), and the most distant are AH and KK (discrepancy 2.8). On the other hand, by calculating the average along the rows of table 2, we obtain the average "distance" of a given juror from all the others. This number is the smallest for PP (1.87), who is the most "central" juror, and the highest for GA (2.37).

Now let us focus on jurors who have opinions "close enough", i.e. their discrepancies from table 2 are smaller than, say, 1.75,[4] and try to understand the structure of the links in the jury. For this purpose, we create the so-called social network graph by drawing 15 circles representing the jurors and connecting each pair with a line if their opinion differs less than 1.75. An appropriate algorithm for such a graph finds groups in which there are many connections, and relatively few connections go outside.[5] Moreover, the graph is drawn in such a way that jurors connected by lines are close to each other.[6] The result is shown in figure 2.

A fascinating thing has happened! The jurors got divided into distinct structures: we have three gray individuals: AH, KK and AML, and groups of several people: blue, green and pink. The division into groups is not strict, because there are connections between them, e.g. EP and NG. Hence the green and pink groups could actually be combined. A typical feature of a social network analysis has emerged here: decomposition into groups of people with similar tastes. Let us also mention that WŚ has the most connections with other jurors, as many as 6, so he is a kind of "hub" of the system.

It's time to finally reveal the secret behind the initials (which is obvious to music lovers and fans of the Competition). The blue group consists of two Russians (Dmitri Alexeev, Dina Yoffe) and an American (John Rink), the pink group contains jurors

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[2] https://chopin2020.pl/en/news/article/505/18th-chopin-competition- - -jurors'-scoring

[3] Technical note for statisticians: the ratings for each juror are first standardized to have the same mean and spread. In this way, we get rid of the effect of severe (understating) and kind (inflating) judges and obtain a more adequate comparison.

[4] The resulting social network graph depends on the assumed value.

[5] The algorithm maximizes the so-called graph modularity, https://en.wikipedia.org/wiki/Modularity_(networks)

[6] For experts: in the graphic model used, all jurors repel each other like electric charges, and those connected by lines additionally attract each other elastically.

Table 1: Scoring excerpt. The columns correspond to the jurors, marked with their initials, and the rows to pianists performing at a given stage. The symbol **a** means the juror is absent, and **s** that the pianist is a student of a given juror, in which case no scoring was made.

	DA	SC	DTS	AE	PG	NG	AH	KJ	KK	AML	JO	PP	EP	KPZ	JR	WŚ	DY
	......																
Yupeng Mei	18	a	17	16	18	17	22	20	20	20	18	18	17	17	20	16	17
Arsenii Mun	18	a	20	18	18	18	18	16	21	20	17	18	18	17	17	20	18
Szymon Nehring	19	a	22	23	19	23	18	20	22	18	20	22	20	s	20	20	19
	......																

Table 2: Difference of opinion for pairs of jurors. The smallest and the largest are marked with a frame.

|	DA	DTS	AE	PG	NG	AH	KK	AML	JO	PP	EP	KPZ	JR	WŚ	DY
DA	-	1.9	2.	1.9	1.8	2.3	2.1	2.2	1.8	1.7	2.1	2.2	1.7	1.9	1.9
DTS	1.9	-	1.6	2.3	1.8	2.4	2.3	2.6	2.1	2.2	1.9	2.1	1.9	2.	1.9
AE	2.	1.6	-	2.1	1.6	2.5	2.3	2.3	2.	1.9	1.9	2.2	2.	1.6	1.8
PG	1.9	2.3	2.1	-	1.7	2.3	2.2	2.2	2.	1.9	1.9	2.	1.9	2.	2.1
NG	1.8	1.8	1.6	1.7	-	2.	2.5	2.5	1.9	1.8	1.6	2.1	2.	1.7	2.1
AH	2.3	2.4	2.5	2.3	2.	-	2.8	2.3	2.4	2.3	2.2	2.2	2.5	2.5	2.4
KK	2.1	2.3	2.3	2.2	2.5	2.8	-	2.2	2.4	2.1	2.4	2.1	2.	2.1	2.1
AML	2.2	2.6	2.3	2.2	2.5	2.3	2.2	-	2.1	2.	2.4	2.4	2.2	2.1	2.
JO	1.8	2.1	2.	2.	1.9	2.4	2.4	2.1	-	1.6	2.	2.	2.1	1.7	2.1
PP	1.7	2.2	1.9	1.9	1.8	2.3	2.1	2.	1.6	-	1.7	1.8	1.8	1.3	1.8
EP	2.1	1.9	1.9	1.9	1.6	2.2	2.4	2.4	2.	1.7	-	1.8	2.	1.7	2.1
KPZ	2.2	2.1	2.2	2.	2.1	2.2	2.1	2.4	2.	1.8	1.8	-	1.9	1.7	1.9
JR	1.7	1.9	2.	1.9	2.	2.5	2.	2.2	2.1	1.8	2.	1.9	-	2.	1.4
WŚ	1.9	2.	1.6	2.	1.7	2.5	2.1	2.1	1.7	1.3	1.7	1.7	2.	-	1.8
DY	1.9	1.9	1.8	2.1	2.1	2.4	2.1	2.	2.1	1.8	2.1	1.9	1.4	1.8	-
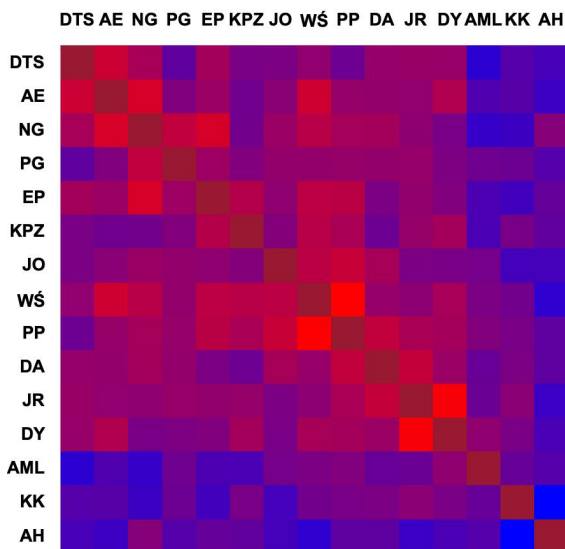
Figure 1: Representation of table 2 with the help of colors. The more red (blue) the color, the closer (farther) the jurors are in their judgments.

from Asia (Dang Thai Son), Akiko Ebi), Brazil (Nelson Goerner) and France (Philippe Giusiano), while the green group they are all Poles! (Janusz Olejniczak, Piotr Paleczny, Ewa Pobłocka, Katarzyna Popowa-Zydroń, Wojciech Świtała). The singles are Adam Harasiewicz, Kevin Kenner and Arthur Moreira Lima. Let us emphasize that the existence of groups of similarity is natural and takes place in all communities. It is influenced by the intensity of contacts, the same tradition and music education, a common cultural circle, or the cultivation of recognized aesthetic patterns (such as the frequently revoked during the transmissions "the school of interpretation of Chopin"). In the author's deep trust, the existence of groups is by no means a sign of a lack of objectivity or other prejudices. It is a typical phenomenon, exhibited by the analysis presented here. However, it is rather surprising to be able to visualize the relationships between the jurors in such a clear way.[7]

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[7]Author's analysis with very similar conclusions for the 17th Chopin Competition in 2015 (based on the score in the final), it was published in Świat Nauki, 2016 nr 1 (293), p. 16 (in Polish).
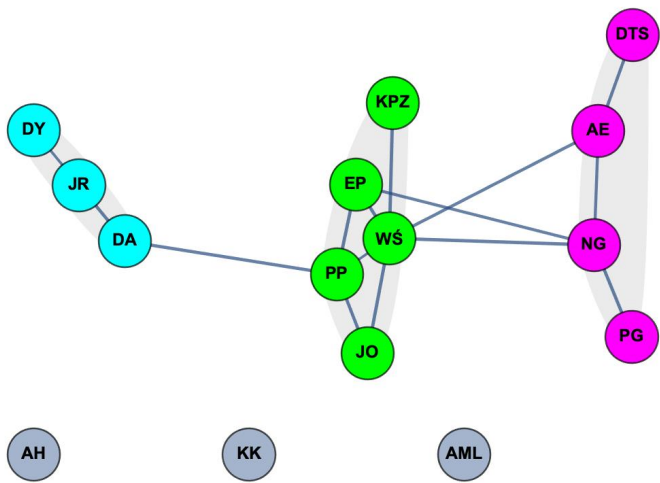
The Poles are holding on tight, but also the Russians and the jurors from Asia ...

November 2021

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Figure 2: Jury of Chopin Competition 2021 as a social network.