INTELLECTUAL ABILITIES AND SPECIFIC SKILLS OF QUALIFIED CHESS PLAYERS

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Summary

The article provides a comparative analysis of the results of testing intellectual abilities and specific skills of chess players by qualification and gender groups. Both positive and negative correlations were obtained between individual components of intellectual abilities, IQ (according to R. Amthauer) and the Elo rating of a chess player. The obtained results of testing the sense of time allow us to conclude that the contribution of this specific skill to the success of a chess player is overestimated.

Keywords: Qualified chess players, components of intellectual abilities, IQ, Amthauer test, specific skills, sense of time, Elo rating.

INTRODUCTION

The intellectual abilities of chess players have been in the focus of attention of researchers for more than a hundred years. French psychologist Alfred Binet was one of the first to show interest in this problem. In 1894, in Paris, he published the work «Psychologie des grands calculateurs et joueurs d'échecs », in which he concludes about the relationship between memory and intelligence in chess players [5]. Soviet scientists I. N. Dyakov, N. V. Petrovsky and P. A. Rudik conducted a study of the characteristics of the mental activity of chess players participating in the international chess tournament in Moscow (1925). Among the participants of the tournament were Emanuel Lasker and Jose Raul Capablanca. Scientists conclude that chess, like any other artificial training, does not lead to the development of a chess player's general memory, and the ability to memorize games and positions is a professional skill. They also did not obtain any results on the superiority of highly qualified chess players in terms of the properties of attention and the speed of intellectual processes. Scientists also come to the conclusion that the thinking of a chess player is more abstract in nature and is akin to the thinking of a mathematician [1].

British grandmaster Jonathan Levitt proposed an exact mathematical relationship between IQ and a chess player's rating (Elo), calling it Levitt's equality: Elo ~ (10 x IQ) + 1000. Levitt, having proposed this formula, did not mean the current rating of a chess player, but the highest that he could achieve during many years of training and participation in tournaments. According to his calculations, international grandmasters (Elo from 2500 points) should have an IQ of at least 150 points, which is considered the level of genius [2, 3]. Scottish grandmaster Jonathan Rawson considers Levitt's equality to be «completely wrong». He notes that the most pronounced abilities for the chess game have nothing to do with intelligence at all, since these are psychological and emotional talents. He concludes that in most leading academic treatises, chess is considered «as an almost exclusively cognitive activity, where the choice of moves and understanding of positions is based only on the basis of mental patterns and conclusions» [6].

Purpose of the study: To identify the relationships between the components of intellectual abilities, IQ, specific skills (sense of time) and the rating of chess players of various qualification and gender groups.

RESEARCH METHODS

26 qualified chess players with a rating from 1700 to 2542 Elo points, 17 boys and 9 girls (aged 17 to 25 years) took part in the intellectual

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abilities testing. We used the Amthauer Intelligens Structur Test (IST), which allows us to measure the level of intellectual development of people in the age range from 13 to 61 years and was developed for the purpose of professional selection and differentiation of candidates for various types of education and activities. The test methodology presents nine groups of tasks (subtests), which are aimed at studying the components of verbal and non-verbal intelligence. The test has fairly high indicators of validity and reliability. To study the specific skills of chess players, we used test tasks developed at the Department of Chess of the RUSSIAN UNIVERSITY SPORT «SCOLIPE» by V.B. Malkin and A.K. Stepanyan [4]:

1) testing the feeling of «empty time» for a period of 30 seconds;

2) dividing the minute into segments - 15, 40, 60 seconds;

3) estimation of the time for solving arithmetic problems (multiplication of two-digit numbers and two-digit by three-digit «in the mind»);

4) estimation of the time for solving a logical problem;

5) estimation of the time for solving a chess problem in three moves.

At this stage, 17 qualified chess players with an average rating of 1880 Elo took part in the testing.

Results and discussion. Table 1 shows the results of testing the intellectual abilities of chess players by qualification and gender groups.

RESULTS AND DISCUSSION

Table 1 shows the results of testing the intellectual abilities of chess players by qualification and gender groups.

The Amthauer test allows you to combine the results obtained by subtests into groups according to the components of general intellectual abilities: complexes of practical and theoretical abilities, complexes of constructive, mathematical and verbal subtests. Table 2 shows the generalized (average) results for the five components of abilities and the average intelligence coefficients (IQ) of the experimental groups.

Table 1. The results of testing the IQ of chess players by subtests

N	Group	LS	GE	AN	KL	RA	ZR	FS	W	ME
8	M 2200-2542	106	101	100	98	94	115	99	86	117
10	M 2100-2542	104	99	101	101	98	118	99	87	120
9	M 1700-2100	100	101	99	104	109	123	106	102	124
7	M 1700-2000	97	95	94	95	96	113	97	89	114
9	W 1740-2100	102	108	102	99	98	116	105	90	114
17	M all	103	101	99	101	102	119	103	94	121

Note: LS – logical selection; GE – definition of common features; AN – search for analogies; KL – classification; RA – arithmetic; ZR – series of numbers; FS – geometric addition; W – spatial imagination; ME – memorization; M – men; W - women

An analysis of the results presented in Tables 1 and 2 allows us to conclude that qualified chess players have an average IQ above the norm (the norm is 90-100 units). The chess players in the 1700-2100 group demonstrate the highest performance. Only in this group, a positive correlation of the rating with the components of intellectual abilities was revealed (Table 3): AN (r=0,57); KL (r=0,53); RA (r=0,4); ME (r=0,46); the number of solved tasks of the RW test (r=0,47); with complexes of verbal (r=0,46) and mathematical abilities (r=0,44).

Table 2. Test results for complexes of abilities (R. Amthauer test)

N	Group	Average rating	Practical	Theoretical	Verbal	Mathematical	Spatial	RW	IQ
8	M 2200-2542	2375	103	99	101	105	93	104	102
10	M 2100-2542	2321	103	100	101	108	93	109	104
9	M 1700-2100	1997	99	103	101	116	104	124	111
7	M 1700-2000	1926	102	104	103	107	98	111	105
9	W 1740-2100	2181	101	101	101	111	98	115	107
17	M all	2178	101	101	101	110	98	113	106

Table 3. Results of correlation analysis between the rating of a chess player and components, complexes of intellectual abilities, IQ

	Components and complexes of intellectual abilities, IQ	M all	M 2200-2542	M 2100-2542	M 1700-2100	W 1740-2100
		Rating				
1.	LS	0,2	-0,17	0,16	0,01	0,11
2.	GE	-0,27	-0,51**	-0,17	-0,40**	-0,35
3.	AN	0,00	-0,53**	-0,53**	0,57*	-0,33
4.	KL	-0,22	-0,17	-0,54**	0,53*	0,01
5.	RA	-0,48**	-0,46**	-0,67**	0,40*	0,32
6.	ZR	-0,20	0,24	-0,20	0,39	0,19
7.	FS	-0,40**	-0,47**	-0,28	-0,21	-0,51**
8.	W	-0,56**	-0,39	-0,44**	-0,39	-0,13
9.	ME	-0,40**	-0,65**	-0,69**	0,46*	0,29
10.	RW	-0,62**	-0,76**	-0,84**	0,47*	0,05
11.	IQ	-0,70**	-0,78**	-0,84**	0,28	0,13
12.	Practical	0,12	-0,42**	-0,25	0,30	-0,10
13.	Theoretical	-0,42**	-0,56**	-0,61**	0,32	-0,23
14.	Verbal	-0,13	-0,63**	-0,54**	0,46*	-0,21
15.	Mathematical	-0,41**	-0,15	-0,52**	0,44*	0,27
16.	Spatial	-0,53**	-0,46**	-0,42**	-0,34	-0,16

In the remaining male subgroups, the correlations between the rating and the components, complexes of intellectual abilities, are negative. There were no correlations between rating and IQ among chess players, except for a negative correlation with the results of the FS subtest (r=-0.51). These results allow us to conclude that rating and IQ have a positive relationship only for a group of chess players with a rating of up to 2200 Elo, with an increase in the rating to 2500 Elo, this relationship becomes negative. 17 qualified chess players

with a rating from 1,500 to 2230 Elo took part in the time sense study. A correlation analysis was carried out between the rating of chess players and their performance on time sense tests. Since no significant relationships were obtained, except for a negative correlation between the rating and the time of solving the arithmetic problem - multiplying two-digit numbers «in the mind» (r=-0.5), further analysis of the results was carried out without differentiation into subgroups.

Table 4. – «Empty time» test results

Indicators	Time intervals and deviation coefficients							
	30”	K	15”	K	40”	K	60”	K
M (average in the group)	31,11	0,96	14,96	1,00	39,49	1,01	59,21	1,01
σ	3,04		1,77		3,97		5,39	

Table 5. Results of testing the sense of time filled with intellectual activity

	ArZ 2		Rezult	ArZ 3		Rezult	Log		Rezult	Chess 3		Rezult
	Sub	Real		Sub	Real		Sub	Real		Sub	Real	
M	24,00	26,14	0,76	63,06	80,66	0,29	126,35	153,69	0,65	56,65	55,39	0,94
σ	24,03	21,79	0,44	60,14	89,25	0,47	127,63	149,87	0,49	55,78	53,88	0,24
K	1,09			1,28			1,22			0,98		

Note: ArZ 2 – multiplication of two–digit numbers; ArZ 3 – multiplication of a two–digit number by a three-digit number; Log – a logical problem; Chess - a chess problem in 3 moves; Sub - subjective time; Real - real time; Rezult – accuracy of the solution

Table 4 shows the results of testing empty time for periods from 15 to 60 seconds. The coefficient «K» shows a deviation from the standard on average in the group.

In general, we can talk about the high accuracy of chess players in estimating empty time, regardless of their rating. Table 5 shows the results of testing the sense of time filled with intellectual activity.

The analysis of the obtained results allows us to conclude that with the complication of the mathematical problem, the deviation from real time increases towards underestimation of the interval passed (from 9% to 28%). When solving a chess problem, the time estimate is the most accurate, the deviation is insignificant (2%).

CONCLUSION

The conducted experimental study allows us to conclude that the intelligence coefficient of highly qualified chess players «M 2200-2500» is the average in the population (average IQ = 102) and negatively correlates with the rating. In the group of chess players «M 1700-2100», the IQ is positively correlated with the rating and is on average 10 points higher than the average statistical indicators. The results obtained can be explained by the fact that the R. Amthauer test is not culture-dependent and the results are largely determined by the educational level of the respondent. Professionalization in chess (rating from 2300 points Elo) due to the significant amount of specific intellectual work and participation in a large number of

Playing chess helps children develop good thinking skills

competitions does not allow chess players to receive a full-fledged school education, which can be assumed and reduces IQ scores.

The sense of time as a specific skill of a chess player is formed at the very first stages of sports improvement and there are no significant differences between chess players of different qualifications in this indicator. Chess players estimate the time intervals most accurately when solving chess problems, which indicates the subject-specificity of this skill.

The conclusions of this study are preliminary, and in the future it is planned to increase the experimental sample and supplement the results obtained.

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