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TACTICS FACTORS IN CHESS: THEORETICAL-EMPIRICAL ASPECTS

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Abstract This research aimed to classify relevant factors affecting chess tactics, and to assess their importance and correlation to chess players' ratings and age. The research was undertaken with the purpose of exploring and describing the research issue. A sequence type of mixed methods approach was used in the research. The exploratory design model of developing taxonomy was chosen with the aim of identifying relevant variables and constructing a classification system in the qualitative component, while the results obtained with this procedure were verified in the other, quantitative component. The participant sample needed for the quantitative component of the research comprised 50 competitively active chess players. The results of the qualitative component point out to the multitude and relevance of the areas where many factors affecting chess tactics originate. However, chess players attached different value to the relevance of certain areas and, accordingly, of factors which can affect chess tactics. In the opinion of the surveyed chess players, theoretical preparation and different forms of planning held a prominent place in chess tactics. Regarding the parts of the whole, chess players placed great importance to scouting, long-term planning and tactics in the narrow sense.

Key words: Star chess, tactics, mixed methods research, chess players, tactics factors

INTRODUCTION

Certain knowledge of tactics and some other areas is necessary for competitors to reach their goals in various sports branches. Between the competition and the success achieved at it, there are numerous *visible* and *invisible* bridges connecting these two areas, and tactics is certainly one of them. Regardless of their importance, together they make up the whole of tactics. Clearly, some assumptions about tactics can hardly be tested empirically, but to deny them would be to deny a part of truth as well.

There is a broad spectrum of potential influences affecting sports results, and we should acknowledge the player's tactical preparation as one of the possibilities. Many coaches and players pay great attention to tactics because they consider it to be one of the more important links in achieving success. The term *tactics* is closely connected to the term *strategy*, and these two terms will be explained in the following text.

Strategy is a word of Greek origin, taken from the military jargon, and it can denote the art of leading an army. For example, strategic planning of war is well known in the military. Regarding sport, strategy relates to resolving the problems during the preparations for a competition and at the competition itself. Bompa [1] explains that a strategy can be understood generally, with the plans focused on one season and longer. In addition to its general nature, Koprivica [8] justifiably attributes strategy with a specific aspect, pertaining to a particular competition in which the player is participating.

In chess, the term *strategy* can represent the imagined development of the two players' duel during a game of chess. According to a widespread belief, chess strategy is of specific nature. It relates to real planning during a competition [4, 21].

The explication of the term *tactics* should start from its most general definition. Klajn and Šipka [5] offer several definitions, such as: 1) the skill of managing military troops during combat and organizing troop transportation; 2) method of combat as a part of strategy; 3) certain modus operandi and organization for achieving success in sports, economy and other fields; and 4) calculated, planned behavior with the aim of achieving a goal or deceiving an opponent.

The subject of tactics is quite broad, and the term itself can be understood in different ways. Tactics in sports can include a general and a specific dimension of different constituent elements, behaviors and guidance [8, 11, 12]. In a broad sense, it points to the proper use of certain means, involving preparations,

skills, solutions, actions, and wisdom, by active participants in order to achieve desired results. In a narrow interpretation, tactics refers to a real situation and solving of a real problem. Authors mostly interpret chess tactics in its narrow sense [6, 21]. Machgielis "Max" Euwe, the fifth world champion, notices that, "Strategy is based on thinking, while tactics deals with realization."

A great number of factors can influence the choice of tactics in chess, and understanding their importance for the outcome (with the orthodox chess trichotomy of the result of a chess game as win/draw/lose) could be of great use for the competitors as well as for their coaches and other interested parties. Also, by understanding its essential value, it is possible to reach a higher level of success at a competition.

Knowledge of tactics mostly comes from practical facts, such as experiences of top chess players and their coaches, or game analysis, and it synthesizes contemplation and practice. There has been hardly any research on tactical factors in this sense. Above all, it is methodologically difficult to conduct research that would answer all the questions on the factors that could influence chess tactics. Although many factors relevant for the choice of tactics are mentioned in chess literature only in passing, there is awareness of their possible influence. Accordingly, we set up a system of tactical factors based on the following detailed considerations, which would point out to their importance.

This objective situation yielded the three issues of this research:

1. Which are the factors that considerably affect chess tactics?
2. Do top chess players assess the importance of individual factors differently?
3. Is there a correlation between player's age and rating, and factors affecting chess tactics?

This setup of the research issue asked for theoretic-deductive and empiric-inductive approaches. The need to gather and organize the possible factors affecting chess tactics greatly determined the goals of this research: firstly, to systematize and classify the important factors; and secondly, to assess the importance of particular factors. The assessment was done by top chess players, and the factors were correlated to the players' rating and age.

The International Chess Federation (FIDE) officially recognizes five aspects of chess, those of play, sport, art, science (as mathematical-logical expression), and didactics [Blanco, according to 13]. Also, many authors from the area of sports training theory classify chess as a sports branch [1, 8, 12], based on various criteria. This interpretation should not disqualify the other aspects of chess; however, their analysis would largely surpass the size of this paper, so here we shall only consider chess as a sport.

Tactics in sports is determined by numerous factors, which, if uncontrolled, can prevent reaching the goal, i.e. achieving the desired result, by disrupting its "stability". Full awareness of the factors that can affect chess tactics and their control will not allow the result to become random due to the random effect. If we assumed that the success of chess tactics depended on the tactics understood only in its narrow sense, any further consideration of tactics in a broad sense would be excluded. We would then lose the insight into the entirety of chess tactics and the factors that can affect it. As Šušnjić [25] observed, "It is possible that there is something for which we haven't yet discovered the methods to detect, something which deals with developing our cognitive powers". A chess player who is unable to perceive chess tactics and the factors affecting it (both in its broad and narrow sense) will probably make a blunder and lose a part of the whole.

Why is classifying the factors that influence chess tactics important and where should we start with the work?

We started from the disorder, working towards the organization of possible factors affecting chess tactics. At the beginning, we set out to make a system, i.e. a classification of factors. The classification was to represent a belief system, in which the chosen factors were relevant to understanding chess tactics. Each of the proposed factors could represent a hypothesis for future research. The idea that factors affecting chess tactics could be organized was one of the proposed assumptions. Also, the idea that everything was connected could not be dismissed. Changing one fact (factor) could change the entire whole (the successfulness of the applied tactics). Therefore, the existing factors affecting chess tactics were to be arranged according to a certain measure or criterion. As the goal of organization (classification) was to eliminate the disorder and connect it into a system, we paid attention to the general relevant, constant, and necessary correlations between tactical factors and the success of the tactics at a competition. Depending on the effect of the factors (how much they were represented during the competition) and the extent to which they could be controlled, there were variations in the stability of chess tactics. Success in chess depends on numerous factors, such as:

1) Player's performance at the competition;
2) Success at competition preparations, and at the competition (psychological, tactical, theoretical and physical preparations);
3) Planning;
4) Method (school of chess);
5) Administration and material-technical factors;
6) Managing factors.

All the above-mentioned are the areas from which certain factors affecting chess tactics can be identified. They also represent an abstraction with a common trait, that of influencing the success at applying chess tactics. However, all terms are theoretical, containing rich experience that becomes visible only when they are divided into relevant facts. It should be emphasized that, due to the "multiplicity of knowledge" in the field of chess tactics, organization according to a certain measure or criterion, i.e. classification and systematization of the existing factors that can affect chess tactics is made difficult. Furthermore, it could easily happen to have certain factors under the blanket of the same abstraction or two theoretical terms. It is yet to be investigated whether this is due to the impossibility to find an ideal measure or a piece of evidence that everything is connected in a whole.

Additionally, we proposed a chess tactics classification observed relative to a player's choice of a particular tactics:

1) Before competition / during competition / during the match;
2) Dependent / not dependent on the competition system and playing conditions;
3) Dependent / not dependent on the opponent;
4) Decisions made individually / under the influence of others;
5) Decisions are deliberate / impulsive.

Considering abstraction, it is common to all of the propositions that they can affect chess tactics; however, the theoretical proposition itself should be divided into relevant facts. Šušnjić says [25] that, "From a proposition as a whole in itself, we cannot understand theory as a higher entity, but from a theory as a superior whole we can understand the proposition as a part of that whole."

THEORETICAL APPROACH TO RESEARCH

Based on numerous papers by theorists from the field of sports training [3, 9, 19] who proposed a system for preparation of athletes, some specific areas from which factors affecting chess tactics may arise were deduced.

COMPETITION

a) There are many known examples of a different approach to the game when it is known in advance who the opponent is and what his individual characteristics are, such as gender, rating, and age.
b) Chess competitions can be organized according to different systems, such as Berger, Swiss, Scheveningen, or eliminatory. They can be individual or team and the competitor's approach can vary relative to the system.
c) At least three playing tempos can be identified in chess practice: classic, moderate, and blitz. Here it should be mentioned that chess tactics could depend on both the planned playing time and the amount of time left for the players (lack of time). Each of the playing tempos carries a specific feature, and the choice of chess tactics can largely depend on these.
d) There are other people present at the competition, such as the audience, the umpires and others [4].

TYPES OF PREPARATIONS

Psychological preparation. Chess players were the subject of much psychological research as early as the beginning of the previous century. The acclaimed chess player and psychologist Reuben Fine [22] published a chronological review of important research on chess psychology. Even today, psychology of chess players is the subject of numerous studies [15, 23]. An important role within chess tactics can be occupied by attention, thinking, memory, nonverbal communication, personality traits, and motivation.

Tactical preparation. Clarification of some key terms related to this issue has already been made. Primarily, it is referred to in the strategic sense. Strategy in chess can be seen in its broad and narrow sense. Specifically, it concerns constructing a plan during a competition or a match, and generally, it can represent long-term planning. It can be said that tactics and strategy in chess are connected and mutually intertwined. Suetin [21] observes well that, "In the process of struggle of tactical ideas and plans in a game of chess there are situations constantly changing."

Tactics understood in the narrow sense can certainly be based on playing styles (dominantly positional, dominantly tactical, and mixed). It should be said that tactics of either attack or defense, as two separate entities, carries its own specific features. Generally, tactics deployed during the match can depend on the way of playing in the phase of attack or in the phase of defense. It is worth mentioning that there is a difference between active and passive tactics (for example combined/forced playing or positional playing), and a difference between individual and team tactics.

Theoretical preparation is one of the most important aspects of a chess player's preparation. Chess theory can encompass studying all three phases of the game (opening, middle and ending), as well as broad social-historic and interdisciplinary considerations. It is clear that without a thorough study of the

chess game, the desired result cannot be achieved. It should be said that a great amount of theoretical knowledge could affect chess tactics. Theoretical knowledge of chess can be acquired by studying literature, at lectures, in expert conversations, analyses and scouting. For example, it can appear as knowledge within the personal repertoire on the one hand, and as the interpretation of the opponent's knowledge on the other hand. As Bogdan Pavlović said [according to 24], "Nothing is ever too practical." The second world champion in chess, E. Lasker, also had something to say on the subject - "The utmost empiricism is detrimental in chess because it requires too much work - a master whose credo is empiricism must be training constantly, and this is impossible in the longer run since man is not a machine" [10].

Physical preparation. If we observe a man as an integral biological, psychological and social being, the importance of this type of preparation is obvious [7]. In the context of this research, there is a question of whether a chess player who is physically better prepared may employ better tactics at a competition. Numerous studies [17, 16] testify about the physiological changes in the chess player's body during the match; the sixth world champion Mikhail Botvinnik [2] observes that, "A chess player must be physically well prepared. And, if such a condition is tied to the adopted methods of preparation, good results at the competition can be guaranteed." The physical preparation of chess players involves many influences that should be taken into consideration, such as fatigue and rest, equal distribution of energy, stress adaptation, nutrition, general health, etc. In this context, it is interesting to know if the chess player may solve tactical tasks better in the conditions of fatigue or rest. Further research should explain how the chess player might solve tactical tasks at different levels of physical preparation. There are some tendencies in sports suggesting that a competitor has to function well under the conditions of psychophysical fatigue.

METHOD

The young chess player and his coach face a number of problems to be solved in the process of learning. One of the most important chess theorists and a top player of his time, Nimzovitsch [18] said that, "The feeling of grey boredom must be unknown to a child." Therefore, the coach preparing a young chess player is mostly concerned about the way in which to study chess and whether the manner of acquiring knowledge throughout the career could represent the basis for further improvement. There are many well-known examples of Russian chess schools whose even weakest students later became masters. Thus, it is hard to say that any element of top level chess could be independent from the method of studying.

PLANNING

The basic goal of planning is for the chess player to reach the desired level of *sports form* at the most important competitions. Sports form is the condition of optimal fitness for sport achievements that an athlete gains through suitable preparation at every new level of sport improvement [9]. Understood in this way, sports form exists in chess as well. Planning can involve time periods such as: macrocycle (mostly annual planning, could be long-term), mezocycle (mostly monthly), microcycle (mostly weekly), daily planning, and planning at the competition. These periods of planning should not be taken strictly as time forms or blocks, since their length could vary depending on many factors. Testifying that planning in chess is not arbitrary, the acclaimed grandmaster Rubinstein [according to 21] said that, "For 60 days of the year I play tournaments, for 5 days I rest, and for the remaining 300 days I train". Conclusions and experience from long-term, macrocycle, mezocycle, etc. planning are of great importance for every chess player. Accordingly, the question is to what extent planning affects the choice of tactics in chess.

ADMINISTRATION AND MATERIAL-TECHNICAL CONDITIONS

The term *administration* here means the organization of the competition, which involves familiarizing with the competition timetable, applying protocol, acquiring important information about the competition, securing comfortable accommodation, establishing contact with media and so on. Good organization of administration can enhance the chess player's feeling of contentment at the competition. Throughout the history of chess, there have been many examples of top chess players protesting against the low material reward and questioning the continuation of their chess career. However, the equipment and overall conditions both in training and at competitions have been constantly improving. The modernization of computers, rooms, chess equipment and many other elements has had positive impact on the quality of competitions and chess players' performance. Here, the question is whether the success at playing chess can depend on administration and material-technical base.

MANAGING FACTORS

Managing factors can be interpreted in at least two ways. Firstly, they may encompass the notions that lead a chess player through life. Consciously or not, every person starts solving numerous questions about the nature of reality from the beginning of life. The answers to these questions represent his or her vision of the world. Can our general perception of the world be independent from our interests and their objectives? With

respect to this, it is interesting whether chess, or chess tactics, can be observed outside our life philosophy. Many chess players have aptly noted that opening in a game of chess gives insight into the life of the player. The chess player's expert team should be made of experts from various fields, with the coach being the most important member. According to Milosavljević [14], the basic task of the chess coach is to teach, or at least manage the work. Furthermore, computer systems are continually developing. Technical possibilities for the generation, gathering, transmission, quick access and storage of data are improving rapidly. In chess, there are incredible possibilities a computer system can offer. Currently, there are over 8 million chess games in different categories available on the Internet, and with diligent data gathering the number of matches could reach 15 million. These pieces of information are very easy to manage, but it is practically impossible to use them all. They can serve as a means in preparation for a competition. Chess players and their expert teams analyze and study numerous available matches with the aim of improving their game.

METHODS AND MATERIALS

EMPIRIC APPROACH TO RESEARCH

TYPE AND DRAFT OF RESEARCH

A sequence type of mixed methods [20] was used in this research. The exploratory design model of developing taxonomy was chosen with the aim of identifying relevant variables and establishing a system of classification in the qualitative component, while in the other, quantitative component, the results received from the first procedure were verified.

In the qualitative component of the mixed methods research, Glaser's version of Grounded Theory was used. The goal was to reach at least the third level of term analysis: gathering data, generating categories and then revealing the core category to organize all other categories. The result of Grounded Theory is not made of findings or exact facts, but of a group of carefully grounded terms organized around the core category and integrated into likely, grounded hypotheses (statements) which should be verified in future research.

In the quantitative component of mixed methods research, the design of correlation studies was used besides the descriptive markers, with the aim to acquire information on the correlation between the rating and the age of chess players, and the proposed factors affecting chess tactics.

SAMPLING IN MIXED METHODS RESEARCH

Sequence sampling typology was used in this research, and suitable random sampling was the chosen strategy. For the needs of the quantitative component of the research, 50 active competitive chess players were questioned, 10 out of whom were grandmasters, 16 international chess masters, 11 FIDE masters, 8 master candidates, while the remaining 7 chess players did not state their titles. The basic group comprised all male chess players, from Serbia, holding one of the following four chess titles: grandmaster (VM), international chess master (IM), FIDE master (FM), and master candidate (KM). According to the data from Perpetual Check (*Večiti šah at Serbian, www.perpetualcheck.com)*, a popular chess portal, the basic group included 462 chess players. All participants were male. A theoretical sample was used for the needs of the qualitative component.

PROCEDURES

The procedure of gathering data in the quantitative component of this research was conducted in the following manner:

1) A questionnaire was made especially for the needs of this research;
2) The questionnaire was emailed to participants;
3) The questionnaire was also available to all participants on the most visited Serbian chess website (*www.perpetualcheck.com)*;
4) The participants emailed back the completed questionnaires to researchers.

For the qualitative component of this research, the code analysis technique was chosen, i.e. the method of constant comparison/data coding. The method had following phases:

1) Data reading. Dividing data into smaller meaningful parts, categories;
2) Labeling each item or category with a descriptive sign or *code*;
3) Comparing each level of a data item with previously coded items, so that similar items were coded the same;
4) Once all the data were coded, codes/categories were grouped together upon similarity; based on each grouping, themes were identified and documented; this method (of constant comparison/coding) was applied inductively.

INSTRUMENT

Quantitative data were acquired by a questionnaire, constructed especially for the purposes of this research. The questionnaire contained 43 items, which could be divided into two sub-structures. The first consisted of independent variables (the chess players' rating, age, and chess title), while the other comprised dependent variables further divided into 9 sub-structures (competition, psychological preparation, tactical preparation, theoretical preparation, physical preparation, method, managing factors and material-technical factors). A Likert-type scale was used, and participants could choose between five answers for each item. Participants gave answers based on the degree to which they agreed with a certain statement.

The scale for assessing factors affecting chess tactics used in this research had good reliability and Cronbach's alpha coefficient of 0.88. Sub-scale for assessing areas from which factors affecting chess tactics were derived showed slightly less reliability, with the Cronbach's alpha coefficient of 0.77. This could be explained by the fewer number of items in this sub-scale.

STATISTICAL AND DATA ANALYSIS

The basic purpose of data analysis in this mixed methods research was contained in two principles: a) analytical generalization, and b) transfer from one case to another. Two types of data (qualitative and quantitative) were sequence analyzed in this research, and integration of quantitative and qualitative data was also run in sequence. Data analysis and integration in this research could be marked by QUAL→QUANT notation. Data analysis of quantitative component was done using Pearson correlation and basic descriptive statistics in the SPSS package.

RESULTS

Figure 1 shows descriptive parameters: mean value and standard deviation (M, SD) of the sub-scale assessing the areas from which the factors affecting chess tactics were derived. All data are shown in decreasing sequence (from highest to lowest).

Figure 2 shows descriptive parameters (M, SD) of all individual factors assessed in this research. All data are shown in decreasing sequence (from highest to lowest).

The results of correlation analysis of rating and individual factors (Table 1) show relatively low correlation, and significance at level $p<0.05$. As for the results of correlation analysis of age and individual factors (Table 2), the results also show relatively low correlation and are significant at level $p<0.05$. The results of descriptive statistics (Table 3) point to the mean value of rating of 2312 with standard deviation of 166 and the mean value of chess players' age of 37 with standard deviation of 11.

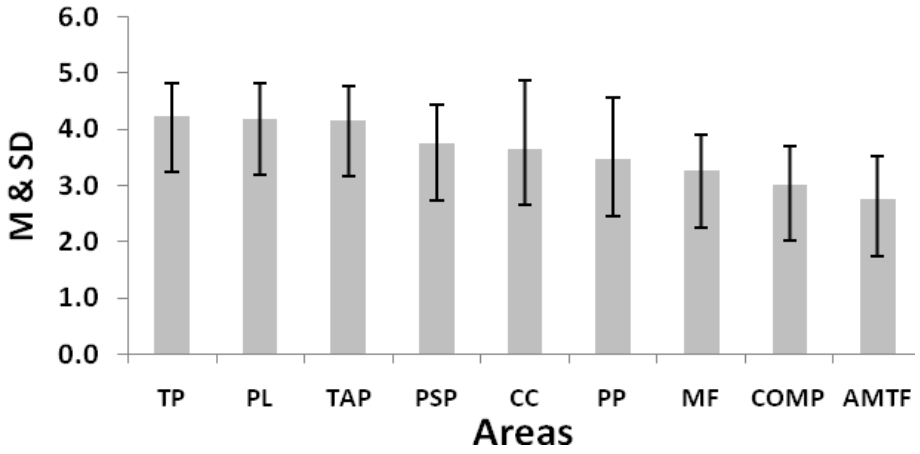

Figure 1. Descriptive parameters of the areas with factors affecting chess tactics

Abbreviations: TP: Theoretical preparation, PL: Planning, TAP: Tactical preparation, PSP: Psychological preparation, CC: Chess school, PP: Physical preparation, MF: Managing factors, COMP: Competition, AMTF: Administration and material-technical factors

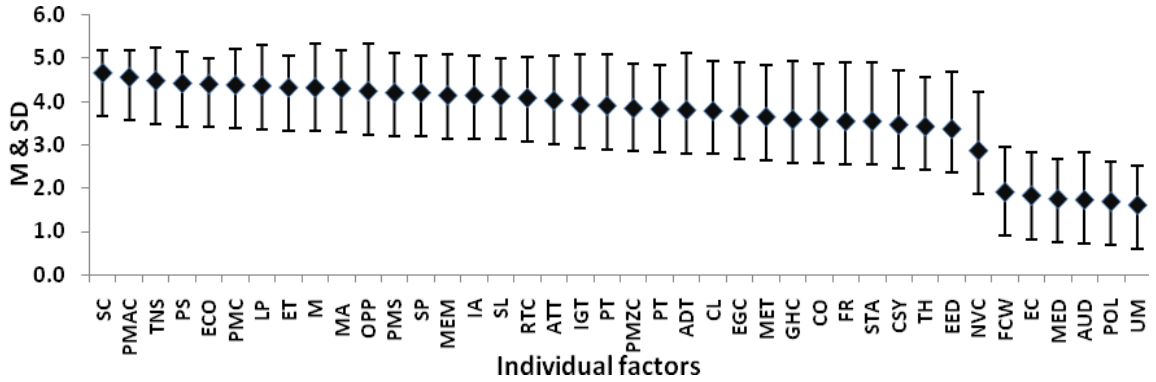

Figure 2. Descriptive parameters of individual factors affecting chess tactics

Note: all abbreviations refer to Graph 2, Table 1 and Table 2:
SC: Scouting, PMAC: Planning macrocycle (most often long-term), TNS: Tactics in narrow sense, PS: Playing style, ECO: Expert comments, PMC: Planning microcycle (most often one week), LP: Life philosophy, ET: Expert team, M: Motivation, MA : Match analyses, OPP: Opponent, PMS: Planning macrocycle (most often one season), SP: Strategic plan, MEM: Memory, IA: Information availability, SL: Studying literature, RTC: Regime of the very competition, ATT: Attention, IGT: Individual and group tactics, PT: Playing tempo, PMZC: Planning mezocycle (most often one month), PT: Personality traits, ADT: Attack and defense tactics, CL: Chess lectures, EGC: Existential conditions, MET: Method, GHC: General health condition, CO: Competition organization, FR: Fatigue and rest, STA: Stress adaptation, CSY: Competition system, TH: Thinking, EED: Equal energy distribution, NVC: Nonverbal communication, FCW: Federations and clubs work, EC: Equipment and conditions in training and during competition, MED: Media, AUD: Audience, POL: Politics, UM: Umpire

Table 1. Correlation between individual factors and chess players' rating

	Rating		
	Pearson Correlation	Sig	N
SP	0.443	0.002	48
GHC	0.331	0.022	48
CO	0.296	0.041	48
EC	0.357	0.013	48
LF	0.318	0.028	48

Table 2. Correlation between individual factors and chess players' age

	Age		
	Pearson Correlation	Sig	N
SL	0.295	0.037	50
OPP	0.353	0.012	50

Table 3. Descriptive parameters of chess players' age and rating

	Descriptive parameters		
	N	AS	Std. Deviation
Rating	48	2312	166
Age	50	37	11

DISCUSSION

Factors that could considerably affect the choice of chess tactics were derived from various areas, which could be roughly divided into at least three sub-groups (competition, preparing for competition and other). Certainly, these areas could differ in relevance, with the corresponding extent to which they affected chess tactics. In turn, this would have an effect on the relevance of individual factors derived from the areas, i.e. the competition system. However, dividing the areas into individual factors on which tactics depends should

not be done without purpose. In case that the division is overly detailed, it can be easy to misinterpret which factors are relevant for the successful application of tactics and which are not. In the context of this research, according to the chess players, theoretical preparation and planning (most often long-term, annual, monthly, weekly or during the competition) represented the most important areas from which factors affecting chess tactics originated. This finding may be explained by the claim that the areas of theoretical preparation and planning "carry with themselves a great amount of uncertainty". In compliance with the features specific to chess, proper solving of tasks of theoretical preparation and planning removes uncertainty and introduces knowledge of chess in the field of tactics. In the opinion of chess players, scouting and long-term planning were the most important individual factors in these two areas. This shows that tactics is not only a group of certain measures and procedures which chess players choose during competition, but also a part of a continuing process.

The data gathered in the correlation analysis (Table 1) point to the correlation between rating and the factors of SP, GHC, CO, EC, and LF. In the opinion of top chess players, factors affecting tactics in a broad sense were more dominant, and chess players with higher ratings gave them greater importance. This can be explained by the fact that chess is the profession of the participants with higher ratings who pay attention to a broader spectrum of possible factors affecting tactics. On the other hand, the correlation between age and individual factors (Table 2) can indicate that older competitors attributed greater importance to chess literature and to the opponent. Accordingly, the results may show that there was more than one group of chess players regarding the approach to sources of information gathered for competitions. The traditional approach of studying tactics of a future opponent is typical of older competitors.

Considering the purpose of this research (data exploration and description), further interpretations would greatly surpass its scope. As there has been no similar research, it is difficult to make any comparisons. The suggested factors affecting chess tactics could represent an incentive hypothesis for future research. However, in view of new problems imposing on this issue, it is important to study the structure of factors that influence chess tactics.

CONCLUSION

A broad range of factors can affect chess tactics but their importance varies. Namely, chess tactics can be seen in its narrow sense, when it refers to the specific features of chess play, i.e. from one move to the next. However, tactics in a broad sense should not be observed isolated from the many areas that affect the success in playing chess. Furthermore, the factors affecting chess tactics in the broad and narrow sense can often interact with each other and thus produce new factors. From the theoretical point of view, the results of this research (classifying the factors with an influence on chess tactics) represent the grounds for future theoretical construction. An attempt was made to identify and sequence the factors that can affect chess tactics and to place each one in the theoretical system.

PRACTICAL APPLICATION

Practical implications of this research could be to inform chess players and other users about the possible ways of thinking in managing chess tactics.

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