

Chess improves academic performance

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ABSTRACT

Despite the fact that chess doesn't involve much reading or math, it develops the skills necessary to excel in things like quantitative reasoning, reading comprehension, and logical thinking, which can greatly improve academic performance. The present research studies the improvement of academic performance with the help of chess. The skills that chess can teach are versatile and can be used in any subject or field that a child studies. Therefore, according to this finding, it can be said that chess affects many factors such as problem solving skills, creativity, critical thinking, active memory, concentration, patience, logical thinking, perception and spatial visualization. Some of these factors are necessary to learn, improve and progress, and once they are learned through chess, they can be transferred to the classroom.

Key words: *chess, academic performance, improvement*



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Introduction

Any activity that is done away from coercion and with people's wishes is successful. Playing games has always been an activity that students learn and enjoy without pressure and with desire and interest. Therefore, education professionals believe that any subject matter will be better if taught to students through games. In fact, the game has an educational aspect in addition to entertainment. Thought games are the pits that prepare a person to move on the rough and winding path of life. When the child can get into these holes at the right time and solve them by himself, he is ready to face various problems and issues that occur in life. Intellectual games involve the person's mind and make him think. In this way, the mind is strengthened and it is considered a brain exercise. After answering the riddle, dopamine hormone is released in the brain and the person feels more satisfied with himself. Creating interactive learning situations is considered as a desirable method of education. Researchers and scientists in the field of education have continuously raised and emphasized the high values of "interactivity of educational environments". These environments include situations in which students directly participate in the learning process instead of being passive recipients of information from educational resources. One of the interactive situations between the student and the teacher is "educational games" which have an educational purpose in their essence; It means conveying a special point, highlighting special capabilities by deepening skills. Educational games can be used by teachers as a useful and efficient medium at formal and informal levels. The ultimate goal of these games is not just to entertain or fill free time, but such games, while creating enjoyable and joyful moments for the audience, by providing experiences close to first-hand experiences, cause faster and more stable learning. The active presence of teachers in the learning process requires the provision of suitable conditions and context in the educational environment. Paying attention to the saying of Imam Sadiq (AS) who says: "A child should play in the first seven years". It shows that children's play is not a new issue, but it has been noticed since ancient times, but today it is more noticed, even in the cultures of ancient people, we see the phenomenon of children's play, in general, not so much in the past. The adult's perception of the adult child had shrunk. That is, the child was considered a miniature of an adult. Many people did not pay attention to the importance of play in the development of children and expected the child to do something like adults and considered the game to be a useless activity except in Some families did not need to work, of course, these families also looked at games as a means of entertainment and even adults played with children, at the same time, the common people also had games for themselves, and maybe we can say that this is the main reason. These games have mostly been the release of tensions and its calming aspect. However, these games have had an important effect on these people in maintaining mental health, maintaining identity, the field of emotions and improving social relations. Along with the industrialization of societies, children's games are different from adults. found On the one hand, living conditions have completely changed, the vast playing environment has become more limited, and in the open nature of vast forests, bungalows, borderless houses have become small houses limited to very cramped apartments, and on the other hand, the problems and occupations of parents have caused them to stay at home. It was also changed through education. Children were entrusted to special institutions. These institutions tried day by day to provide better work. Because children were not able to learn science at a young age, that is, the rejection of the miniature child theory of adults, they came to the conclusion that something else should be done with children. Chess is a popular game played by millions of people around the world. Its popularity is at least partially attributed to its perceived impact on cognitive skills in general, and mathematical ability in particular. In recent years, chess coaching for children has become increasingly popular in developed countries. The European Parliament has expressed a favorable opinion on the use of chess courses in schools as an educational tool (Binove et al., 2011). In 2014, School Library

Journal's educational pick of the year was a chess-related product called Yamie Chess, sponsored by academics at Harvard and MIT. The benefits of playing chess are regularly suggested in a documentary that focuses on an insider. A city school in New York and two European countries—Armenia and Poland—have even mandated chess instruction in their elementary school curricula. A topic in primary schools in 2020, a topic that was widely covered in the German press. Parents and teachers generally see chess as a very popular extracurricular activity in elementary school. However, to date, there is rarely a study that examines the effects of chess training in detail. Jerim et al. (2018) evaluated the effect of teaching chess to children on academic results. Contrary to popular belief, they found no evidence that teaching children chess improved their math ability. Also, there was no effect on reading and science. However, the research results of Islam et al. (2021) showed that chess improves students' math scores. The research findings of Borden and Beer (2006) have shown that mental and educational games are considered as an effective strategy and increase the learning and motivation of students in a class, and based on the findings of Franklin and Lewis (2003), games Education can facilitate students' learning and cause active participation of students in the class. Therefore, it is possible to use mental games in the educational process to increase the mental ability of students and their creativity, which in itself leads to the progress of academic courses, especially in mathematics, because mental games increase the power of searching for Finding the correct solution to the problem, also cause the growth and development of different parts of the students' minds and make them imagine, think and analyze, in addition to this, it strengthens the speed of action, verbal intelligence, strengthening and understanding the material quickly. and their awareness in different fields. Therefore, according to the above-mentioned contents, this research deals with the study of chess on academic performance.

chess game

Chess is a two-person game that is played on a chess board (Figure 1) and using chess pieces (king, minister, rook, elephant, horse, and pawn). Each of the chess pieces move in a special way and are able to hit the opponent's pieces as well. The goal of this game is to defeat the opponent; It means creating a situation where the rival king has no way to escape. Also, the game ends if one of the players voluntarily surrenders; This usually happens when failure seems inevitable. A chess game can also end in a draw in several cases. The game of chess is divided into three parts: the beginning of the game, the middle of the game, and the end of the game, and in each of these stages, different tactics, strategies, and styles are used. Chess pieces have different values and are written with special symbols to record movements. Chess has tactics such as rook and pincer and has special movements and movements such as rook, anpassan and pawn promotion (Shenak, 2007).

figure 1). Chess page

Chess and students' learning and problem solving process

Chess has long been recognized throughout the world as a powerful builder of intelligence and mind. Chess brings out hidden abilities that cannot be achieved through traditional educational tools. It increases logical thinking, instills self-confidence and self-worth. It improves the pattern and communication cognitive skills and teaches the values of hard work, concentration, reality and commitment (Karamti Moghadam, 2015). It is claimed that chess is an activity of limitless potential for the mind. Chess develops mental activities that are used throughout life (Kian, Zadeh, 2016). Educators use chess as an educational strategy to stimulate intellectual processes such as attention, memory, concentration, creativity, and reasoning (Galiga and Felsner (2014). One of the most important skills in the learning process of subjects such as mathematics is the perception of problem solving skills. Problem solving is a skill that is used to strategically analyze and solve difficult situations and answer questions (Qasemi Qashlaq, 2015) Perception of problem solving skills The problem includes cognitive processes, but knowledge alone is not enough to solve the problem. Problem solvers need to analyze the problem to understand it, evaluate special information for its adequacy, organize for events and design a plan, evaluate the desired action plan before implementing it and evaluate their results. These behaviors are not only related to thinking and organizing knowledge. Rather, regulating and revising understanding, planning and evaluating results are closely related to thinking about thinking and metacognition (Yas-Sarmiento et al., 2017). Hall (1999). The ability of 5th and 6th grade students to understand problem solving after completing three assignments was investigated. In his study, he made it clear that providing special training as well as cognitive problem solving strategies to the experimental groups made them more capable in solving complex problems and solving problems faster compared to the control group (cited by Peters et al., 2012).). Among the games invented by humans, chess as an intellectual game that has deep effects on thought and mind has been the focus of researchers for years. By using chess, psychological processes such as active memory, reasoning, fluid Processing relationships, spatial cognitive skills, concentration and attention. Chess increases emotional intelligence and problem-solving ability, and teaches independent and quick decision-making in difficult situations, which helps foster creativity and problem-solving, and reading skills. It strengthens the memory of language and mathematics and nourishes critical thinking (Al-Dawa and Al-Shamiyeh, 2016). Chess provides an exercise for quick and accurate decision-making in a short time and can thus improve the results of students in school exams. Trincherro (2013) chess teaches how to think logically and efficiently and shows the choice of the best option among the available options and shows the importance of a flexible program, concentration and the result of choice and decision-making, and girls and boys regardless of their natural capabilities or socio-economic background is covered (Miley et al., 2018). Chess is one of the best and most effective tools

in preparing children to face the current world, which is drowning in the sea of information and with more difficult situations. They face each other in decision-making (Barrett, 2014). Much research has been done on the effects of playing chess in cognitive fields. However, it is still not possible to determine the clear and precise effects of chess training on the focus of attention and spatial relationships on the one hand, and cognitive abilities such as profile, happiness, problem solving profile, and academic progress on the other hand; Because in some researches it has been determined that short-term chess training cannot have strong effects on intelligence profile (Tseng, Chen, Wu and Wei, 2018). In a study conducted by Blasko-Fontsilá et al. (2016) under the title of chess, the world's largest problem-solving activity, he found that chess can teach students these things: concentration, planning for the future, predicting the results of achieving the goal, optimal use of memory, control ability. The countless variables that are encountered as well as the analysis of different situations, computer skills, using body language in communication, understanding the value of changing points of view to find solutions, and activities that are done in silence. Karimianpour (2008) also obtained these results in his research that teaching chess increases the mathematical problem solving skills of children. Also, the results of Ghasemi Qashlaq's research (2015) showed that teaching chess game increases the mathematical numerical memory problem solving in elementary school girls. Sezch et al. (2019) showed in their research that chess increases the concentration of visualization, thinking before doing work, evaluation of possibilities, detailed analysis, conditions for reflection, general recognition of patterns, map planning and simultaneous consideration of several solutions. For this reason, it increases intelligence and improves educational performance, so it can be considered in school curriculum designs and implicitly integrated with the curricula of other subjects, especially mathematics. Karimianpour (2008) investigated the effect of chess training on the development of problem solving skills of 70 children in Tehran. In his research, he mentioned the non-verbal subtests of Wechsler Mazes, designing with parts, completing pictures of animal houses, geometric design to measure problem solving skills and test basic math skills, classification, maintenance, mental components of similarities and differences and to measure basic math skills. Has used. The results showed that chess training had a significant effect on the development of problem solving and mathematical problem solving skills and also there is a significant difference between boys and girls in these two skills. According to the research findings, it can be concluded that chess training can improve The development of problem solving skills and solving mathematical problems is effective. Ilin has also stated in this context that the game of chess can create various issues for a person. Considering the opponent's pieces, neutralizing his traps and dealing with the obstacles created are among the issues that arise in the game of chess and it seems It turns out that the game of chess prepares a person to face various problems in the future life by planning different problems (Razvani, 2014). Chess is a type of game that is considered a part of human culture and increases the ability to think logically, increases cognitive skills, improves group spirit, improves the value of hard work and concentration, and can also increase responsibility in children. Wang and Wang, 2018). Another research conducted by Artis (2001) on the effect of chess in strengthening and increasing problem solving skills in children emphasizes that by adding chess to the classical mathematics education program, teachers were able to significantly increase the average problem solving ability index. and increase the active memory of students. The students who had completed chess in their mathematics education program showed a much higher score than those who had completed the standard mathematics education program, according to Mohammad Baqer (2016), therefore, through short-term chess education, identifying the relationships between phenomena and re-creating Possible situations can develop memory and problem solving skills. Referring to some researches about the effects of chess on cognitive fields, it has been determined that short-term chess training is effective in developing memory and solving problems from a cognitive profile (Kamkari, Shakarzadeh Navabi and Ebrahimzadeh, 2010). Therefore, according to the fact that the primary school period is of increasing importance and by identifying the effects of chess training on the ability of problem solving skills, practical information can be obtained for the generalization of the game of chess, and in this way, experimental data for cognitive consolidation. therefore, identifying the effects of short-term chess training in the fields of problem-solving skills can provide basic and necessary information for the development of the elementary school math curriculum, so that in case of identifying the contribution and role of the effects of short-term training, Chess can be used as a practical measure in order to prepare problem solving skills for the process of reading and analyzing mathematical concepts in the educational field. Chess training increases emotional intelligence and its components in female students with math disorders according to The findings are Yadollahi, (1391), Zare et al. (1388), Trincheró and Sala (2016), and Swan Vary (2014). They have shown that the use of chess game to teach children provides them with more attention and leads to better learning. Students with math disorders have deficits in attention and visual memory, so in teaching these students, multiple methods should be used. The presentation was used in order to provide different ways of acquiring knowledge. In teaching these students, the use of attractive activities, the use of objective strategies, the use of exaggeration strategies, the use of jokes and games, and the lively presentation and exploration of the subject are emphasized so that more attention is given. Silver et al. (2017) found that expert chess players, compared to novice chess players, examined more possibilities for choosing each move and depending on the type of coded information and the amount and time of using them, they were faster. And more precisely, they do this. The connection between chess and psychology is a two-way connection; The activity in chess has received much attention in psychological research. Scientists see in chess a clear characteristic for further studies in the field of psychology. Because chess, due to its complexity and depth, unlike many manifestations of human behavior, the rules It gives simple and accurate criteria to measure the results. The necessity of analyzing the psychology of the chess player's activity stems from the importance of the human battle on the chess board. In most cases, the situations that occur during the game are very complicated. This means that under these conditions, it is absolutely impossible to find the best continuation of the game. And for this reason, the choice

of a move by the player depends to a large extent on the player's individual characteristics, such as experience, knowledge of the personality, emotional intelligence, and his creative methods. It is not mental, but it is also a personality struggle (Salehi Moghadam, 2016).

Hee was a professional who paid attention to chess and in 1894, he did a deep research in the field of cognitive functions related to chess and spent hours studying and talking with chess champions. including Binch's achievements in the field of cognitive functions related to success in chess; Raising the focus of attention and memory was visual. In describing the center of attention and visual memory, he stated that a person who plays chess has the ability to use his memory and attention without looking at the chessboard and opponent's pieces. Such actions had led to the design of various questions related to the numbers of words and sentences in the questions of the intelligence scale. Mustafavi, Kashani Salehi Moghadam and Sarafian (2015) There have been many psychological researches in the field of chess. Ferguson (1995) in his studies on the effects of chess on children's cognitive abilities and focus of attention suggests that skill in chess does not only require mastery of a specific skill or a combination of one or two skills, but a wide combination of skills together. It provides the ability, therefore, he found that learning chess, even in childhood, strengthens the focus of attention and cognitive skills, including reasoning, some language skills, and active memory.

The effects of chess on students' intellectual and cognitive skills and abilities

Chess is a complex brain activity that requires intelligence, concentration and high decision-making power. Playing chess has many brain benefits. The game of chess is known as "the game of kings". In this game, the brain is used to predict the opponent's moves for the attack. As more studies are done about the brain, it is found that chess is a tool to strengthen the brain's abilities and has many benefits (Sala and Gubet, 2016). According to some studies, the main effects of chess are as follows:

Chess Increases IQ: It has always been thought that chess is for those who have better reasoning power and higher chess IQ. However, the question of chicken and chicken eggs is raised about chess. Do smarter people go to chess or does playing chess make you smarter? In recent studies, it has been found that playing chess increases intelligence. In these studies, 4,000 Venezuelans were examined and it was found that after 4 months of chess training, their IQ increased (Rot, 2008).

Chess cultivates both sides of the brain: In the studies of German researchers, it has been found that people who play chess cultivate both hemispheres of the brain. They expected to observe in the studies that the left hemisphere of the brain of people who play chess is stronger, but they found out to their disbelief that the right hemisphere of the brain also works with the same quality (Scholz et al., 20). 08).

Chess increases creativity: Since the right hemisphere of the brain is related to creativity, playing chess also increases creativity. Playing chess increases initiative. Studies on students who played chess one day a week and compared them with people who worked with computers or did other activities one day a week showed that people who play chess have better brains. They are more creative than others (Sternberg and French, 2014).

Chess increases memory: To play chess well, we need a good memory because we have to remember the opponent's moves and remember them in the next moves. In studies carried out for 2 years, it was found that students who play chess regularly have more memory and organizational ability (Rosolem et al., 2017).

Chess increases the ability to solve problems: the game of chess is like a big puzzle that needs to be solved. has it. In the studies conducted on 450 fifth grade students, these people were divided into three groups.

became The first group completed a normal math program. After the first level, the group took mathematics with learning chess, and the third group started learning and playing chess from the same level. The tests showed that the ability to solve the problem was 81.2 percent in the third group, 62 percent in the second group, and 21.46 percent in the first group (Roth, 2008).

Chess increases the ability to read: In a study conducted on 53 students, it was found that people who play chess have better reading ability (Roth, 2008).

Chess increases concentration: deep concentration in chess improves the results of the players. If a person's attention is distracted even for a few seconds during the game, it can affect the outcome of the game. Considering that chess requires a lot of concentration, the concentration ability of people who play this sport is also greater (Sala and Gubet, 2016).

Increasing attention: Attention is another important cognitive factor and one of the necessities in the field of education, learning and training, which should be paid attention to at a young age (Salehi et al., 2015). The level of students' attention to the subject of the lesson is one of the main factors in teaching and learning. As Bandura emphasizes that the initial stage of any learning begins with attention, and if attention is not enough, one's learning will be impaired. Attention is one of the most important tasks of the mind and alone is one of the main aspects of the structure of memory, which also plays an important role in the structure of intelligence, memory and perception (Narimani et al., 2013). Attention is the ability to select a part of environmental information for further processing. (Gordon and Schroeder, 2001; quoted by Abdi et al., 2012) The ability to pay attention allows humans to control the entry of various stimuli into the conscious scene of the mind. and select a few of them from various stimuli (Abdi, 2012). Healthy attention skills are a very important prerequisite to meet daily demands. Whenever we cannot rely on pre-learned methods, we must focus and constantly control actions. This case is not limited to practical works; Rather, it is equally true in relation to any social interaction and any type of mental activity; In this way, attention abilities can be considered as basic processes. Impairment in attention and concentration and memory

causes a decrease in cognitive performance and a decrease in efficiency and functional efficiency of a person. And thus, reducing the level of optimal cognitive performance affects all aspects of life (Salehi et al., 2015).

Chess increases the power of planning and forecasting: chess expands the front cortex of the brain, this part is related to planning, judgment and control. The expansion of this part of the brain makes better decisions in complex conditions. In general, it can be found that chess increases students' concentration, problem-solving ability, decision-making power, and attention (Roth, 2008).

The importance of information processing and problem solving in the global village, the Internet, email and computers are rapidly changing the indicators of success in work and education. With the acceleration of the globalization process, information flows faster and faster. The information that took months to access a few years ago can now be accessed in a few minutes through the Internet. With such easy access and huge amount of information, the ability to choose appropriately from the wide range of available options is vital. In such a world, students should try to coordinate the speed, flexibility and power of criticism of their reactions with the current world's complexity process. In addition to storing a considerable amount of this information, students must have the ability to search in this sea of information and, most importantly, process information. They should also strengthen their ability to categorize appropriate and inappropriate information, quickly learn new technologies, and use them to solve problems. This is where chess appears as a special and powerful tool in the education of our children's minds. The dynamic nature of chess presents a changing set of problems in each move. Except for the initial moves at the beginning of the game - which can be considered the strongest - each move provides a new opportunity. Chess players try to find the best possible move in every situation on the board with their own calculations and predictions of possible situations and their evaluation based on theoretical principles. In some positions there is more than one good move, as in the real world there can be more than one suitable option. Players must learn to make decisions in ambiguous or difficult situations in chess (Sala et al., 2016).

Chess and academic progress

Chess is a suitable option with exceptional power to develop the minds of our children and helps them face and overcome the ever-increasing complexities and needs of the global village. Day by day, more and more schools around the world realize the value and importance of chess and use it. They have a place in their standard educational program. In fact, chess is just a game. A game that at the same time has attracted some of the greatest minds of the last century and called them to fight. Today, the books written about how to play can easily fill the shelves of a library. Chess is also a special and effective tool in education. Chess challenges the human mind, both male and female, with special or ordinary talent, sportsman or non-athlete, rich or poor. Chess can teach students the importance of planning as well as the outcome of decision-making. In addition, it is an exercise to increase students' concentration power. Strong chess players also learn how to achieve pleasant wins and graceful losses, logical and effective thinking, and decision-making in difficult and ambiguous situations (Seymour and Norwood, 1993). At higher levels, if a good game requires a plan and a plan that is consistent and related to the changing state of the page, and a plan that is planned without considering the possible and different responses of the opponent will not have the necessary efficiency, it teaches flexible planning. Chess can also create self-confidence and self-belief in children, but as losing is inevitable even for world champions, it has no middle ground with arrogance.

Chess is also considered a tool for the education and development of gifted students. Chess tournaments are a good opportunity for these gifted children to meet their peers of different ages, as most chess tournaments, unlike other sports, do not have an age limit for participation. Research has shown that studying and learning chess methodically can help children, while Strengthening IQ skills provides an increase in language, math and reading index. Chess competitions that are held with a time limit and a chess clock train players to make quick decisions under pressure. A skill that can help students in the same pressure as school exams. Chess is an attractive tool to train the mind and challenge it. The necessary concentration in the game makes the mind more sensitive and alert and strengthens proper thinking. Finally, one of its most important effects is teaching thinking and solving variable problems by presenting a diverse combination of consecutive problems. With millions of different possibilities in the game, players must always come up with new situations and problems to face. They cannot solve these problems by applying a fixed formula or using their memory. Rather, they should rely on their analysis and calculation power and find the right move using basic rules and exemplary situations and their creativity and initiative.

Nowadays, sports and science are mixed with each other to such an extent that without a doubt the countries that have synchronized their sports with modern science have easily stolen the lead from others. Different branches of science in different fields, including psychology, bodybuilding, nutrition, etc., are rushing with the help of sports and are advancing it at full speed. And in the meantime, the countries that are not paying attention to this category will undoubtedly fall further behind this group in the future. The intellectual sport of chess is no exception to this rule, and chess is no longer limited to working on the board. The following article from an Argentinian researcher about nutrition confirms how a chess player prepares himself before and during the match with proper nutrition.

Despite the fact that chess doesn't involve much reading or math, it develops the skills necessary to excel in things like quantitative reasoning, reading comprehension, and logical thinking, which can greatly improve academic performance.

In fact, students who play chess score an average of 4.3 points higher than their peers on state reading assessments and 6.4 points higher on math assessments.

Chess has been shown to improve students' academic performance in all areas including science, history, and art. The skills that chess can teach are versatile and can be applied to any subject or field a child studies.

Many researches indicate that intellectual games by influencing thinking skills lead to academic progress in students (Alborzi, 2016), and in other words, important behavioral areas and provoke reflection, especially in students, which can be mutually related with intellectual games and To make a decision, and it is considered one of today's challenges, is educational progress. Academic progress in scientific issues for students is both a sign of individual success and a factor for the progress of society. Academic progress has a reciprocal and two-way relationship with many human behaviors, including thinking, decision-making, and problem solving. In theoretical and research texts, academic progress has been described as "students' success in learning course material" (Saif, 2009). However, the relationship between academic progress and human cognitive behaviors has been confirmed. Some researchers believe that playing chess has positive effects on the academic performance of elementary and middle school students in subjects including mathematics (Barit, 2010; Barrett, 2014). It significantly affects the solving of mathematical problems. Hiromano (2011), Berkeley (2012), Martins (2012) and Trincherro (2013) and Rezvani, Fadaei and Goya (2014) confirmed the role of playing chess on mathematical problem solving skills, and also Rasakh et al. (2019) confirmed the effect of playing chess on academic progress. Have.

Conclusion

Berkley (2012) states that spatial visualization, which is one of the factors that chess affects, is most related to academic progress. Smith (1998) believes that teaching chess can strengthen students' patience, perseverance, concentration and creativity; And these features are essential for the success of students (Berkeley, 2012). Also, chess helps learning informally (Scholz et al., 2008). On the other hand, some researchers, including Heng (2015), citing Berkeley (2012) and Rifner (1992) refer to the transfer of skills learned by chess to other areas. As Heng (2005, cited in Berkley, 2012) states, some skills necessary in chess, including perception, analysis and evaluation, are transferable to other domains. Rifner (1992) also states that problem solving skills learned through chess are transferable to other areas. Therefore, according to this finding, it can be said that chess affects many factors such as problem solving skills, creativity, critical thinking, active memory, concentration, patience, logical thinking, perception and spatial visualization. Some of these factors are necessary to learn, improve and progress, and once they are learned through chess, they can be transferred to the classroom.

- It is suggested to consider the role of intellectual games, especially chess, and its conscious, purposeful and planned use in schools, as a tool for teaching some skills to students.
- In order to inform parents about the role of intellectual games in their children's academic and behavioral life and their academic progress, educational workshops should be held.
- Intellectual games such as chess can play an important role in behavioral and educational activities and skills, it is suggested to carry out more extensive research in relation to the factors influencing decision-making and the factors that chess affects.

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