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The Effect Of Playing Chess On The Concentration Of ADHD Students In The 2nd Cycle

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Abstract

The study examines the effect of playing chess on the concentration of students with Attention Deficit Hyperactivity Disorder (N=14, age: 11-13). The study hypothesized that chess improves concentration period and listening language skills. The sample was chosen from two schools with inclusion, students received chess training twice per week. Pre- and post- measurements of Conner's Teachers Rating Scale: Revised-Long version, concentration tasks, and scores of school language listening tests were the data collection tools of the study. Results showed improvement in concentration skill and period, and in listening score.

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Keywords: ADHD, Chess, concentration, listening skills

1. Introduction

Students diagnosed with ADHD can develop their reasoning skills and higher level thinking capabilities when allowed to discuss and compare their ideas. Such skills as (Storey, 2000) advocated are reinforced through playing chess. Research showed that chess instruction can strengthen student's patience, perseverance, concentration and creativity (Smith, 1998). Moreover, due to parent's reservations towards providing their child with medication, several studies were conducted about interventions to reduce ADHD symptoms. The importance of this study is that it is a new topic in the research field that examines chess for the students having ADHD. The study will examine the benefit of learning chess and its rules on the concentration skill and period, as well as on the school listening language score of the 6th grade students with ADHD who receive special learning support.

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Nomenclature

- A ADHD: attention deficit hyperactivity disorder
- B CTRS: R-L : Conner's Teachers Rating Scale: Revised- Long version
- C Chess
- D Concentration
- E Listening Skills

2. Literature Review*2.1 ADHD interventions studies*

Attention Deficit Hyperactivity Disorder is a condition of brain that causes children difficulty controlling their behavior in school and social setting (Lerner&Johns, 2009). Studies showed a positive effect of music therapy on improving the attention and concentration of students with ADHD (Sze & Yu, 2004). Bailey (2009) showed the decrease in certain undesirable behavior by half after a physical activity intervention. Some special diet were suggested for decreasing symptoms of ADHD, these diets include omega-3 fatty acids supplements (Portwood, 2006), the Feingold diet (removal of food additives, and controlling blood- sugar levels therapy (Hammerness, 2009).

2.2 Benefit of chess in education studies

Chess is a mental game played by two players using a board of 64 black and white squares and 16 pieces each. Chess gained attention in the academic field since some researchers argues and proved that chess skills lead to the improvement of academic achievement due to their transferability to other areas (Smith, 1998). Furthermore, concentration is an important notion in chess because the player must be able to detect various possibilities, threats, and attacks. An experiment of systematic outcomes of attention has been explained by experts' superiority in picking up information from a board position faster and more accurately (Saariluoma, 1984). In a study conducted by Ferreira and Palhares (2008), it was found that chess players recorded a significant difference in pattern tests between chess players students and non-chess players. The more experienced the player is, the better spatial and logical abilities he has (Horgan & Morgan, 1990). Sigrimac(2012) proved the benefit of chess playing on learning conceptual development of six-years-old children, but no significant difference was found between males and females. Chess can be a game that helps student on the fringe, it could be a valuable tool as an element of a mathematics lesson or students who receive special education services (Barret & Fish, 2011).

2.3 Overview of theories

The study was built on three theories of self-regulation, decision making, and attention. Self-regulation is to alter behavior with flexibility and adaptability to the social environment and situation (Schuck & Ertner, 200). El-Daw (1997) stated that is is goal-directed learning as the individual decides on strategy to use for planning and calculating actions. It is viewed by information processing theory as metacognitive awareness. As in chess, it is required from the player to understand task, set a goal, choose suitable strategy and evaluate results. Moreover, decision making theories provoke that the more experienced the person, the more patient he is in taking time for assessing new situations and taking a decision (Zaghloul & Zaghloul, 2003). Flexible allocation of capacity theory of attention considers attention flexible according to the variation of demands imposed by the task. It is affected by the difficulty of the task or arousal sources (Kahneman, 1973). Increasing attention to relevant stimuli and decreasing attention to the irrelevant stimuli leads to concentration (Castle & Buckler, 2009).

3. Purpose of the Study

The aim of the research is to investigate the effect of training chess on the concentration and listening language scores of students with ADHD.

4. Research Questions

The following questions will determine the problematic of the research:

- Does playing chess help students with ADHD in strengthening the period of concentration?
- Does playing chess improve the concentration ability (less forgetting, less losing of materials/tools...) of students with ADHD?
- Does playing chess and learning its rules improve the listening skills of students with ADHD?

5. Hypotheses

- Learning chess and learning its rules will increase the period of concentration of students diagnosed with ADHD.
- Learning chess and learning its rules will increase the concentration of students with ADHD who have an average IQ.

6. Method

An experimental design was conducted to teach 14 students with ADHD the chess game in the years 2012-2013 and 2013-2014 for four months, twice a week.

6.1 Participants demography

Fourteen participants were chosen from two inclusive schools in Saida, Lebanon, such that none of them have any additional impairment, and they have been diagnosed with ADHD. All students have an average IQ, but struggle to stay focused and attentive in class. Using CTRS_R-L scores prior of the intervention, all students were found to have same level of severity (percentile between 65 and 80) which is slightly atypical.

6.2 Training

Participants were trained by Sara El-Shamieh, an international chess player and club trainer. Four of the students were trained at the school during the last school period, while ten were trained at Ahli chess club in Saida after school for four months twice per week of 30-45 minutes sessions. Students were taught first the movement of each piece with its value, then chess-puzzles and position tasks were given, after than check mate approaches, and finally playing a round with all pieces. Taking into consideration that children with ADHD can quickly get bored, several motivational methods were used to keep their interest in the game including teaching videos and a behavioral chart. Visual cues were provided for helping their memorization of chess pieces' moves and values and posted on the wall of the class. Four months later, post-measurements were conducted for students assessing their improvement.

6.3 Tools

The trainer used the translated Arabic version of CTRS:R-L, duration of playing until first disturbance behavior record sheet, concentration tasks (spot-difference task, and finding shape), in addition to their language listening school scores.

7. Results

Table 1. Summary of time recorded for appearance of first disruptive behavior

	Pre-	Post-
$\bar{X}$	4.07	9.64

Results in table1 showed that the time taken by student until they show disruptive behavior (hitting someone, talking aloud, etc..) has extended at the end of experiment.

Table 2. Score and time of students in pre- and post- test of Spot Difference task

	Score	Time (sec)
Pre-	2 of 3	58.14
Post-	3 of 3	60.71

Results in table2 showed the slight increase (2 sec) in time for solving the task, and an improvement in score where all students found all differences after the intervention

Table 3. Score and time of students in pre- and post- test of Find Shape task

	Score (/100)	Time (sec)
Pre-	73.7	143
Post-	78.9	195.5

Results in table 3 showed an improvement in the score by 5 points and an increase in the time taken to solve the task by 52 seconds.

Table 4. Students' raw score on the inattention subscale of the CTRS:R-L

	Pre-	Post-
$\bar{X}$	26.21	21.21

Results in table 4 represent the average of students on the inattention subscale (10 items, 30 is the maximum score) showing a decrease in the average by 5 points. The less the score is the less inattentive the student is, thus this decrease is considered an improvement in students' behavior and a better attention.

Table 5. Average of Students' Listening language school scores

	Pre-	Post-
English	70.71	73.83
Arabic	69.14	72.43

Results in table 5 represent the average of students' scores in the listening language school scores prior to the intervention and at the end of the study. The results showed a slight improvement in the English and the Arabic scores by 3 points of 100.

8. Discussion

8.1 investigating the first hypothesis

In the behavior disturbance duration recording, students needed more time to exhibit unacceptable behavior at the end of the intervention. It is justified by the students better control of reactions and more focus on task in hand as the chess game trains students to take their time choosing their best move. In the concentration tasks (Spot-Difference, and Find-Shape) students' scores revealed a better result in finding the answer in addition to more time recorded for solving the task. As Smith(1998) claimed about gaining more patience, perseverance, concentration, and creativity from chess due to the persistent changes created on the board during the game. Students learned from the game to focus their attention on the important aspects of a task to engage the suitable processing required. This is the information processing approach suggested by Demetriou(2000). Thus first hypothesis was confirmed with the presented sample.

8.2 Investigating the second hypothesis

As the concentration skill was tested through the measurement of inattention items in the CTRS:R-L, results revealed a decrease in the total score of these items for each student (19.2%). The decrease means a better control of behavior and reactions which is explained by the increase of attention. Focusing on a plan during a chess game and evaluating of consequences of a move (Puddephatt, 2003) leads to gaining self-regulation for altering behavioral flexibility (Baumeister & Vohs, 2007) justifying this improvement. Moreover, listening language scores also showed a slight improvement (5%) in scores. During chess sessions oral instructions were provided for training their auditory focus and concentration as they were asked to wait few minutes processing before giving out their answers. This slight improvement justifies a better listening skills to instructions and explanations. Therefore, the second hypothesis is validated for the present sample.

9. Conclusion

Through the mentioned results, training students with ADHD on playing chess has affected their concentration period and skill. It was shown that students take a longer duration until they started exhibiting undesirable and unacceptable behaviors. Hence, it is important for students to learn chess as it trains them to stay longer on task, control their actions, and maintain focus. Results also revealed an improvement in the concentration tasks and the listening language scores at the end of the intervention. After the analysis of the results based on self-regulation, decision-making, and attention theories, it was concluded that the hypotheses are proved in the present study according to its chosen sample of students. However, there is difficulty generalizing the results as the sample was not representative.

10. Recommendations for Further Research

Based on previously mentioned findings, it was recommended that:

- The inclusion of chess game in the school curriculum for the benefits it has on the skills and mental abilities of the individual
- A follow-up study with a larger sample and over a longer duration of time
- More studies about the benefit of chess for students with special needs

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