Enhancing Cognitive Processes in Children through Chess Training

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Chess has been known to foster intellectual development and critical thinking skills. Most of today’s chess programs rely on intensive search to generate moves. Some chess engines like Crafty and Giraffe using neural networks, self-learns from its earlier processes. Chase & Simon (1973) found that pattern recognition was one of the most important processes for chess skill. Neural networks thus form the substrate of pattern recognition. Despite considerable advances in experimental techniques and computational paradigms, we still have an incomplete understanding of how human cognitive function emerges from neural structure and dynamics. To better understand human cognition and the factors that impact cognitive processes, a systematic chess intervention using two training methodologies was carried out.

This study analysed the impact of frequency and intensity of chess training that is required to lead to a significant improvement in the IQ and other cognitive functions. The objective of the study was to compare two methodologies of chess training - chess in academy and chess in schools. Two groups receiving chess training over a one year period were compared – one group was a chess in-school training program and the other was chess in academy program. In the chess in schools program, the training methodology comprised once a week training session with groups of 6 to 8 children. In the chess in academy program, the training comprised biweekly training sessions with groups of 4 children. In both the groups, the chess trainer worked with the child, analysing their games and several case studies of tactics and end games. IQs of 61 children studying in chess academy were compared with IQs of 23 children studying chess in school. Data were analysed using paired t tests. Findings clearly indicated increases in IQ scores in both the groups with greater gains being observed in the chess in academy group (p < .01) compared to the chess in schools group (p < .05). The cognitive functions that significantly improved after the chess training in chess in schools were Memory, Conceptual thinking, Verbal Reasoning and Numerical Reasoning. The cognitive functions that significantly improved after the chess training in chess in academy were Memory, Conceptual thinking, Verbal Reasoning, Numerical Reasoning, Non Verbal Reasoning, Language and Social Intelligence. This increase in IQ and the cognitive functions could be attributed to the intensive chess training programs where the child’s cognitive processes are enhanced by improving the evaluation of the current positions, the pattern recognition ability and the decision making processes by choosing the right move from a given set of candidate moves. Out of several numbers of possible moves, a chess player chooses a few feasible moves which are termed as candidate moves. The expertise of a chess player is to find those candidate moves after careful calculation and positional judgement and then choose one best move at every turn. Analysis of games from the score sheet enables the child to learn from past mistakes thus enhancing the meta-cognitive abilities of the child. The study clearly shows that higher training frequency and more intensive chess coaching resulted in greater enhancement of cognition in children.