CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Liam M. Scott-Curtis

Project Number
J0716

Project Title
Chessers, a Mind-Boggling Game: How Chunking, Interference, Entanglement and Negative Transfer Make a Mess of Things

Abstract

Objectives/Goals
The objective is to test my hypothesis that previous knowledge of chess interferes with a person's ability to play checkers with chess pieces.

Methods/Materials
Consent was gained from 60 middle school students, who were tested and placed in 3 groups based on previous knowledge of chess. 40 moves of chessers (checkers played with chess pieces) were played with each subject. After each move, subjects described how chess interfered with their strategy and decisions. Each test was recorded. Interference was rated using a scale of 0-2 (no, slight, or significant interference). Using transcripts, interference was classified as follows: due to movement of piece, value of piece, chess strategy, or general confusion.

Results
Group 3 (most experienced chess players) reported the highest levels of interference on the 0-2 scale and the highest degree of interference in each category, except in chess strategy. When subjects were categorized using a ratio of pieces taken to pieces lost, with < 1:4 being the least successful players and > or = to 1:1 being the most successful, 90% of Group 3 lost more pieces than were taken, with 60% of Group 3 losing pieces at rate of < 1:2. Groups 1 (least experienced chess player) and 2 (mid-level player) had relatively even distribution in each ratio. Players in the ratio of > or = 1:1, reported the highest levels on the scale of interference.

Conclusions/Discussion
My hypothesis was correct. Group 3 experienced the most interference playing chessers and reported the most negative transfer of learning from chess, resulting in a higher loss of pieces. However, in one category of interference, chess strategy, Group 3 showed less interference than Group 2, perhaps because previous knowledge of chess strategy created not only negative transfer of learning, but also, eventually, positive transfer of learning, especially of forward thinking, as this group may have created new strategies for chessers instead of only applying chess chunks (pattern recognition). Surprisingly, winners reported the most interference. Current chess-based research discusses how both chunking and forward-thinking are entangled in the process of mastering chess. In my experiment, chess chunking contributes to the negative transfer of learning in chessers for Group 3, but because of positive transfer of chess strategy (forward thinking), they eventually gained an advantage as they became acclimated to chessers.

Summary Statement
My experiment tested whether knowledge of chess interferes with a person's ability to recognize patterns and use strategy while playing checkers with chess pieces.

Help Received
Parents helped transcribe audio recordings and helped edit report and abstract. Parents purchased recording device. Mrs. Macy and other teachers gave me time with students for testing.