



# Center for Children and Families

## 2017 Spring Lecture Series

### Expanding Opportunities for Children and Youth

#### “Cognitive Benefits of Learning to Play Chess and other Strategy Games”

Chandramallika Basak, PhD  
Assistant Professor, School of Behavioral and Brain Sciences  
Director of the Lifespan Neuroscience and Cognition (LiNC) Lab  
The University of Texas at Dallas

March 3, 2017

#### Myths and facts about “cerebral” games:

- Misconception: Chess instruction make you smarter, especially in mathematics.
  - Fact: Chess players, both adults and children, are more intelligent than general population. However, these studies are correlational in nature and cannot establish that chess skill is the underlying cause of better cognitive abilities.
  - Fact: Chess experts show advantage only in chess-like scenarios when tested of immediate memory, but not in other domains.
  - Fact: Assessing children’s performance before and after long-term chess instructions shows modest benefit to cognitive and academic skills.
  - Fact: Duration of chess training matters.
  - Fact: More than half of other types of educational interventions are better than chess instruction.
- Misconception: Playing video games make you aggressive
  - Fact: These are correlational studies that compare gamers vs. novices, and cannot establish a causal link between game playing and aggression.
- Misconception: Playing video games make you smarter.
  - Fact: Avid gamers, compared to novices, do perform better on a variety of cognitive and perceptual domains, but these studies are correlational in nature and cannot establish that playing video games actually cause better cognitive abilities.
  - Fact: Training novices to play video games has not always been associated with cognitive benefits.

#### What is common between chess and video games?

- Not all games are created equal.
- Turn-based, or real-time strategy, video games involve similar cognitive mechanisms as in chess.
- Therefore, research from one domain can advance our understanding of the other domain.

## **Past Research on Strategy Video Games**

- Randomized control trials (RCTs) are the best way to approach establish causal links between training and cognitive benefits.
- RCTs on real-time strategy video-games suggest that both younger adults and seniors improve in complex cognitive skills, such as attending to the task and ignoring the distractors, multi-tasking abilities, and immediate memory of untrained items.
- These RCTs are effective usually of just a short duration (<20 hours).
- Cognitive benefits usually accompany changes in brain function that underlie these cognition, particularly the regions that develop later in children.

## **How can we improve the memory and attentional skills in children?**

### ***Goals of the current study (In Collaboration with UT Dallas' Summer Chess Camp)***

- An approach similar to strategy video game training can be used for chess instruction in children.
- Explore the effects of training over a short, but intense, duration of training.
- Compare the effects from chess training to a placebo.
- Assess changes in cognition before and after.
- How does past experience in chess influence the cognitive benefits from the summer camp?

### ***Preliminary findings***

- Children recruited from the chess camp improved in focusing attention to the target and in multi-tasking skills.
- These improvements suggest that chess instruction has the potential to improve the “building blocks” of complex cognitive skills.

### ***Specific Actions***

- Inability to focus attention to the relevant task is an issue in children, particularly those diagnosed with ADHD.
- Ignoring distractors and focusing on task at hand is important for most cognitive tasks and educational achievements.
- Learning chess or related strategy games may induce efficient focusing of attention in children, by enhancing underlying neural networks.
- Talk to children about “brain plasticity”.
- Play strategy-based board games with children.
- Don't judge all video games to be same. Some may prove to be beneficial not only for your child, but also for your parent.
- Grandparents and children can both benefit from strategy game training. What about grandparent-child summer camps!

**Web-based resources**

UT Dallas' Summer Chess Camp

<http://www.utdallas.edu/chess/education-camp/camp.html>

**Video games and society**

<https://www.aaas.org/event/neuroscience-and-society-series-ready-player-one-how-video-games-affect-your-brain-and>

**Peer-reviewed Journal Articles**

Meta-analysis on chess instruction in children

<http://www.sciencedirect.com/science/article/pii/S1747938X16300112>

**Meta-analysis on computer-based training in older adults**

<http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001756>