

Spatial Learning Conference
May 19 – 21, 2010
Co-Organized by Boston College and Harvard University
Funded by the National Science Foundation:
Spatial Intelligence and Learning Center

Sources of Individual Differences in Spatial Skills:
The Interaction between the Learner and the Learning Environment

Schedule

Wednesday evening

5:30 – Welcome and Introduction

6-7 – Keynote Speech: Steve Kosslyn, Harvard University

Thursday

9:15 – Welcome and Introduction

9:30-12:30 – talks

9:30-10:00 – Russell Epstein, University of Pennsylvania

10:00-10:30 – Amy Shelton, Johns Hopkins University

10:30-11:00 – Maria Kozhevnikov, University of Singapore

11:00-11:10 - break

11:10-11:40 – Giorgio Ganis, Harvard University

11:40-12:10 – Rich Haier, University of California, Irvine

12:10-1:30 – lunch

1:30-4:30 – talks

1:30-2:00 – Barbara Tversky, Stanford University

2:00-2:30 – Priti Shah, University of Michigan

2:30-3:00 – David Uttal, Northwestern University

3:00-3:10 - break

3:10-3:40 – Martha Carr, University of Georgia

3:40-4:10 – Mary Hegarty, University of California, Santa Barbara

4:10-4:40 – Sheryl Sorby, Michigan Tech University

Friday

9:00-12:30 – talks

9:00-9:30 – Marina Vasilyeva, Boston College

9:30-10:00 – Beth Casey & Elida Laski, Boston College

10:00-10:30 – Daniel Voyer, University of New Brunswick

10:30-10:40 - break

10:40-11:10 – Scott Kaufman, Free University of Brussels/New York University

11:10-11:40 – Diane Halpern, Claremont McKenna College

11:40-12:10 – Susan Levine, University of Chicago

12:10-1:30 – lunch

1:30-4:40 – talks and final discussion

- 1:30-2:00 – Lynn Liben, Pennsylvania State University
- 2:00-2:30 – Jodie Plumert, University of Iowa
- 2:30-3:00 – Susanne Lajoie, McGill University
- 3:00-3:10 - break
- 3:10-3:40 – Small Group Discussion
- 3:40-4:40 – General Discussion

Overview of Presentations

Wednesday, May 19: Keynote Speech

Steve Kosslyn, Harvard University: The reality simulation principle

Thursday, May 20: Presentations

- I. The neural bases of spatial cognition
 - a. The brain basis of spatial navigation (Russell Epstein, University of Pennsylvania)
 - b. Biological correlates of individual differences in spatial performance and strategy choices (Amy Shelton, Johns Hopkins University)
 - c. The neural correlates of individual differences in visual-spatial reasoning and its application to real-life performance (Maria Kozhevnikov, University of Singapore)
 - d. Malleability and training effects
 - i. What visuo-spatial skills are enhanced by action videogame training? Behavioral and neuro-imaging evidence (Giorgio Ganis, Harvard University)
 - ii. Spatial ability, intelligence, and Tetris: Structural and functional imaging studies of plasticity (Rich Haier, University of California, Irvine)
- II. Mechanisms: Spatial cognition as a function of basic cognitive processes
 - a. From spatial action to spatial thought (Barbara Tversky, Stanford University)
 - b. The role of working memory and affective processes on spatial performance (Priti Shah, University of Michigan)
 - c. How representation influences the development of spatial cognition: Maps, words, and gestures (David Uttal, Northwestern University)
- III. The impact of spatial cognition on other domains
 - a. The role of spatial skills on the development of mathematics learning in elementary school students

- i. Spatial ability correlates as a function of math problem type and solution strategy (Martha Carr, University of Georgia)
- b. The role of spatial skills on STEM fields, such as engineering, mathematics, medical science, computer science, physics, etc.
 - i. Two related aspects of adaptive spatial thinking: (1) strategy choice and (2) effective use of external representations, with examples drawn from chemistry problem solving, medical reasoning and meteorology (Mary Hegarty, University of California, Santa Barbara)
 - ii. The role of spatial training on improved spatial performance in Engineering students (Sheryl Sorby, Michigan Tech University)

Friday, May 21: Presentations and Conclusion

- I. Understanding gender differences in spatial reasoning
 - a. Factors affecting spatial skills in young boys and girls
 - i. Gender differences in preschoolers: The effects of structural characteristics of spatial stimuli on mental rotation performance (Marina Vasilyeva, Boston College)
 - ii. Social ecology of the home: Its impact on spatial ability and arithmetic performance in first grade girls (Beth Casey & Elida Laski, Boston College)
 - b. Methodological Issues:
 - i. The impact of procedural factors on evidence for gender differences (Daniel Voyer, University of New Brunswick)
 - c. Understanding the role of working memory on gender differences in spatial skills (Scott Kaufman, Free University of Brussels and New York University)
 - d. An overview and synthesis of issues relating to gender differences in spatial skills (Diane Halpern, Claremont McKenna College)
- II. Biological and environmental factors associated with individual differences in spatial cognition
 - a. Environmental factors impacting spatial cognition
 - i. Individual differences in parent-child spatial language and play: Relation to preschoolers' spatial skill (Susan Levine, University of Chicago)
 - ii. Parent-child interactions related to spatial skills and map understanding, from the perspective of both parent and child variables (Lynn Liben, Pennsylvania State University)
 - b. Cognitive structures interacting with the environment

- i. Spatial thinking emerges out of the interaction of the cognitive system and environmental structure (Jodie Plumert, University of Iowa)
- ii. Aptitude-Treatment Interactions revisited: Implications for designing technologies to increase strategy awareness and spatial skills (Susanne Lajoie, McGill University)

III. Conclusion of the Conference

- a. How to develop new strategies and methodologies for examining the interaction of the learner and the learning environment and their effects on spatial cognition
- b. New research paradigms for moving beyond the heredity/environment controversy relating to gender differences