Practice Amount, Not Practice Type, Influences Visuospatial Problem-Solving

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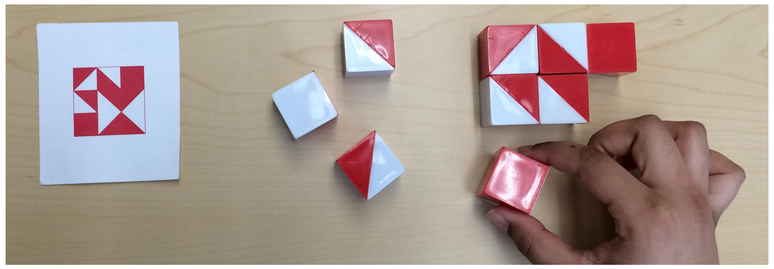
RESEARCH QUESTIONS

- Practice—the repetition of an activity or action—can improve skills by increasing accuracy and knowledge transfer (Barch & Lewis, 1954; Hughes et al., 2013) and decreasing reaction time (Wright & Richard, 1999).
- Three questions were examined about the role of practice in a visuospatial problem-solving task:
  1. How does practice type influence performance?
  2. How does practice amount influence performance?
  3. What is the relationship between task difficulty and practice?

EXPERIMENTAL TASK



- 154 college-age adults (55 men, 99 women) were presented with the ***Block Design Task (BDT)*** (Ronnlund & Nilsson, 2006; Wechsler, 1955):
  - A task from the Wechsler Adult Intelligence Scale (WAIS) that incorporates analytical reasoning, problem-solving skills, and psychomotor functioning.
  - Assesses visuospatial skills in typical and atypical populations.
  - Participants recreated an image of a block design using nine blocks. Each block has two white sides, two red sides, and two half-white and half-red sides.
  - Accuracy (number of correct blocks out of nine) and latency (time required to complete the design) were measured.

METHOD AND VARIABLES OF INTEREST

PRACTICE TYPE

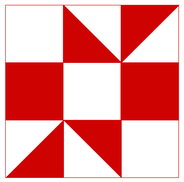
- Prior to test trials, participants received one of three types of practice with the BDT:
  - ***Motor practice***: Recreate the design image physically using the blocks.
  - ***Mental practice***: Recreate the design image mentally using visual imagery.
  - ***Modeling practice***: Observe another person recreate the design image using the blocks.
- Each practice type requires distinct components of practice (e.g., perceptual information and consequences of actions, an opportunity to observe an expert problem solver use effective strategies).

PRACTICE AMOUNT

- In all three practice type conditions, participants received 6 practice trials (***less practice condition***, n = 78) or 12 practice trials (***more practice condition***, n = 76).
- After practice, participants received 40 test trials, which were analyzed by ***trial block***.

DIFFICULTY LEVEL

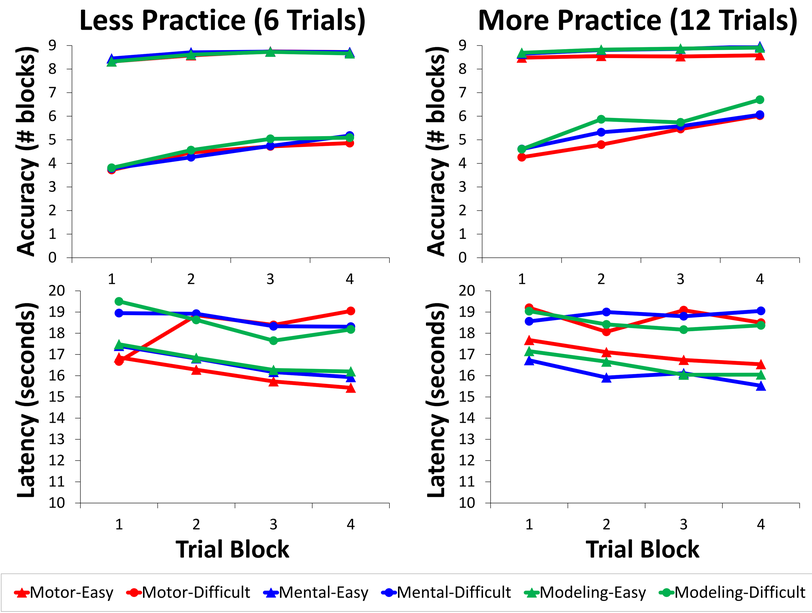
- Half of the test trials were easy, and half were difficult. The following guidelines were used (Miller et al., 2009):
  - ***Easy***: Designs with more solid colored blocks and edges that have different colors.
  - ***Difficult***: Designs with more half-white and half-red blocks and edges that share the same color.



Easy Design Example

Difficult Design Example

RESULTS AND CONCLUSIONS



- Practice, both before and during test trials, improved performance. Task difficulty decreased performance.
  - Practice amount: $p < .01$, $\eta_p^2 = .06$
  - Trial block: $p < .01$, $\eta_p^2 = .41$
  - Difficulty level: $p < .01$, $\eta_p^2 = .84$
  - Difficulty level x practice amount: $p < .01$, $\eta_p^2 = .06$
  - Difficulty level x trial block: $p < .01$, $\eta_p^2 = .24$
  - Difficulty level x practice amount x trial block: $p < .05$, $\eta_p^2 = .02$
- Practice type did not influence performance, p = .45.

FUTURE DIRECTIONS

- Practice type may not have influenced performance because the participants were young adults, who show peak performance in the BDT (Rozencwajg et al., 2005). It is possible that they benefit from any practice.
- Future work will test older adults to examine whether participants' age influences the relationship between practice type and visuospatial performance.

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