International University of Nature, Society and Man “Dubna”

Mental Rotation As Major Part Of Solving Spatial Tasks

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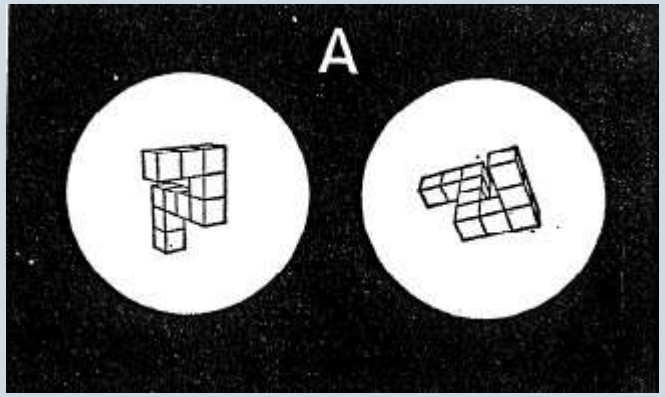
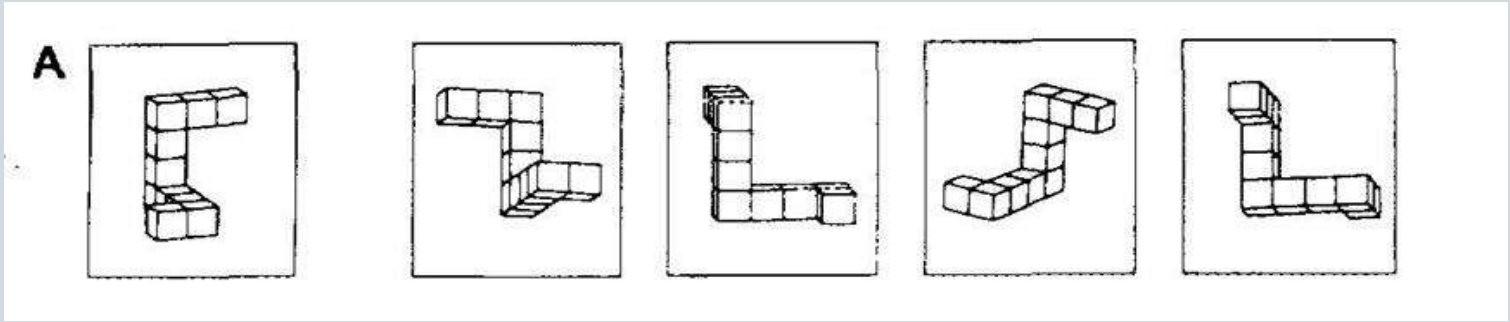
Mental Rotation Classical Methodology

- Shepard and Metzler test (1971)



- Vandenberg and Kuse test modification (1978)

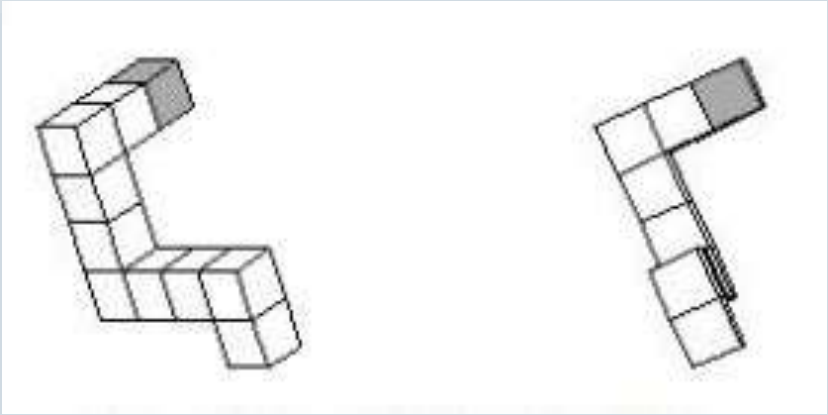


Markable Results

- Reaction time increased linearly with increasing angular disparity between the stimuli (Shepard and Metzler, 1971)
- There are gender differences in spatial abilities (Vandenberg and Kuse, 1978)
- Mental rotation scores increased with age for both genders (Christian Geiser, Wolfgang Lehmann, Michael Eid, 2008)
- Training of mental rotation was effective for children and adult. Manual training would improve the rotation process itself. (Gunnar Wiedenbauer, Petra Jansen-Osmann, 2007)

Spatial Strategies

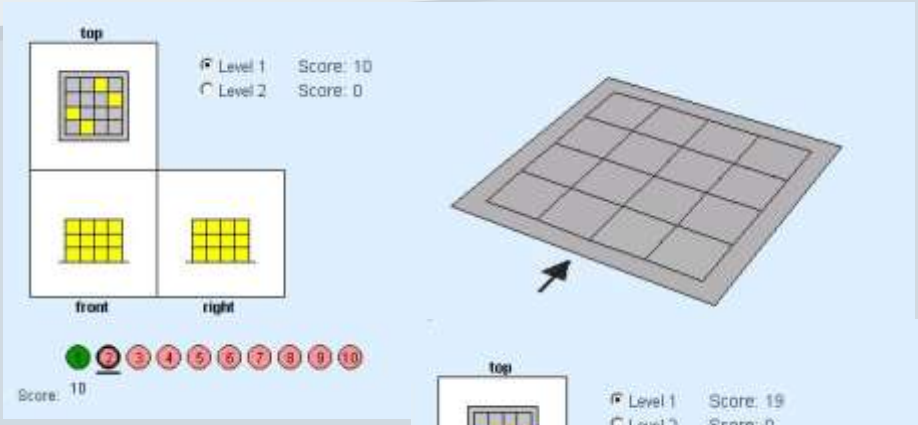
- holistic strategie
- analytical strategie

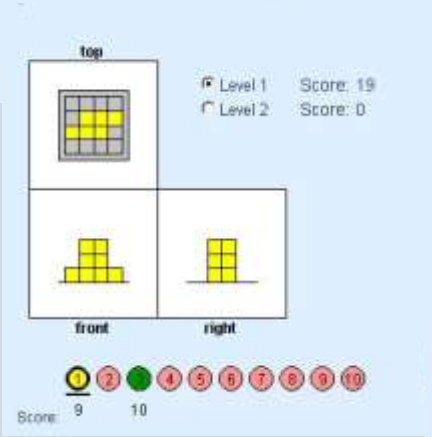


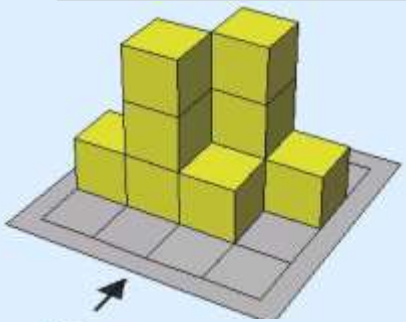
It means that while rotation test solving it isn't necessary to rotate and one can use simple comparison.

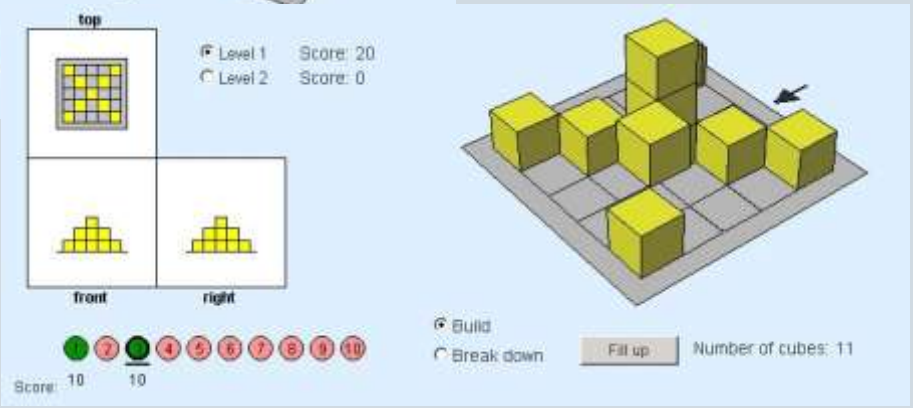
So, how to catch and measure **the mental** rotation?

Practical Mental Rotation Task





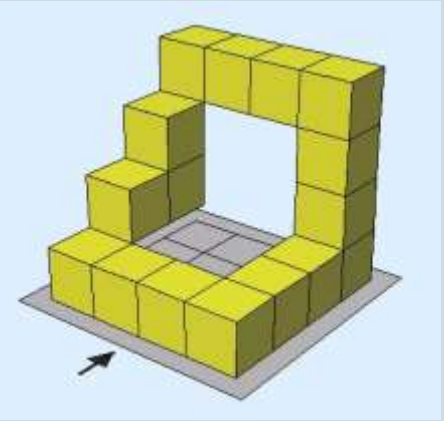




Creation solid complex shape from simple cube primitives by three views

Working surface can be rotatable or fixed by predefined angle, and solver had to rotate scene in mind

Parameters



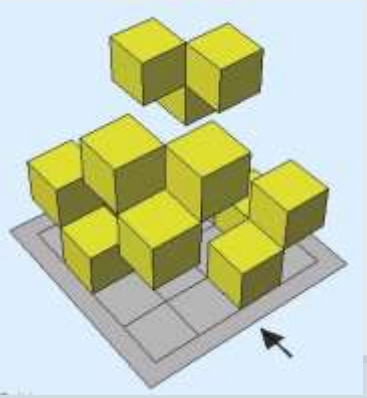
- Shape complexity
- Scene fixation angle
- Task completion degree (simple and difficult)
- Maximum solving time depends of task complexity
- Aid types

Lines of Study

- Age differences. We can determine age when mental rotation just appeared.
- Gender differences.
- Mental rotation training. Campare affectivity of different kinds of learning.

Studying Mental Rotation in Real Activities

We interesting in research mental rotation in real activity when rotation is required part of solving practical problem, e.g., construction activity, terrain orientation, modeling.



Research Plan

Preparing	Stating experiment	Forming experiment
■ Interviewing interests and hobbies ■ IQ testing ■ Neuropsychological testing	Solving construction tasks with different complexity levels	Solving construction tasks with different complexity levels in real life and on PC

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