
Picture Span Test: Measuring visual working memory capacity involved in remembering and Comprehension

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Cross-modal Interactions in Natural and Artificial Cognitive Systems

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Authors’ Motivation

- Working memory is central to cognition and involves executive functions
- Domain specific resources in WM: verbal & visuospatial
- Prediction of cognitive skills per domain
- Need for appropriate working memory tasks:
  - Not purely storage!
  - Existent: Reading Span Test (RST)
  - Need: Separate for visual
Authors’ Goal

- Develop a new visual working memory task: PST
- Differentiate the role of inhibition and verbal encoding for visual working memory
  - Inhibition
  - Verbal Encoding
- Using PST to differentiate between individual working memory capacity
Authors’ Method: Picture Span Test

- RST as blue print: correlation with cognitive task is higher than with simple storage tasks
- PST entails understanding the situation in the scene
  - Two conditions: congruent or incongruent
  - Comprehension needed to judge true or false
- Comparison of PST scores with other cognitive measures
  - Psychometric subtest of visuospatial abilities
  - RST for verbal abilities
  - Visual storage task: Simple Object Span Test (SOST)
Authors’ Hypothesis

- PST correlates
  - Higher to the visuospatial cognitive task than to the RST
  - higher to the visuospatial cognitive task than to the SOST
Author Methods

Picture Span Test

Simple Object Span Test

Author Methods
Authors’ Methods
Authors Results

Table 2
Correlations Between Span Measures and Visuospatial Ability Measures

<table>
<thead>
<tr>
<th></th>
<th>PST</th>
<th>SOST</th>
<th>RST</th>
<th>Plate Match</th>
<th>Paper Unfold</th>
<th>Figure Reconstruct</th>
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<td>-</td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<td>-</td>
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<td>Plate match</td>
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<td>.46**</td>
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<td>.50**</td>
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<td>.22</td>
<td>.46**</td>
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</tr>
<tr>
<td>Figure reconstruct</td>
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<td>.12</td>
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<td>.51**</td>
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</table>

Note—See Table 1 for explanations of abbreviations. *p < .05. **p < .01.

APPENDIX B
The Summary of the Factor Analysis

<table>
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<tr>
<th>Measure</th>
<th>Factor 1 (visuospatial)</th>
<th>Factor 2 (verbal)</th>
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</table>

Note—PST, picture span test; SOST, simple object span test; RST, reading span test; Plate match, the plate matching test; Paper unfold, the paper unfolding test; Figure reconstruct, the figure reconstruction test.
Authors’ Conclusion

- PST is good for visuapatial working memory assessment
- PST possibly good for assessing the interplay of working memory and long term memory
- Individual differences can be evaluated with PST
Discussion

- Verbal vs. spatial component: Which arguments are in favour of Chinese / Japanese being verbally encoded? Which for being visually encoded?
- Asian vs. European people: Spatial training because of the different nature of the written language?
References

