



3,457 Views | 117 CrossRef citations to date | 1 Altmetric

Original Articles

The relationship between visuospatial sketchpad capacity and children's mathematical skills

Joni Holmes , John W. Adams & Colin J. Hamilton

Pages 272-289 | Received 01 Oct 2006, Published online: 07 Feb 2008

 Cite this article  <https://doi.org/10.1080/09541440701612702>

Sample our
Behavioral Sciences
Journals



>> [Sign in here](#) to start your access
to the latest two volumes for 14 days

 Full Article

 Figures & data

 References

 Citations

 Metrics

 Reprints & Permissions

Read this article

 Share

Abstract

This study examined the association between visuospatial sketchpad (VSSP) capacity and children's mathematics attainment. The aim of the study was to explore age-related differences in the relationship between the visual and spatial memory subcomponents of the VSSP (Logie, 1995) and a range of mathematical skills. Fifty-one 7- to 8-year-old and fifty-six 9- to 10-year-old primary schoolchildren participated in the study. The Visual Patterns Test and the Block Recall task were employed as VSSP measures. The results revealed a differential pattern of associations between children's visual and spatial working memory abilities and their mathematical skills. In younger children, the Block Recall task predicted mathematics performance, whereas, in the older children, the Visual Patterns Test was a significant predictor of mathematics performance.

Acknowledgements

This work was supported by a postgraduate studentship awarded to the first author from the Department of Psychology, University of Durham. The authors would like to thank the children, parents, and staff of Green Lane Primary School, without whom this research would not have been possible.

Related Research Data

[Relationships between facets of working memory and performance on a curriculum-based mathematics test in children](#)

Source: Educational and Child Psychology

[Combining representations in working memory: A brief report](#)

Source: British Journal of Developmental Psychology

[Representation and working memory in early arithmetic](#)

Source: Journal of Experimental Child Psychology

[Assessment of working memory in six- and seven-year-old children.](#)

Source: Journal of Educational Psychology

[Working memory](#)

Source: Unknown Repository

[The Unity and Diversity of Executive Functions and Their Contributions to Complex “Frontal Lobe” Tasks: A Latent Variable Analysis](#)

Source: Cognitive Psychology

[Working memory and phonological awareness as predictors of progress towards early learning goals at school entry](#)

Source: British Journal of Developmental Psychology

[Exploring the roles of the visual-spatial sketch pad and central executive in children's arithmetical skills: Views from cognition and developmental neuropsychology](#)

Source: Developmental Neuropsychology

[A Longitudinal Study of Mathematical Competencies in Children With Specific Mathematics Difficulties Versus Children With Comorbid Mathematics and Reading Difficulties](#)

Source: Child Development

[Working Memory for Movements](#)

Source: The Quarterly Journal of Experimental Psychology Section A

The theory of the estimation of test reliability

Source: Psychometrika

Short-term memory and working memory as indices of children's cognitive skills

Source: Memory

The episodic buffer: a new component of working memory?

Source: Trends in Cognitive Sciences

Verbal and non-verbal working memory and achievements on National Curriculum tests at 11 and 14 years of age

Source: Educational and Child Psychology

The relationship between articulation time and memory performance in verbal and visuospatial tasks

Source: British Journal of Psychology

Distributed brain sites for the g-factor of intelligence

Source: NeuroImage

Object and Spatial Visual Working Memory Activate Separate Neural Systems in Human Cortex

Source: Cerebral Cortex

Behavioural evidence for separating components within visuo-spatial working memory

Source: Cognitive Processing

Chapter 7 Visuo-spatial working memory: Visual, spatial or central executive?

Source: Unknown Repository

Chapter 2 The Ins and Outs of Working Memory: Overcoming the Limits on Learning from Imagery

Source: Unknown Repository

Working Memory and Children's Mathematical Skills: Implications for mathematical development and mathematics curricula

Source: Educational Psychology

Working Memory in the Classroom

Source: Unknown Repository

Working memory skills and educational attainment: evidence from national curriculum assessments at 7 and 14 years of age

Source: Applied Cognitive Psychology

Computerized Training of Working Memory in Children With ADHD-A Randomized, Controlled Trial

Source: Journal of the American Academy of Child & Adolescent Psychiatry

The effects of phonological and visual-spatial interference on children's arithmetical performance

Source: Educational and Child Psychology

Mathematical Skills in Ninth-graders: Relationship with visuo-spatial abilities and working memory

Source: Educational Psychology

Working memory in children with specific arithmetical learning difficulties

Source: British Journal of Psychology

The role of working memory in mental arithmetic

Source: The European Journal of Cognitive Psychology

What develops in visuo-spatial working memory development?

Source: The European Journal of Cognitive Psychology

Visuo-spatial Working Memory

Source: Unknown Repository

Visuospatial working memory, movement control and executive demands

Source: British Journal of Psychology

Time Constraints and Resource Sharing in Adults' Working Memory Spans.

Source: Journal of Experimental Psychology General

Verbal and Visuospatial Short-Term and Working Memory in Children: Are They Separable?

Source: Child Development

The role of the executive system in visuo-spatial memory functioning

Source: Brain and Cognition

Working memory capacity and its relation to general intelligence

Source: Trends in Cognitive Sciences

Interference in Immediate Spatial Memory: Shifts of Spatial Attention or Central executive Involvement?

Source: The Quarterly Journal of Experimental Psychology Section A

Working memory is (almost) perfectly predicted by g

Source: Intelligence

Short Article: Limiting the use of Verbal Coding in the Visual Patterns Test

Source: Quarterly Journal of Experimental Psychology

Working memory components of the Corsi blocks task

Source: British Journal of Psychology

Transient and sustained activity in a distributed neural system for human working memory

Source: Nature

Exploring the central executive

Source: Unknown Repository

Pattern span: a tool for unwelding visuo-spatial memory

Source: Neuropsychologia

The development of strategy use in elementary school children: Working memory and individual differences

Source: Journal of Experimental Child Psychology

Working memory and children's use of retrieval to solve addition problems

Source: Journal of Experimental Child Psychology

Development of Memory for Pattern and Path: Further Evidence for the Fractionation of Visuo-Spatial Memory

Source: The Quarterly Journal of Experimental Psychology Section A

Executive and visuospatial sketchpad resources in euthymic bipolar disorder: Implications for visuospatial working memory architecture

Source: Memory

Abstract representations of numbers in the animal and human brain

Source: Trends in Neurosciences

Different problem-solving strategies for algebra word and equation problems.

Source: Journal of Experimental Psychology Learning Memory and Cognition

Working memory, short-term memory, and naming speed as predictors of children's mathematical performance

Source: Intelligence

The Inner Eye and the Inner Scribe of Visuo-spatial Working Memory: Evidence from Developmental Fractionation

Source: The European Journal of Cognitive Psychology

Interference in immediate spatial memory

Source: Memory & Cognition

Developmental fractionation of working memory

Source: Unknown Repository

The microgenetic method: A direct means for studying cognitive development.

Source: American Psychologist

Irrelevant Pictures in Visual Working Memory

Source: The Quarterly Journal of Experimental Psychology Section A

Linking provided by 

Related research

People also read

Recommended articles

Cited by
117

Working Memory and Children's Mathematical Skills: Implications for mathematical development and mathematics curricula >

Joni Holmes et al.
Educational Psychology
Published online: 19 Jan 2007

[Short-Term Memory, Working Memory, and Executive Functioning in Preschoolers: Longitudinal Predictors of Mathematical Achievement at Age 7 Years >](#)

Rebecca Bull et al.

Developmental Neuropsychology

Published online: 12 May 2008

[Exploring the roles of the visual-spatial sketch pad and central executive in children's arithmetical skills: Views from cognition and developmental neuropsychology... >](#)

Rebecca Bull et al.

Developmental Neuropsychology

Published online: 4 Nov 2009

[View more](#)

Information for

Authors

R&D professionals

Editors

Librarians

Societies

Opportunities

Reprints and e-prints

Advertising solutions

Accelerated publication

Corporate access solutions

Open access

Overview

Open journals

Open Select

Dove Medical Press

F1000Research

Help and information

Help and contact

Newsroom

All journals

Books

Keep up to date

Register to receive personalised research and resources by email

 Sign me up



Copyright © 2025 Informa UK Limited [Privacy policy](#) [Cookies](#) [Terms & conditions](#)

[Accessibility](#)

 **Taylor & Francis Group**
an informa business

Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG