Can Memory Predict Your Child's Success at school?

Presented by

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Transforming Struggling Students into Confident Learners

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What do the Experts Say?

Tracy Packiam Alloway, PhD

Director of the Center
for Memory and Learning in the Lifespan

University of Stirling, UK.

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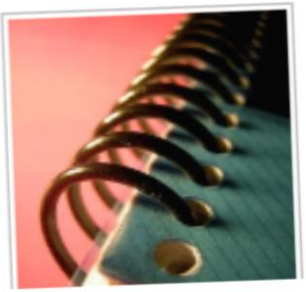
JAN 10, 2010

Working memory: a better predictor of academic success than IQ?

By: Dr. Tracy Alloway

Working memory is the ability to hold information in your head and manipulate it mentally. You use this mental workspace when adding up two numbers spoken to you by someone else without being able to use pen and paper or a calculator. Children at school need this memory on a daily basis for a variety of tasks such as following teachers' instructions or remembering sen-



Welcome to SharpBrains!

As seen in *The New York Times, The Wall Street Journal, CNN* and more, SharpBrains is an independent market research and think tank tracking health and productivity applications of neuroscience. **AARP** recently named The SharpBrains Guide to Brain Fitness a **Best Book** on the subject.

New Market Report: The Digital Brain Health Market 2012–2020

http://www.sharpbrains.com/blog/2010/01/10/working-memory-a-better-predictor-of-academic-success-than-iq/

“Working Memory in Children with Reading Disabilities”

Susan Elizabeth Gathercole, PhD

Tracy Packiam Alloway, PhD

Dr. Catherine Willis

& Dr. Anne-Marie Adams

https://dspace.stir.ac.uk/bitstream/1893/799/1/GathercoleJECP.pdf

“Working Memory in Children with Reading Disabilities”

… **the severity of deficits** in the areas of both reading and mathematics in a sample of children with reading disabilities **was closely associated with working memory skill.**

https://dspace.stir.ac.uk/bitstream/1893/799/1/GathercoleJECP.pdf

“Working Memory in Children with Reading Disabilities”

We propose that this association arises because **working memory acts as a bottleneck for learning in classroom activities**…

https://dspace.stir.ac.uk/bitstream/1893/799/1/GathercoleJECP.pdf

The Combined and Differential Roles of Working Memory Mechanisms in Academic Achievement

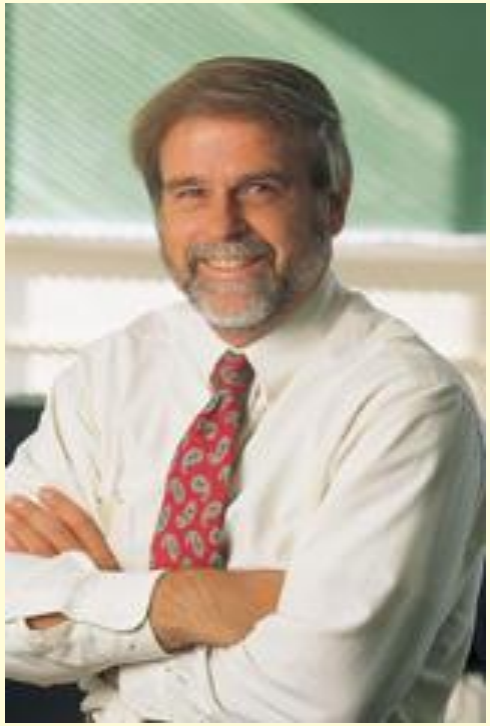
Dr. Bronwyn Murray . PsyD

dspace.iup.edu/bitstream/handle/2069/283/Bronwyn Murray.pdf?sequence=1

In this study the combined working memory factors were clearly better predictors of achievement than traditional measures of intelligence.

dspace.iup.edu/bitstream/handle/2069/283/Bronwyn Murray.pdf?sequence=1

Short-Term Memory and Working Memory
Do Both Contribute to Our Understanding of Academic Achievement in Children and Adults with Learning Disabilities?



H. Lee Swanson, PhD

http://ldx.sagepub.com/content/27/1/34.short

Both Short-Term Memory and Working Memory are important in understanding reading comprehension and mathematics performance in children and adults with learning disabilities…

http://ldx.sagepub.com/content/27/1/34.short

The Role of Short Term Memory and Academic Achievement

John M. Jaquith, M. Ed.

http://nacd.org/learn_more/docs/the_role_of_short_term_memory_and_academic_achievement_1996.pdf

More Research at the

End of this Presentation.

Average grade equivalents

for total reading scores increase

as digit spans increase

for both auditory and visual digit

spans

http://nacd.org/learn_more/docs/the_role_of_short_term_memory_and_academic_achievement_1996.pdf

Our experience with over a 1000 clients.

Memory span of 2:

Non-reader

High Anxiety & possible Nightmares

Do not understand or apply social skills

Memory span of 3:

Starts to recognize

small words inconsistently

Wants friends, cannot keep them.

Memory span of 4:

Reading is laborious

No consistency in recognized words.

20 minutes of homework takes 3 hours.

Memory span of 5

Reading is less laborious.

Begins to understand patterns in reading and spelling.

Memory span of 6

Understands patterns to

sound out words.

Improved Spelling.

Our experience with over a 1000 clients.

Memory span of 7

Uses decoding to read words.

Reading comprehension & academic ability performance will be at norm unless there are mitigating factors.

Memory is Changeable !

Do we just give up

if the memory span

is small?

NO

What to Do

1. Measure Short-term memory
2. Increase the Size of Memory
3. Teach Skills

= Increased Academic Success

We Can Show You

How to Build Memory

Span!

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Courtesy of: http://www.cogmed.com/research

Year	Publication	Title	Author	Abstract
2013	Memory & Cognition	Exploration of an adaptive training regimen that can target the secondary memory component of working memory capacity	Gibson et al.	In Press
2012	Psycho-Oncology	Working memory training in survivors of pediatric cancer: A randomized pilot study	Hardy et al.	Link to abstract
2012	Journal of Child Psychology and Psychiatry	Effects of a computerized working memory training program on working memory, attention, and academics in adolescents with severe LD and comorbid ADHD; a randomized controlled trial	Gray et al.	Link to abstract
2012	Frontiers in Human Neuroscience	Computerized training of non-verbal reasoning and working memory in children with intellectual disability	Söderqvist et al.	Link to abstract
2012	Journal of Applied Research in Memory and Cognition	Component analysis of simple span vs. complex span adaptive working memory exercises: A randomized controlled trial	Gibson et al.	Link to abstract
2012	Scandinavian Journal of Occupational Therapy	Working memory training for patients with acquired brain injury: effects in daily life	Johansson & Tornmalm	Link to abstract
2012	Frontiers in Human Neuroscience	Working-memory training in younger and older adults: Training gains, transfer and maintenance	Brehmer et al.	Link to abstract
2012	Neurotherapeutics	Will working memory training generalize to improve off-task behavior in children with Attention-Deficit/Hyperactivity Disorder?	Green et al.	Link to abstract
2011	NeuroImage	Neural correlates of training-related working-memory gains in old age	Brehmer et al.	Link to abstract
2011	Science	Interventions shown to aid executive function development in children 4 to 12 years old	Diamond & Lee	Link to abstract

Courtesy of: http://www.cogmed.com/research

Year	Publication	Title	Author	Abstract
2011	Neuropsychologia	Preliminary evidence that allelic variation in the LMX1A gene influences training related working memory improvement	Bellander et al.	Link to abstract
2011	Learning and Individual Differences	The impact of working memory training in young people with social, emotional and behavioral difficulties	Roughan & Hadwin	Link to abstract
2011	Developmental Science	Gains in fluid intelligence after training non-verbal reasoning in 4-year-old children: A controlled randomized study	Bergman Nutley et al.	Link to abstract
2011	Child Neuropsychology	Component analysis of verbal versus spatial working memory training in adolescents with ADHD: A randomized, controlled trial	Gibson et al.	Link to abstract
2011	Developmental Psychology	Dopamine, working memory, and training induced plasticity: Implications for developmental research	Söderqvist et al.	Link to abstract
2011	Journal of Speech, Language, and Hearing Research	Working memory training for children with cochlear implants: A pilot study	Kronenberger et al.	Link to abstract
2010	The Journal of Pediatrics	Computerized working memory training improves function in adolescents born at extremely low birth weight	Løhaugen et al.	Link to abstract
2010	Trends in Cognitive Sciences	Training and plasticity of working memory	Klingberg et al.	Link to abstract
2010	Journal of Clinical Child & Adolescent Psychology	A controlled trial of working memory training for children and adolescents with ADHD	Beck et al.	Link to abstract
2010	Advances in Child Development and Behavior, Vol. 39	Poor working memory: Impact and interventions	Holmes et al.	Link to abstract
2010	School Mental Health	Working memory training for children with attention problems	Mezzacappa et al.	Link to abstract

Courtesy of: http://www.cogmed.com/research

Year	Publication	Title	Author	Abstract
2010	Reading and Writing	Effects of working memory training on reading in children with special needs	Dahlin	Link to abstract
2010	Applied Cognitive Psychology	Impacts of training and medication on working memory on ADHD Children	Holmes et al.	Link to abstract
2010	Brain Injury	Computerized training of working memory in a group of patients suffering from acquired brain injury	Lundqvist et al.	Link to abstract
2009	Developmental Science	Training leads to sustained enhancement of poor working memory in children	Holmes et al.	Link to abstract
2009	Neuroscience Letters	Working memory plasticity modulated by dopamine transporter genotype	Brehmer et al.	Link to abstract
2009	Science	Changes in cortical D1 receptor binding after cognitive training	McNab et al.	Link to abstract
2009	Developmental Science	Training and transfer effects of executive functions in preschoolers	Thorell et al.	Link to abstract
2007	Physiology and Behavior	Changes in cortical activity after training of working memory – a single-subject analysis	Westerberg & Klingberg	Link to abstract
2007	Brain Injury	Computerized working memory training after stroke – a pilot study	Westerberg et al.	Link to abstract
2005	JAACAP	Computerized training of working memory of children with ADHD	Klingberg et al.	Link to abstract
2004	Nature Neuroscience	Increased prefrontal and parietal activity after training of working memory	Olesen et al.	Link to abstract
2002	J. of Clinical & Experimental Neuropsychology	Training of working memory in children with ADHD	Klingberg et al.	Link to abstract