

NumbersAlive! Research on Early Childhood Learning and Math Anxiety

“First grade math skills set foundation for later math ability” – Press Release from *NIH News* on NIH Study – February 27, 2013

<http://www.nih.gov/news/health/feb2013/nichd-27.htm>

“Children who failed to acquire a basic math skill in first grade scored far behind their peers by seventh grade on a test of the mathematical abilities needed to function in adult life, according to researchers supported by the National Institutes of Health.”

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“Early Math Training Adds Up” – *Washington Post Express* Article on above NIH Study – March 26, 2013

“The number sense, or what Geary more precisely terms ‘number system knowledge,’ turns out to be a fundamental skill that students continually build on, much more than the simple ability to count.”

“National Institute of Health says it's best to start early. ‘We should be talking to our children about magnitude, numbers, distance, shapes as soon as they're born.’”

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“Math anxiety causes trouble for students as early as first grade” – *University of Chicago News* summarizing University Chicago study – September 12, 2012

<http://news.uchicago.edu/article/2012/09/12/math-anxiety-causes-trouble-students-early-first-grade>

"The study found that among the highest-achieving students, about half had medium to high math anxiety. Math anxiety was also common among low-achieving students, but it did not impact their performance...The team showed that a high degree of math anxiety undermined performance of otherwise successful students, placing them almost half a school year behind their less anxious peers, in terms of math achievement."

FULL STUDY:

[http://home.uchicago.edu/~lizgunderson/Publications/Ramirez%20et%20al%20\(in%20press\)%20-%20math%20anxiety.pdf](http://home.uchicago.edu/~lizgunderson/Publications/Ramirez%20et%20al%20(in%20press)%20-%20math%20anxiety.pdf)

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“Math anxiety in second and third graders and its relation to mathematics achievement study” – *Frontiers in Developmental Psychology* – June 7, 2012

http://www.frontiersin.org/Developmental_Psychology/10.3389/fpsyg.2012.00162/full

"The effects of math anxiety on math achievement can be detected in the earliest stages of formal math learning in school."

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“School Readiness and Later Achievement” – *Developmental Psychology* – 2007

http://www.policyforchildren.org/pdf/School_Readiness_Study.pdf

"In 2007, Greg Duncan, an economist now in the UC Irvine School of Education, shook the world of early childhood education when he and fellow researchers published a paper showing that early math concepts, such as knowledge of numbers and measurement, were ‘the most powerful predictors of later learning,’ even more than reading and writing."

“President George W. Bush (2002) endorsed Head Start reforms in 2002 that focus on building early academic skills, observing that ‘on the first day of school, children need to know letters and numbers. They need a strong vocabulary. These are the building blocks of learning, and this nation must provide them.’ ”

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“Attitudes to Mathematics in Primary School Children” – *Child Development Research Journal* - 2012

<http://www.hindawi.com/journals/cdr/2012/124939/>

“Young children show little relationship between mathematics anxiety and mathematical performance, but they do show a relationship between self-rating and mathematical performance, which seems to develop during the later primary years...It is thus arguable that self-rating, rather than mathematics anxiety, is the key factor in the primary school age group, and that perhaps researchers on younger children’s attitudes to mathematics should focus more on self-rating.”

(In other words, perceived math ability had a greater impact on math performance than math anxiety.)

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“Maths anxiety: the numbers are mounting” - *The Guardian* – April 30, 2012

<http://www.guardian.co.uk/education/2012/apr/30/maths-anxiety-school-support>

“Math anxiety, a feeling of fear about math, is believed to affect about a quarter of the population.”

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“The Neurodevelopmental Basis of Math Anxiety” – *Psychological Science* - March 20, 2012

http://mathbrain.stanford.edu/publications/Young_Neurodevelopmental_Basis_Math_Anxiety_12

“Math anxiety has a detrimental impact on an individual’s long-term professional success, but its neurodevelopmental origins are unknown. In a functional MRI study on 7- to 9-year-old children, we showed that math anxiety was associated with hyperactivity in right amygdala regions that are important for processing negative emotions. In addition, we found that math anxiety was associated with reduced activity in posterior parietal and dorsolateral prefrontal cortex regions involved in mathematical reasoning.”

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“Tomorrow's Science, Technology, Engineering and Math Workforce Starts with Early Education” – *Ready Nation* Newsletter – 2013

http://www.readynation.org/uploads//20130318_ReadyNationSTEMBrieflowreswithendnotes.pdf

“A 2012 Canadian study found that ‘[K]indergarten skills in math significantly predicted second grade math, reading, and general achievement.’

“According to Prof. Greg Duncan at the University of California, Irvine, ‘Early math concepts, such as knowledge of numbers and ordinary [sequences like 1, 2, 3], were the most powerful predictors of later learning’ and ‘school-entry reading and math skills are almost always statistically significant predictors of later reading and math achievement... [and] rudimentary math skills appear to matter the most.’

“Children with ‘persistent’ problems in math at ages 6, 8 and 10 were 13 percent less likely to graduate high school and 29 percent less likely to attend college.

“An article in *Science* concludes, ‘Preschool children’s knowledge of mathematics predicts their later school success into elementary and even high school. Further, it predicts later reading achievement even better than early reading skills.’”