



**November 2012:  
Math Learning in Early Childhood**

**News**

[Advisory Committee on Head Start Research and Evaluation Final Report](#)

This month, the Advisory Committee on Head Start Research and Evaluation released their Final Report on the Head Start Impact Study and other effectiveness studies of Head Start and Early Head Start. Overall this independent committee wrote that, “The appropriate interpretation of the studies’ findings in context is that Head Start and EHS are improving family well-being and improving school readiness of children at or below the poverty line in the U.S. today.” The report goes on to describe how research findings also suggest ways Head Start and Early Head Start can continue to improve and makes major recommendations to OHS about improving the use of data for school readiness; implementing evidence-based practices; and working toward continuity of services from prenatal care to age 8. Click to read coverage from the [Huffington Post](#) or to see the [full report](#). Note that these were comments on Impact Study results after 1st Grade, which were released in 2010, and not the 3rd Grade results about to be released soon.

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**Survey**

[Survey to Collect Nominations for the Home Visiting Research Agenda](#)

The Affordable Care Act (ACA) dedicated \$1.5 billion to home visiting for expectant families and families with young children. As part of the ACA, the Home Visiting Research Network (HVRN) was established in July 2012 and is responsible for setting a national agenda for home visiting research. The agenda will identify key priorities for research activities, funding, and training over the next ten years. To create that agenda, the HVRN team at Johns Hopkins is surveying home visiting stakeholders (including practitioners, parents, and advocates) to identify key research priorities. If you work in home visiting or want to help inform this research agenda, [take the survey today!](#) (In the coming months, NHSA will be establishing a learning group around home visiting! If you're interested in learning more, stay tuned or email Emmalie Dropkin at [edropkin@nhsa.org](mailto:edropkin@nhsa.org).)

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## Resources

### [“Do you really need to do it that early?”](#)

Douglas Clements, professor at the University of Buffalo and a well-known scholar of early learning and mathematics, explains in this three-minute video just how much young children are using math all the time and what parents and teachers can do to support early math development. As he says, “Play and mathematics are not on opposite sides of the stage. They can be combined to the benefit of children everywhere.”

### [Subitizing: What is it? Why Teach it?](#)

*by Douglas Clements for the National Council of Teachers of Mathematics, Inc.*

Subitizing is a complicated word that describes something adults don’t even have to think about: looking at a small group of objects and knowing how many there are. It’s one of two ways the brain processes numbers - the other involves estimating sizes for larger groups of objects. In this article, Dr. Clements explains how subitizing is related to early counting and offers suggested activities to support young children’s skills.

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## Research Studies

### [Early Math Matters: Kindergarten Number Competence and Later Mathematics Outcomes](#)

*by Nancy Jordan, David Kaplan, Chaitanya Ramineni and Maria Locuniak for Developmental Psychology*

Number competencies, the understanding of numbers and number relationships, are believed to develop during early childhood and underly later mathematical learning and academic success. In this study, the authors examined whether number competence in kindergarten predicts math performance in first grade and rate of learning between first and third grades and whether rate of growth in early childhood predicts later achievement. A cohort of kindergarteners were assessed for number competencies several times over the course of kindergarten and first grade, then again during second and third grades.

Early number competence and math learning were found to predict later achievement and rates of learning; the most significant finding was that higher kindergarten number competence predicted math achievement at the end of third grade. In particular, success on story problems that required children to reason rather than simply repeat basic facts was an indicator of later success.

With regards to Head Start, the study found that low-income children tended to have slower rates of math learning and poorer outcomes in third grade, likely because of weaker number competencies in kindergarten. The authors emphasize that these findings demonstrate that math should have a key role in early intervention programs.

### [Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten](#)

*by Clancy Blair and Rachel Peters Razza for Child Development*

Beginning in early childhood, children develop the abilities to direct their attention, conceive of other's thoughts as true or false, ignore distractions and shift their attention. In child development terms, these abilities are terms effortful control, false belief understanding, inhibitory control and attention-shifting - all of which fall under the umbrella title of executive function. In this study, the authors relate each of these functions to math and literacy ability in kindergarten based on assessment of 170 Head Start children in rural and suburban settings.

The authors found that each executive function contributed separately to children's math and reading ability. Inhibitory control in particular was found to contribute to all measured areas of academic ability and may be a central feature of early childhood development, representing an important area of brain development during this period. Executive function may be tied to math learning because they involve similar areas of the brain, and because math tasks require children to be able to narrow their focus to the activity at hand. The effect on math may also arise from improved school behaviors enabling children's academic success.

Regardless, these findings underscore that curricula that are proven to support development of executive function may also contribute to math and reading outcomes and that policies focused on school readiness should incorporate the need for fostering self-regulation and executive function alongside narrower academic outcomes.

### [Construction and Evaluation of a Number Sense Test with Head Start Children](#)

*by Elena Malofeeva, Jeanne Day, Ximena Saco, Laura Young & Dennis Ciancio for the Journal of Educational Psychology*

Number Sense in young children has many definitions, but the authors choose to think of it as "an understanding of what numbers mean and of numerical relationships" - essentially the same idea as Number Competencies in the first article above. In this study the authors asked whether number sense could be measured reliably in young children and enhanced through intervention. To answer these questions, the authors created an assessment of number sense, used it with Head Start children, and implemented an intervention with a subset of the children to demonstrate how the assessment reflected children's learning on the skills targeted by the intervention. In addition,

they measured how children's math skills related to their self-perception and attitudes toward school both before and after intervention.

The assessment was shown to be reliable for children attending Head Start, though it has not yet been normed for wider demographics. The intervention in question - six sessions over three weeks - was shown to increase children's performance a third of a standard deviation in the areas of math targeted. Both the assessment and intervention are described in detail in the study; follow the link above for details. The authors also found indications that early intervention may also benefit children's sense of confidence about their skills. Overall, this work supports the growing theme in Head Start that high quality instruction teaches the necessary skills to help children be ready for school.

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### **Discussion Questions**

1. After watching the video from Dr. Clements, do you think any differently about the math you see in your children's play? How could you introduce additional math into their play?
2. The Jordan et al. article suggests that children who understand numbers well enough to reason out story problems in kindergarten do better in later math learning. Does your math instruction use story problems? What are the most effective strategies you've found for teaching math?
3. What does the Blair and Razza article mean for math instruction? What activities in your program support executive functions? (See NHSA's [September Research Blast](#) for more on EF!)