

# Program to overcome early US Math deficiencies could improve workforce

January 30 2013

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One in five adults in the United States lacks the math competency expected of an eighth grader, according to the United States Center for Educational Statistics. University of Missouri researchers identified how a lack of a specific math skill in first grade correlated to lower scores on a seventh grade math test used to determine employability and wages in adults. Intervention programs designed to overcome this early math deficiency could prepare students for later employment, help them make wiser economic choices and improve the future U.S. workforce.

"Our study made a connection between [child psychology](#) and [labor economics](#) in order to examine the roots of America's shortage of mathematically proficient workers," said lead author David Geary, professor of [psychological sciences](#) at University of Missouri. "We isolated a specific skill that has real world importance in employability and observed how that skill related to grade-school mathematical performance. By identifying a specific numerical skill as a target, we can focus education efforts on helping deficient students as early as kindergarten and thereby give them a better chance at career success in adulthood."

The particular [math](#) skill Geary identified, "number system knowledge," is the ability to conceptualize a numeral as a symbol for a quantity and understand [systematic relationships](#) between numbers. In Geary's research, having this knowledge at the beginning of first grade predicted better functional mathematical ability in adolescence. On the other hand, skill at [solving math problems](#) by counting didn't correlate to later

ability. Students who started behind in counting ability were able to catch up, whereas students who were behind in number system knowledge stayed behind their peers.

"An early deficit in number system knowledge creates a weak foundation for later learning," said Geary. "That weak foundation can lead to a lifetime of problems, not limited to reduced employment opportunities. Poor understanding of mathematical concepts can make a person easy prey for predatory lenders. Numerical literacy, or numeracy, also helps with saving for big purchases and managing mortgages and credit card debt."

Geary's study involved 180 13-year-olds who had been assessed every year since kindergarten for intelligence, memory, mathematical cognition, attention span and achievement. All of these factors were controlled for in the analysis of scores on the employability tests administered in seventh grade. Demographic differences also were accounted for along with other factors.

**More information:** The study, "Adolescents' Functional Numeracy is Predicted by Their School Entry Number System Knowledge," was published in the journal *PLOS ONE*.

Provided by University of Missouri-Columbia

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