

PRE-ELEMENTARY EDUCATION LONGITUDINAL STUDY  
**PEELS PROGRESS**

*Notes*

NCSEER 2010-3003

**FINDINGS**

*Math performance for preschoolers with disabilities on the Woodcock-Johnson III Applied Problems subtest and Quantitative Concepts subtest improved significantly from 2003–04 to 2004–05.*

*Improvement in scores on Applied Problems was evident for males but not females.*

*Significant increases in scores on Applied Problems were found for children identified as having a developmental delay, learning disability, or speech or language impairment.*

*Preschoolers with Disabilities:  
Early Math Performance*

The Pre-Elementary Education Longitudinal Study (PEELS) has been examining the preschool and early elementary school experiences of 3-, 4-, and 5-year-old children with disabilities. The study followed a nationally representative sample of more than 3,000 children who received preschool special education services until 2009, when they were ages 8 through 10.

Research on acquisition of number skills among children with disabilities has been relatively rare (Bashash, Outhred, & Bochner 2003), but some research suggests that many 5- to 7-year-old children with disabilities have deficits in their early mathematical abilities (VanLuit & Schopman 2000). This *PEELS Progress Notes* presents emerging findings related to early math performance. The findings in this document are highlights from Carlson et al. (2008).

**Data Sources**

Data in this document were obtained from three sources:

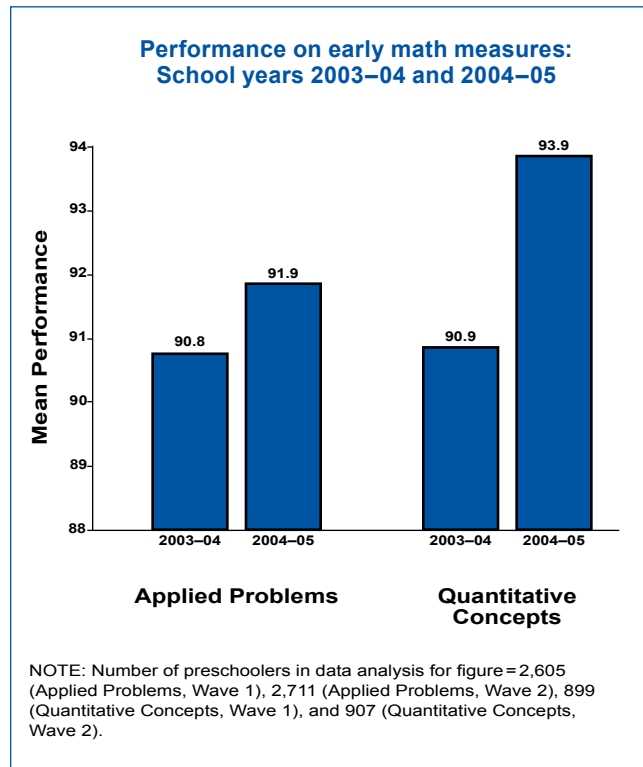
- **PEELS Wave 1 parent interviews.** A parent/guardian of each child in the sample was asked to complete a 1-hour computer-assisted telephone interview about his/her child's health and disability, behavior, school programs and services, special education and related services, child care, and out-of-school activities. Respondents also were asked a series of questions about their household, its resources, and their family background. The response rate for the 2003–04 parent interview was 96 percent.
- **PEELS Wave 1 teacher questionnaire.** Researchers used either the *Early Childhood Teacher Questionnaire* or *Kindergarten Teacher Questionnaire* to ask teachers about each child's experiences in the class or program. Questionnaire items addressed classroom staffing and materials, children's interactions with nondisabled peers, and children's transitions in and out of their current programs. They also included items about each child's primary disability. In 2003–04, the response rate was 79 percent.
- **Woodcock-Johnson III Applied Problems and Quantitative Concepts subtests** (Woodcock, McGrew, & Mather 2001). The Applied Problems test is a measure of children's ability to analyze and solve practical math problems using simple counting, addition, or subtraction operations. The Quantitative Concepts test measures basic mathematical concepts, symbols, and vocabulary. On the Quantitative Concepts subtest, only children in the oldest third of the sample had scores available for both years and, as a result, only their data are reported. Both subtests are norm-referenced tests with a mean of

100 and a standard deviation of 15. The response rates for the child assessment were 96 percent in 2003–04 and 94 percent in 2004–05.

*Note:* Data collection instruments can be found at [www.peels.org](http://www.peels.org).

### Early Math Scores Improved

Overall performance on the early math measures improved significantly for PEELS children. In 2003–04, the mean overall performance of young children who received preschool special education services was 90.8 (S.E. = 0.7)<sup>1</sup> on the Applied Problems subtest. In 2004–05, the mean overall performance was 91.9 (S.E. = 0.7), which was a statistically significant increase. The increase from 2003–04 to 2004–05 was evident only for males—90.2 (S.E. = 0.8) in 2003–04 and 91.8 (S.E. = 0.7) in 2004–05. Females had the same mean performance of 92.2 in both 2003–04 (S.E. = 1.1) and 2004–05 (S.E. = 1.2).<sup>2</sup>



Changes in mean performance on the Applied Problems test varied by disability category. In 2003–04, children identified as having a developmental delay had a mean performance of 83.7 (S.E. = 1.2), which increased significantly to 86.0 (S.E. = 0.9) in 2004–05. Similarly, the mean performance of children identified as having a learning disability (M = 85.3, S.E. = 2.0 in 2003–04 and 91.1, S.E. = 2.5 in 2004–05) or speech or language impairment (M = 96.1, S.E. = 0.8 in 2003–04 and 97.8, S.E. = 0.6 in 2004–05) also increased significantly.<sup>3</sup>

Children in the oldest third of the PEELS sample had 2 years of data available on the Quantitative Concepts subtest, and they had a statistically significant increase in performance, from 90.9 (S.E. = 0.8) in 2003–04 to 93.9 (S.E. = 0.9) in 2004–05.<sup>4</sup>

### References Cited in This Report

Bashash, L., Outhred, L., & Bochner, S. (2003). Counting skills and number concepts of students with moderate intellectual disabilities. *International Journal of Disability, Development and Education*, 50(3), 325–345.

Carlson, E., Daley, T., Bitterman, A., Riley, J., Keller, B., Jenkins, F., & Markowitz, J. (2008). *Changes in the characteristics, services, and performance of preschoolers with disabilities from 2003–04 to 2004–05, Wave 2 overview report from the Pre-Elementary Education Longitudinal Study*. Rockville, MD: Westat. Available at [www.peels.org](http://www.peels.org).

Van Luit, J. E. H., & Schopman, E. A. M. (2000). Improving early numeracy of young children with special education needs. *Remedial and Special Education*, 21(1), 27–40.

Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock-Johnson III Tests of Achievement*. Itasca, IL: Riverside Publishing.

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<sup>1</sup> S.E. = standard error.

<sup>2</sup> *t*-tests for dependent samples were performed to examine statistically significant differences over time within subgroups at *p* < .05.

<sup>3</sup> M = mean.

<sup>4</sup> Analyses by disability and gender were not conducted for the Quantitative Concepts subtest because the restricted age range limited the sample size.