

Three-Year Longitudinal Study Shows Impressive Gains for 1,800 Superkids Students

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Neshaminy School District, in Langhorne, Pennsylvania, near Philadelphia, began using Superkids with about 1,800 students in kindergarten through second grade in the 2009–10 school year. Dr. Jerome D'Agostino, professor in the School of Educational Policy and Leadership at Ohio State University, analyzed the district's 2007–12 DIBELS data to measure the impact. At the end of the 2011–12 school year, DIBELS data were available from the first cohort of students who were taught with Superkids from kindergarten through second grade, 2009–12. For the first time, it was possible to measure the full three-year impact of the Superkids program.

Dr. D'Agostino found that the percentage of students meeting benchmark on the DIBELS second-grade Oral Reading Fluency measure increased from 63% before Superkids was implemented to 78% after three years of Superkids. Nearly 100 more children out of 610 reached the proficient level of reading fluency. During the same period, the percentage of students performing below benchmark declined from 37% to 22%. The longer students were taught with Superkids, the higher their Oral Reading Fluency scores. First-grade students who had Superkids in kindergarten performed better on DIBELS Nonsense Word Fluency than students who did not have Superkids in kindergarten. Overall, students who were taught with Superkids all three years (K–2) acquired skills at a rate five times greater than students who did not have Superkids.

To determine if these findings could be attributed to Superkids, Dr. D'Agostino conducted a quasi-experimental longitudinal study that employed an analytical method called hierarchical linear modeling. In addition to finding that groups with more Superkids instruction experienced greater growth on DIBELS than groups with less Superkids instruction, this analysis found that the gains were attributable neither to initial differences in student ability nor to

teachers' experience teaching the program over time. The most apparent explanation for the statistically significant improvement was the Superkids program.

The Superkids Reading Program

The Superkids Reading Program is a phonics-based core curriculum created just for kindergarten through second grade, when the skills of learning how to read and write must be mastered. Superkids incorporates the major areas of instruction that are critical to teaching children how to read—phonemic awareness, phonics, fluency, vocabulary, and comprehension. In addition, the program supports best instructional practices by integrating thorough, systematic reading instruction with instruction in the other language arts: spelling, handwriting, expressive writing, grammar, and mechanics. The systematic, explicit phonics instruction at the heart of the program teaches children to decode words with continuous practice until they reach automaticity and fluency. Because the text is phonetically controlled in kindergarten and first

DIBELS: What Do the Results Mean?

In a recent study, researchers found that measures of oral reading fluency such as DIBELS are highly correlated with reading comprehension. The Florida Center for Reading Research found that the first- and second-grade DIBELS Oral Reading Fluency measures are good predictors of third-grade reading comprehension.* In other words, if student scores on DIBELS Oral Reading Fluency improve, it is highly likely their comprehension is also improving.

*Kim, Y.-S., Petscher, Y., Schatschneider, C., & Foorman, B. (2010). Does growth rate in oral reading fluency matter in predicting reading comprehension achievement? *Journal of Educational Psychology*, 102, 652–667.

grade, almost all words children encounter contain sound-symbols that have been explicitly taught. As children experience the success of decoding phonetically controlled texts, their confidence grows, and they are motivated to read more complex and challenging material. By the time children reach second grade, they have acquired all the tools they need to read all forms of text accurately, fluently, and with understanding.

Measurement and Sample

Neshaminy uses Dynamic Indicators of Basic Early Literacy Skills (DIBELS) to identify students who need intervention and to track progress in reading instruction and learning over time. The district administers DIBELS at the beginning, middle, and end of each school year to all students in kindergarten through second grade. DIBELS are measures for assessing the acquisition of early literacy skills from kindergarten through sixth grade. They are short (one-minute) fluency tests used to regularly monitor the development of early literacy and early reading skills. Studies have shown that DIBELS measures correlate highly with other measures of reading achievement and are predictive of performance on the high-stakes assessments of

several states, including Colorado, Florida, Ohio, and Pennsylvania.¹ Improved performance over time on DIBELS is therefore a strong indicator that reading instruction and learning are improving.

In June 2012, Neshaminy provided five years of DIBELS data (2007–08 through 2011–12) to Dr. D’Agostino. Table 1 describes the complete set of data that was received.

Each cohort described in Table 1 had between 500 and 600 students in any given year. Neshaminy has a low mobility rate, so a sizable majority of students within each cohort remained in the system from kindergarten through second grade. This means that for most students in cohorts 2–4, there were data for nine successive testing periods. Ultimately, Dr. D’Agostino was able to include 14,006 total test points, making this a large and robust longitudinal study. Such a large study over three years is rare among early reading programs.

Research Questions

Dr. D’Agostino sought to answer four questions:

1. Did the percentage of students meeting the DIBELS benchmarks improve as students had more years of instruction with Superkids?

Table 1

Student Cohort	Year Started Kindergarten	DIBELS Testing Periods								
		Kindergarten			First Grade			Second Grade		
		Beg	Mid	End	Beg	Mid	End	Beg	Mid	End
1	2006–07							X	X	X
2	2007–08	X	X	X	X	X	X	X	X	X
3	2008–09	X	X	X	X	X	X	X	X	X
4	2009–10	X	X	X	X	X	X	X	X	X
5	2010–11	X	X	X	X	X	X			

“X” indicates testing periods for which DIBELS data were available.

Green shading indicates testing periods when students had Superkids instruction.

¹ Dynamic Measurement Group (2008). *DIBELS 6th Edition Technical Adequacy Information* (Tech. Rep. No. 6). Eugene, OR: Author. Retrieved from <http://dibels.org/pubs.html>.

2. Did cohorts of children with more years of Superkids instruction demonstrate more improvement on DIBELS reading measures from test period to test period in kindergarten through second grade than students with fewer years of Superkids instruction?
3. Did students across all cohorts have greater growth on DIBELS reading measures during periods in which they received Superkids versus when they did not?
4. Were any differences in improvement rates between cohorts attributable to the fact that teachers became more experienced with the program year after year?

Methods and Results

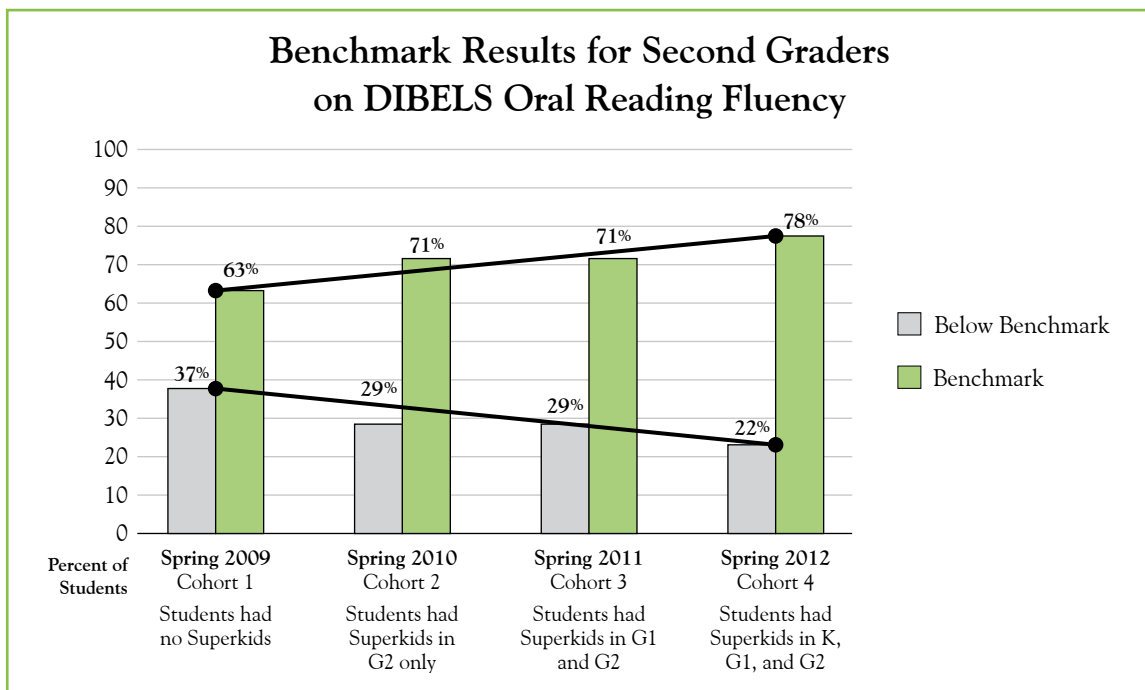
Benchmark Analysis

To answer research question 1, Dr. D’Agostino calculated the percentages of students in cohorts 1–4 who were above and below benchmark on the spring DIBELS Oral Reading Fluency measure (see Table 1 for descriptions of the student cohorts). Cohort 1 comprised students who had no Superkids instruction, whereas cohort 4 included students who had three years of Superkids instruction. Cohorts 2 and 3 fell between the other two cohorts in terms of years of Superkids instruction.

Dr. D’Agostino found that the percentage of students at or above benchmark on DIBELS Oral Reading Fluency increased from 63% in 2009 (cohort 1) to 78% in 2012 (cohort 4). The intervening years also exceeded the 2009 level, meaning that second graders who had Superkids instruction for all three years (K–2) performed better than those with less Superkids instruction. At the same time, the percentage of students scoring below benchmark went down, meaning that fewer students needed reading intervention.

Dr. D’Agostino also analyzed the performance of first graders on Nonsense Word Fluency, a measure of decoding ability. He calculated the percentages of students in cohorts 2–5 who were above and below benchmark on the spring benchmark for that test. cohorts 2 and 3 comprised students who did not have Superkids instruction in kindergarten, whereas cohorts 4 and 5 included students who did have Superkids instruction in kindergarten.

Dr. D’Agostino found that the percentages of students at or above benchmark on DIBELS Nonsense Word Fluency for cohorts 2 and 3 were 71% and 70%, respectively, and for cohorts 4 and 5 were 82% and 83%, respectively. In other words, having Superkids in kindergarten appears to make students better decoders in first grade.



It was important to examine whether the performance of these students differed at the beginning of their kindergarten years. If so, then the differences at the end of second grade might be explained by differences that existed before Superkids was implemented. Dr. D'Agostino found that on DIBELS Initial Sound Fluency and Letter Naming Fluency, there were no statistically significant differences between the cohorts in the percentages of students meeting the kindergarten benchmark goals.

Hierarchical Linear Modeling (HLM) Analysis

To understand whether the improvements were attributable to Superkids, and to make use of the large amount of longitudinal data available, Dr. D'Agostino undertook additional analysis using a quasi-experimental, longitudinal growth-curve design. This design provides stronger impact than the above analysis because it uses all available data rather than just the spring scores. It can therefore measure learning over the entire duration of the study.

Because DIBELS measurements differ at each testing period across grades, Dr. D'Agostino used item-response theory methods to link the various DIBELS tests to create one overall DIBELS scale. The resulting vertical growth scale scores were used to develop individual student growth trajectories over multiple grade levels. Using hierarchical linear modeling (HLM), Dr. D'Agostino aggregated the growth trajectories to the cohort level to examine whether groups of students who had Superkids in various grades had significantly greater average growth rates.

Dr. D'Agostino conducted three analyses using HLM methods. In the first, which addressed research question 2, he found that groups of students with more Superkids instruction had significantly higher growth rates than groups with less Superkids instruction. The biggest difference was between cohort 4 and cohort 2, with an effect size of .24.² In the

² Effect size is a way of quantifying the difference between two groups in terms of standard deviation. An effect size of .24 for a whole-district implementation of a reading program is considered by many researchers to be moderately large.

³ This does not mean they scored five times higher on DIBELS, but rather that the incremental improvement on DIBELS scores from one period to the next was, on average, five times greater.

second, which addressed research question 3, he separated the data into two groups, one that included all testing periods when students had Superkids instruction, and the other that included all testing periods when students did not have Superkids instruction, regardless of cohort or grade. He found that the group with Superkids instruction experienced a growth rate five times greater than the group without Superkids.³ In his third analysis, which addressed research question 4, he compared two cohorts (4 and 5) that had the same amount of K-1 Superkids instruction but whose teachers had different amounts of experience with the program. The two groups of students had the same growth rates, so he concluded that differences in teacher experience with the program do not explain the differences found in his earlier analysis. This in turn strengthens the case that the cause of the improved growth was the Superkids program itself.

Conclusion

This study showed that students in Neshaminy School District who had more Superkids instruction perform better on DIBELS measures than students who had less Superkids instruction. Performing better on DIBELS measures, in particular Nonsense Word Fluency and Oral Reading Fluency, indicates that students were better decoders and had stronger fluency. This is an expected outcome, because the Superkids program helps children build the neural connections that are necessary for automatic word recognition and fluent reading. When words are recognized quickly and effortlessly, the brain is freed to devote more energy to the meaning of the written words. It is therefore highly likely that children in Neshaminy also comprehend what they read better.

This is one of the largest longitudinal studies conducted of an early reading program. Its findings show that Superkids had a major positive impact on reading instruction and learning in the Neshaminy School District.



For more information about this and other research about the Superkids program, contact **Steve Tardrew**, vice president of research, at 608-729-2815 or steve.tardrew@rowlandreading.org.