Improved Academic Achievement by Students in the St. Charles Parish Public Schools who used Fast ForWord® Products and Reading Assistant™ Software: 2010 - 2012

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord and Reading Assistant products on the academic achievement of elementary and middle school students who used the products within the curriculum in a school setting.

Results: After the elementary school started using the Fast ForWord and Reading Assistant products with their struggling students, the number of 3rd and 4th graders earning passing scores on the state assessment increased from 58% to 72% for 3rd graders and from 61% to 80% for 4th graders. At the middle school, following a class-wide implementation with 6th graders, the students who used the products showed significantly greater growth across all three subtests (Language, Math, and Reading), than 6th graders in prior years. On average, after using the products, the 6th graders' Language scores increased from the 52nd to the 56th percentile, their Reading scores improved from the 43rd to the 49th percentile, and their Math scores improved from the 37th to the 41st percentile.

Study Design & Participants: The design of this study was a multi-school quasi-experimental study using high stakes and nationally-normed assessments. The academic performance of students in the experimental group (scores from the years the products were used) was compared to that of students in the control group (scores from the years the products were not used). Study participants were elementary and middle school students in the St. Charles Parish Public Schools of Luling, Louisiana.

Materials & Implementation: Following staff training on the Fast ForWord and Reading Assistant products, students started using the products during the 2010-2011 school year. The students had their academic achievement evaluated each spring with the Louisiana Educational Assessment Program (LEAP), integrated Louisiana Educational Assessment Program (iLEAP) and/or Reading Progress Indicator (RPI).

Keywords: Louisiana, elementary school, middle school, suburban district, quasi-experimental study, Fast ForWord Language Series, Fast ForWord Literacy Series, Fast ForWord Reading Readiness, Fast ForWord Reading Levels 1-5, Scientific Learning Reading Assistant Expanded Edition, Louisiana Educational Assessment Program (LEAP), integrated Louisiana Educational Assessment Program (iLEAP)and/or Reading Progress Indicator).

INTRODUCTION

Numerous research studies have shown that cognitive and oral language skills are under-developed in struggling readers, limiting their academic progress (Lyon, 1996). University-based research studies reported the development of a computer software product that focused on learning and cognitive skills, and provided an optimal learning environment for building the memory, attention, processing and sequencing skills critical for reading success (Merzenich et al., 1996; Tallal et al., 1996). This prototype of the Fast ForWord Language software showed that an optimal learning environment and focus on early reading and cognitive skills resulted in dramatic improvements in the auditory

processing and language skills of school children who had specific language impairments (Merzenich et al, 1996; Tallal et al., 1996) or were experiencing academic reading failure (Miller et al., 1999).

Further research has demonstrated that the use of an optimal learning environment with a focus on reading and cognitive skills not only benefits the auditory processing and language skills of school children who have specific language impairments, but can benefit the reading achievement of a wide range of students.

The St. Charles Parish Public Schools were interested in evaluating the effectiveness of an optimal learning environment with a focus on early reading and cognitive skills as a way to improve the academic achievement of their students. In this study, commercially available computer-based products (Fast ForWord Language Series, Fast ForWord Literacy Series, Fast ForWord Reading Readiness, Fast ForWord Reading Levels 1-5, and Scientific Learning Reading Assistant Expanded Edition) were used to evaluate the effectiveness of this approach for improving the academic achievement of elementary and middle school students[1].

METHODS

Participants

The St. Charles Parish Public Schools serve nearly 10,000 students. Approximately 59% of the students in the district are Caucasian, 36% are African American, and 4% are Hispanic; 48% of the students are eligible for free or reduced-price lunches, 10% receive services for Special Education and fewer than 1% of the students are English language learners.

During the 2010-2011 and 2011-2012 school years, two schools, Luling Elementary School and R.K. Smith Middle School, chose to use Scientific Learning products and participate in the study reported here. Luling is a Title I school with a targeted assistance approach. At Luling, 81% of the students are eligible for free or reduced-price lunches; at R.K. Smith, 73% of the students are eligible.

At the elementary school, the products were used with the lowest 20% of the students. At the middle school, a classwide approach was taken with all 6th graders using the products.

Implementation

Educators were trained in current and established neuroscience findings on how phonemic awareness and the acoustic properties of speech impact rapid development of language and reading skills; the importance of guided oral reading practice for building reading fluency; the scientific background validating the efficacy of the products; methods for assessment of potential candidates for participation; the selection of appropriate measures for testing and evaluation; effective implementation techniques; approaches for using the online reporting tools, Scientific Learning Progress Tracker and MySciLEARN™, to monitor student performance; and techniques for measuring the gains students have achieved after Fast ForWord and Reading Assistant participation.

Materials

The Fast ForWord products are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. Each product includes several exercises designed to build cognitive skills critical for all learning, such as attention and memory. These exercises simultaneously develop academic skills critical for reading, such as English language conventions, phonemic awareness, vocabulary, and comprehension.

Reading Assistant is a computer-based tutor for guided oral reading. Combining advanced speech recognition technology with research-based interventions, Reading Assistant helps elementary and secondary students strengthen their reading fluency, vocabulary and comprehension.

Some of the primary skills developed by these products are outlined in Table 1. More detailed descriptions of the exercises and learning modes within each product can be found online at http://www.scientificlearning.com/exercises.

[1] Products used by fewer than five students are not included.

Primary Skills / Product Name	Listening Accuracy & Auditory Sequencing	Auditory Word Recognition	English Language Conventions	Following Directions	Listening Comprehension	Phonological Skills / Phonemic Awareness	Phonics / Word Analysis	Fluency	Vocabulary	Reading Comprehension
Fast ForWord Language Basics	●									
Fast ForWord Language v2	●	●	●	●		●			●	
Fast ForWord Language to Reading v2	●		●	●	●	●	●		●	
Fast ForWord Literacy	●	●	●	●	●	●			●	
Fast ForWord Literacy Advanced	●		●	●	●	●	●		●	
Fast ForWord Reading Readiness				●		●	●			
Fast ForWord Reading Level 1					●	●	●	●	●	●
Fast ForWord Reading Level 2					●	●	●	●	●	●
Fast ForWord Reading Level 3						●	●	●	●	●
Fast ForWord Reading Level 4						●	●	●	●	●
Fast ForWord Reading Level 5						●	●	●	●	●
Reading Assistant								●	●	●

Table 1: The Fast ForWord and Reading Assistant products work on numerous cognitive and early reading skills. The primary skills focused on by each product are noted in the table.

Assessments

Before and after Fast ForWord and Reading Assistant participation, student academic achievement was assessed with a variety of tests including Louisiana's annual tests (LEAP or iLEAP) and/or Reading Progress Indicator (RPI).

Louisiana Educational Assessment Program (LEAP): LEAP 21 is part of Louisiana's criterion referenced state testing program. The LEAP is administered to students in grades 4 and 8 and measures how well a student has mastered the state content standards. Students receive a scaled score and one of five achievement ratings ranging from Unsatisfactory to Advanced. An achievement rating of 3 (Basic) or above is considered passing.

integrated Louisiana Educational Assessment Program (iLEAP): iLEAP is part of Louisiana's criterion referenced state testing program. The iLEAP is administered to students in grades 3, 5, 6, and 7 and has both a norm-referenced component and a criterion referenced component. Students receive two scores: one indicates the student's performance relative to the Louisiana state standards while the other indicates the student's performance relative to national norms.

Reading Progress Indicator (RPI): Reading Progress Indicator is a computerized assessment designed to rapidly measure the impact of the Fast ForWord products. It assesses a student's early reading skills including phonemic awareness, decoding, vocabulary, and comprehension.

Analysis

Scores were reported in terms of scaled scores and achievement levels for the LEAP and iLEAP. The iLEAP results were also reported in terms of normal curve equivalents. Data were provided for the three years immediately before the schools used the Fast ForWord and Reading Assistant products, and the two years after initial use. For the elementary school (3^{rd} – 5^{th} grade) achievement level data was collapsed across the three years before product use, and the two years after product use. Chi-Square analyses were used to compare the number of students with passing scores ("Basic" or above) in the two groups (group 1: all students in the three years before product use; group 2: all students in the two years with product use by the lowest 20%). For the middle school, where the products were implemented class-wide with sixth graders, one group included all sixth graders from the three years prior to product use, while the other group included all sixth graders from the two years with product use. iLeap scores were analyzed using a repeated measures general linear model, analyzing whether there was an effect of test and/or time. This analysis used students' normal curve equivalent scores from the end of fifth grade and the end of sixth grade across the three tests (Reading, Language, and Math).

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Reading Progress Indicator scores were reported in terms of normal curve equivalents, scaled scores, grade equivalent scores, and percentile scores. Scaled scores and normal curve equivalents were used to analyze Reading Progress Indicator scores, but were converted to grade-equivalent reading levels and percentiles for reporting purposes.

All analyses used a p-value of less than 0.05 as the criterion for identifying statistical significance.

RESULTS

Participation Level

Research conducted by Scientific Learning shows a relationship between product use and the benefits of the product. Product use is composed of content completed, days of use, and adherence to the chosen protocol (participation and attendance levels). During the 2010-2012 school years, the St. Charles Parish Public Schools chose to use the 40- and 90-Minute protocols at the elementary school and 50- and 90-Minute protocols at the middle school. These protocols call for students to use the product for 40-, 50-, or 90-minute a day, five days per week for four to thirteen weeks. The schools chose to modify the recommended product use. The elementary school used the Fast ForWord products four days a week. After students completed the Fast ForWord Language Series, they used the Fast ForWord products two days a week and Reading Assistant two days a week. The middle school used the Fast ForWord products for the full class period three days a week. The other two days students used Reading Assistant followed by 14 minutes of Fast ForWord product use. At both schools, students started each product using the 40- or 50-Minute protocols. After most of the exercises were complete, students switched to the 90-Minute protocol and focused on the remaining one or two exercises. Most students completed multiple products; 81% completed at least one product, 59% completed two or more. Average product use is shown in Table 2.

2010–2012 Fast ForWord Product Use						
	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Participation Level	Attendance Level
Fast ForWord Language Basics	221	14	28	99 %	97 %	76 %
Fast ForWord Language v2	387	55	139	80 %	82 %	71 %
Fast ForWord Language to Reading v2	266	55	170	75 %	79 %	67 %
Fast ForWord Literacy	375	33	77	90 %	88 %	79 %
Fast ForWord Literacy Advanced	324	43	105	84 %	84 %	78 %
Fast ForWord Reading Readiness	132	38	87	85 %	99 %	74 %
Fast ForWord Reading Level 1	149	29	101	88 %	80 %	58 %
Fast ForWord Reading Level 2	242	31	98	82 %	75 %	61 %
Fast ForWord Reading Level 3	249	39	105	80 %	82 %	72 %
Fast ForWord Reading Level 4	135	33	76	85 %	85 %	78 %
Fast ForWord Reading Level 5	74	46	100	48 %	85 %	77 %
Total	785	122	334	-	84 %	71 %

Table 2. Usage data showing the number of students who used the Fast ForWord products during the 2010 – 2012 school years, along with group averages for the number of days participated, the number of calendar days between start and finish, the percentage of product completed, the participation level, and the attendance level. Total values reflect the average total number of days that students used products. Note: Students often use multiple products.

2010-2012 Reading Assistant Product Use			
	N	Days	Calendar Days
Reading Assistant	241	29	204

Table 3. Usage data showing the number of students who used the Reading Assistant software, the average number of days each student used the software, and the number of calendar days across which students used the software.

Assessment Results

Louisiana Educational Assessment Program (LEAP): LEAP scores were available from five administrations: 2008 through 2012. These data provided scores from three administrations before the Fast ForWord products were used by the district and two administrations after the Fast ForWord products were used. Fourth grade English Language Arts (ELA)

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results from the three years prior to the use of the Fast ForWord products were collapsed providing results for 281 students; ELA results from the two years in which Fast ForWord products were used (by the bottom 20% of the class) provided data for 189 students. In order to pass, students must obtain a level of "Basic" or higher. Table 4 shows the percentage of students from each group who were at each achievement level; before the implementation of the products, 61% of the students were "Basic" or above, after implementation, 81% of the students were "Basic" or above. A Chi-Square analysis showed that there was a statistically significant difference between the number of students in each group that were at a "Basic" level or higher ($\chi 2$ (1) = 33.71; $p < .001$) indicating that significantly more students achieved passing scores after the school started using the Fast ForWord and Reading Assistant products.

	Before	After
Unsatisfactory	21%	5%
Approaching Basic	18%	14%
Basic	47%	58%
Mastery	11%	18%
Advanced	2%	4%

Table 4. During the 2010-2011 school year, Luling Elementary School began using the Fast ForWord and Reading Assistant products with the lowest 20% of their 4th graders. Across the following two years, 80% of Luling's 4th graders earned a passing score (Basic or above) on the LEAP ELA. Across the three prior years, only 61% of Luling's 4th graders earned a passing score.

A longitudinal plot (Figure 1) shows that the percentage of Luling Elementary students performing at "Basic" or above hovered in the low 60's until the struggling students started using the Fast ForWord and Reading Assistant products (during the 2010-2011 school year). The passing rate immediately increased to 78% and climbed higher the following year.

Integrated Louisiana Educational Assessment Program (iLEAP): Similar to the LEAP analysis, the iLEAP analyses investigated the percentage of students in 3rd and 5th grade who obtained an achievement level of "Basic" or higher during the three years before the Scientific Learning products were used by any students (n =293 for 3rd grade; n = 271 for 5th grade) and during the two years when the products were used by selected students (n = 175 for 3rd grade; n = 220 for 5th grade) (Table 4). Chi-Square analyses showed that, for third graders, there was a statistically significant difference between the number of students in each group that were at a "Basic" level or higher ($\chi 2$ (1) = 14.35; $p < .001$) with more students at "Basic" or above after the use of the Scientific Learning products; for fifth graders, there was not a significant difference between the two groups ($\chi 2$ (1) = 0.012; $p > .10$).

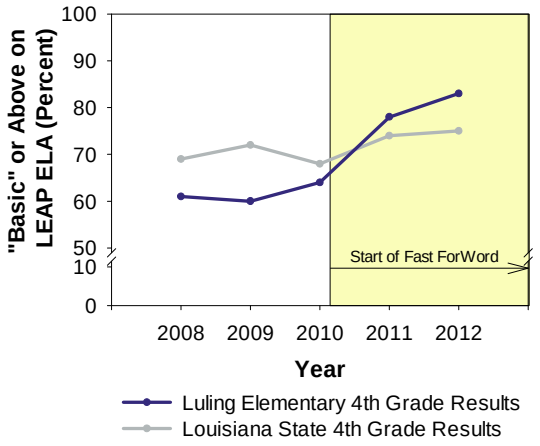

Figure 1. Luling Elementary School started using the Fast ForWord and Reading Assistant products with the lowest 20% of their students during the 2010-2011 school year (between the 2010 and 2011 administrations of the LEAP). In prior years, the passing rate of Luling's 4th graders fell below the state average, while after using the products Luling's passing rate exceeded the state average. (Passing is defined as earning a level of "Basic" or above.)

	3rd Grade		5th Grade	
	Before	After	Before	After
Unsatisfactory	13%	13%	16%	19%
Approaching Basic	29%	15%	29%	25%
Basic	39%	53%	46%	41%
Mastery	16%	14%	9%	14%
Advanced	3%	5%	0%	1%

Table 4. During the 2010-2011 school year, Luling Elementary School began using the Fast ForWord and Reading Assistant products with the lowest 20% of their students. Across the following two years, there was a significant increase ($p < 0.05$) in the number of 3rd graders who earned a passing score (Basic or above) on the iLEAP; the number of 5th graders earning a passing score remained stable.

In addition, since the entire 6th grade used the Fast ForWord and Reading Assistant products and the iLEAP, which has a normed component, is administered to students in 5th through 7th graders, the iLEAP analysis investigated the effect of the Fast ForWord products on the academic growth of 6th graders by looking at changes in their normal curve equivalent (NCE) scores. NCE scores are similar to percentiles in that if students improve as much as their academic peers, their NCEs should remain constant. Change scores were calculated for each 6th grader by subtracting the student's 5th grade score from their 6th grade score. Across the two years prior to the implementation of the Fast ForWord and Reading Assistant products (2008 to 2009 and 2009 to 2010), change scores were available for 161 students. Across the following two years (2010 to 2011 and 2011 to

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2012), change scores were available for 155 students. Three students who repeated 6th grade were not included in the analysis. Figure 2 shows average change scores for the two groups.

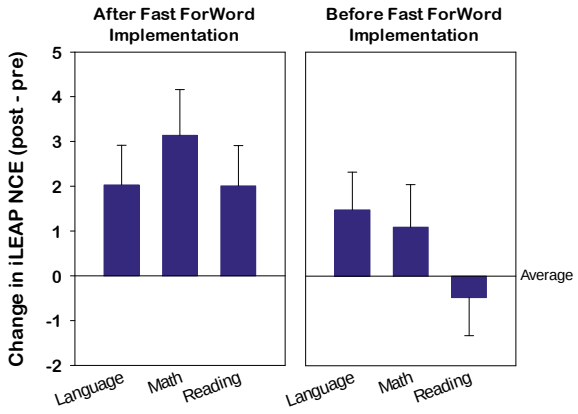

Figure 2. On all three tests, the improvement of the 6th graders after classwide implementation of Scientific Learning's products was greater than that of the 6th graders before product implementation. (Students who make average improvements relative to their academic peers will have no change in their NCE score.)

A repeated measures multivariate analysis of variance (MANOVA) was performed using the three iLEAP subtests (Reading, Language, and Math) and two time points (5th grade and 6th grade; table 5).

There was a main effect of test indicating that there was a statistically significant difference between the performance of the students on the various tests (students were the strongest on the Language subtest and the weakest on the Reading subtest). There was also a statistically significant Time by Group interaction indicating that the sixth graders who used the products showed greater improvement than the sixth graders who did not use the products.

	MANOVA	
	df	F
Time	(1, 311)	1.5
Time x Group	(1, 311)	4.5*
Test	(2, 310)	32.5*
Test x Group	(2, 310)	1.3
Time x Test	(2, 310)	1.6
Time x Test x Group	(2, 310)	0.7

Table 5. A MANOVA showed a main effect of Test with students earning the highest scores on the Language assessment and lowest scores on the Reading assessment. It also revealed a statistically significant Time by Group interaction, indicating that gains were significantly greater for one group. Across all three subtests, greater gains were made by the group of 6th graders from the years after the school started classwide implementation of the Fast ForWord and Reading Assistant products than by the group of 6th graders from prior years. p < 0.05*

Figure 3 shows the 2010, 2011, and 2012 iLEAP results for the 49 students who first used the products as 6th graders during the 2010-2011 school year. In all areas, the group's 2012 scores were greater than they had been in 2010, prior to the use of the Scientific Learning products.

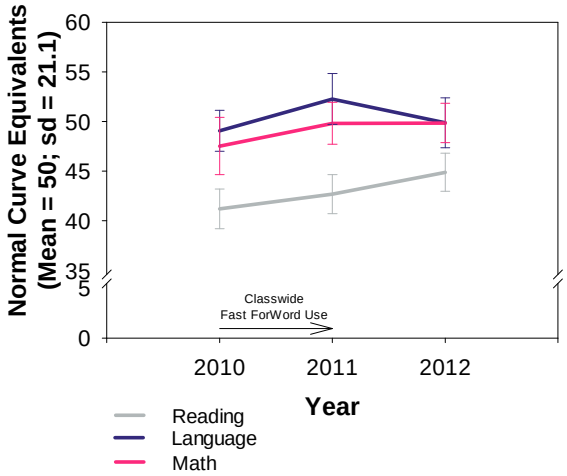

Figure 3. Forty-nine students first used the Fast ForWord and Reading Assistant products as 6th graders, during the 2010-2011 school year. A MANOVA shows that across the three tests, the students made statistically significant improvements in their scores between 2010 and 2011. They also made statistically significant improvements between 2010 and 2012 (p < 0.05).

Reading Progress Indicator (RPI): RPI was administered prior to product use and upon completion of each product. Four hundred ninety-two students used the products during the 2010-2012 school years and took RPI two or more times. On average, the students were mid-year fourth graders (4.4) and had 8½ months between their first and last assessment. During that time, the students' skills improved by one year and four months, from the early third grade level (3.2) to the mid-fourth grade level (4.6), with 84% of the students making gains (Figure 4).

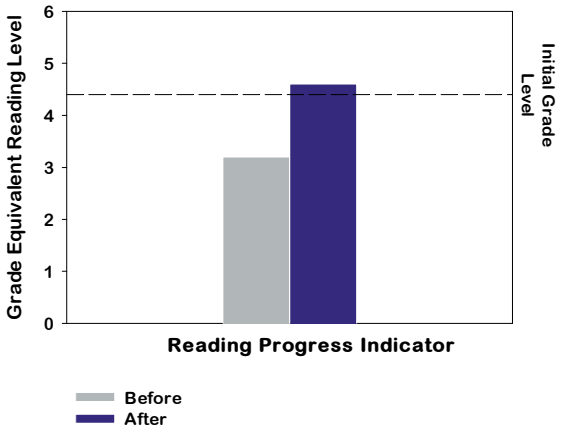

Figure 4. During the average of 8½ months between the first and last assessment, the 492 students with two or more data points improved their grade equivalent reading level by an average of one year and 4 months.

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DISCUSSION

On average, during the 2010-2011 and 2011-2012 school years, students in the two schools in the St. Charles Parish Public Schools that used Scientific Learning products made significant improvement in their performance on the state assessments, relative to the performance of their peers in years prior to the introduction of the Fast ForWord products and Reading Assistant software.

At the elementary school, students selected to use the products were those in the bottom 20% of their class. On the high stakes LEAP test, the percentage of fourth graders at the "Basic" level or above rose significantly, increasing from 61% to 80%. The percentage of students at the "Unsatisfactory" level declined from 21% to 5%. On the iLEAP, the percentage of 3rd graders at the "Basic" level or above increased significantly, rising from 58% to 72%. There was not a significant change for 5th graders (55% before; 56% after).

At the middle school, where 6th graders used the Fast ForWord products and Reading Assistant software, this study looked at the performance of the 6th graders relative to their performance as 5th graders. On average, students in the experimental group improved two to three NCE points. This corresponds to students improving their Language scores from the 52nd percentile to the 56th percentile, improving their Math scores from the 37th percentile to the 41st percentile, and improving their Reading scores from the 43rd percentile to the 49th percentile. Longitudinal data is available for one class indicating that there were significant gains between 5th grade and 7th grade for students who used the Scientific Learning products in the 6th grade.

These findings demonstrate that, within the St. Charles Parish Public Schools, an optimal learning environment coupled with a focus on cognitive and early reading skills can help students attain a higher level of reading, language and math achievement.

CONCLUSION

Language and reading skills are critical for all students, impacting their ability to benefit from instruction, follow directions and participate in class discussions. Strong linguistic skills also provide a critical foundation for building reading and writing skills. After Fast ForWord and Reading Assistant use, students in the St. Charles Parish Public Schools made significant gains in their academic achievement. These results replicate other studies and suggest that using these Scientific Learning products strengthened the students' foundational skills and better positioned them to benefit from the classroom curriculum.

Notes:

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REFERENCES

(2007) Reading Progress Indicator, Bookette Software Company.

Louisiana Department of Education. *Annual Assessments*. http://www.louisianabelieves.com/assessment/annual-assessments retrieved March 4, 2013.

Louisiana Department of Education. *Test Results.* http://www.louisianabelieves.com/resources/library/test-results retrieved March 4, 2013.

Lyon, G.R. (1996). Learning Disabilities. *The future of children: Special education for students with disabilities.* 6:54-76.

Merzenich MM, Jenkins WM, Johnston P, Schreiner CE, Miller SL, & Tallal P (1996). Temporal processing deficits of language-learning impaired children ameliorated by training. *Science*, 271, 77-80.

Miller, S.L., Merzenich, M.M., Tallal, P., DeVivo, K., Linn, N., Pycha, A., Peterson, B.E., Jenkins, W.M., (1999). Fast ForWord Training in Children with Low Reading Performance, *Nederlandse Vereniging voor Lopopedie en Foniatrie: 1999 Jaarcongres Auditieve Vaardigheden en Spraak-taal*. (Proceedings of the 1999 Dutch National Speech-Language Association Meeting).

Scholastic Inc. (2005). *The Scholastic Reading Inventory*. New York, NY: Scholastic Inc.

Tallal P, Miller SL, Bedi G, Byma G, Wang X, Nagarajan SS, Schreiner C, Jenkins WM, Merzenich MM (1996). Language comprehension in language-learning impaired children improved with acoustically modified speech. *Science* 271:81-84.

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