Improved Language and Reading Skills by Students in the School District of Philadelphia who were Receiving Services for Special Education and who used Fast ForWord® Products

ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord products on the language and reading skills of at-risk students who used the products within the curriculum in a school setting. **Study Design:** The design of this study was a multiple-school case study using nationally normed tests of language skills. **Participants:** Study participants were 23 students from three different schools in the School District of Philadelphia. **Materials & Implementation:** Following staff training on the Fast ForWord products, a group of School District of Philadelphia students used the products in the Fall of 1999 for 38 days over 8 weeks. Before and after Fast ForWord participation, student performance was evaluated with the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3). **Results:** On average, students made significant improvements in their language abilities, gaining three and one-half years in language age in eight weeks.

Keywords: Pennsylvania, elementary school, middle school, urban district, special education services, observational study, Fast ForWord Language, Fast ForWord Middle & High School, Clinical Evaluation of Language Fundamentals.

INTRODUCTION

Early laboratory tests of a prototype of a computer-based product combined an optimal learning environment with a focus on early reading and cognitive skills. The results were dramatic improvements in the auditory processing and language skills of elementary school children who had specific language impairments (Merzenich et al., 1996; Tallal et al., 1996) or were at-risk for academic failure (Miller et al., 1999). The School District of Philadelphia was interested in evaluating the effectiveness of this approach for improving their curriculum and instruction for students who were considered at risk for retention or academic or reading failure. In this study, commercially available computer-based products (Fast ForWord Language and Fast ForWord Middle & High School) were used to evaluate the effectiveness of this approach for improving the oral language and early reading skills of children.

METHODS

Participants

During the Fall of 1999, twenty-three students at two elementary schools (Key and Southwark) and a middle school (Vare) in the School District of Philadelphia used the Fast ForWord products. All the students were receiving special education services. The students had their language performance evaluated with the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3) before and after Fast ForWord participation. School personnel administered the assessment and reported scores for analysis.

Implementation

At each participating school, 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 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 Progress Tracker reports to monitor student performance; and techniques for measuring the gains students have achieved after they have finished using Fast ForWord products.

Materials

The Fast ForWord Language and Fast ForWord Middle & High School products are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. The products include six to seven exercises designed to build skills critical for reading and learning, such as auditory processing, memory, attention, and language comprehension. While there are differences between these products, both help develop certain critical skills as detailed in the following exercise descriptions.

Circus Sequence[1] and Sweeps[2]: Students hear a series of short, non-verbal tones. Each tone represents a different fragment of the frequency spectrum used in spoken language. Students are asked to differentiate between these tones. The exercises improve working memory, sound processing speed, and sequencing skills.

Old MacDonald's Flying Farm[1] and Streams[2]: Students hear a single syllable that is repeated several times, then interrupted by a different syllable. Students must respond when they hear the change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

Phoneme Identification[1] and IDs[2]: Students hear a target phoneme, and then must identify the identical phoneme when it is presented later. These exercises improve auditory discrimination skills, increase sound processing speed, improve working memory, and help students identify specific phonemes.

Phonic Match[1] and Matches[2]: Students choose a square on a grid and hear a sound or word. Each sound or word has a match somewhere within the grid. The goal is to find each square's match and clear the grid. The *Phonic Match* and *Matches* exercises develop auditory word recognition and phoneme discrimination, improve working memory, and increase sound processing speed.

Phonic Words[1] and Cards[2]: Students see two pictures representing words that differ only by the initial or final consonant (e.g., "face" versus "vase", or "tack" versus "tag"). When students hear one of the words, they must click the picture that matches the word. These exercises increase sound processing speed, improve auditory recognition of phonemes and words, and help students gain an understanding of word meaning.

Language Comprehension Builder[1]: Students listen to a sentence that depicts action and complex relational themes. Students must match a picture representation with the sentence they just heard. This exercise develops oral language and listening comprehension, improves understanding of syntax and morphology, and improves rate of auditory processing.

Block Commander[1]: In Block Commander, a three-dimensional board is filled with familiar shapes that students select and manipulate. The students are asked

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[1] Exercise from the Fast ForWord Language product.
[2] Exercise from Fast ForWord Middle & High School product.

to follow increasingly complex instructions. This exercise increases listening comprehension, improves syntax, develops working memory, improves sound processing speed, and increases the ability to follow directions.

Stories[2]: Students follow increasingly complex instructions, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

Assessments
Students in the School District of Philadelphia had their language skills evaluated with the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3) before and after participation on the Fast ForWord products.

Clinical Evaluation of Language Fundamentals (CELF-3): The CELF-3 is a comprehensive language test widely used to measure a child's ability to understand words and sentences, follow directions, recall and formulate sentences, and understand relationships between words and categories. The Institute for the Development of Educational Achievement, in accordance with the Reading First legislation, determined that the CELF-3 subtests listed in Table 1 are appropriate outcome assessments for accurately measuring improvement in the vocabulary skills of children in early elementary school. As defined by the Reading First legislation, vocabulary skills are an essential component of early reading.

Performance on this test can be reported in terms of two subtest scores or composite scores: the *Receptive Language Score*, and the *Expressive Language Score*. Alternatively, these two composites can be combined to yield the *Total Language Score*.

On the CELF-3, subtest standard scores have a mean of 100 and a standard deviation of 15 (in this metric, scores from 85 to 115 are within the normal range).

CELF-3 Subtest	Description of Subtest
Concepts and Directions	a receptive language assessment that tests the student's ability to interpret and execute commands of increasing complexity
Recalling Sentences	an expressive language assessment that tests the student's ability to remember and reproduce sentences of increasing length and difficulty
Word Classes	a receptive language assessment that tests the student's ability to understand relationships between words and categories
Formulated Sentences	an expressive language assessment that tests the student's ability to formulate a sentence using a specific word or related to a specific picture

Table 1. Receptive and Expressive Language subtests from the CELF-3 are recognized by the Institute for the Development of Educational Achievement as appropriate assessments for measuring early reading skills, specifically vocabulary.

Analysis
Data was analyzed in aggregate, as well as for each school, using dependent t-tests. All analyses used a p-

value of 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 level). The Fast ForWord Language protocol calls for students to use the product 100 minutes per day, for 5 days a week for four to eight weeks. The Fast ForWord Middle & High School protocol calls for students to participate for 90 minutes per day, 5 days a week for four to eight weeks.

The students from the School District of Philadelphia used the Fast ForWord products in the Fall of 1999. Student performance was assessed with the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3) before and after Fast ForWord participation. Twenty-three students had pre- and post-Fast ForWord participation CELF-3 scores available for analysis.

On average, students used the Fast ForWord products for 38 days over a period of 60 calendar days. They achieved an average participation level of 90% and completed 74% of the product content. Detailed usage information is shown in Table 2.

Assessment Results

Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3): Before participation on the Fast ForWord products, students, on average, were well below the average range on both their Receptive and Expressive Language scores. After Fast ForWord participation, students, on average, made significant improvements and moved into the average range of language ability (Figure 1).

Figures 2 to 4 show language improvements from the individual schools in this study. On average, all three schools showed significant student language improvement, with scores moving into the average range after participation on the Fast ForWord products. The combined average language gain between the three schools was three and one-half years in an eight week time.
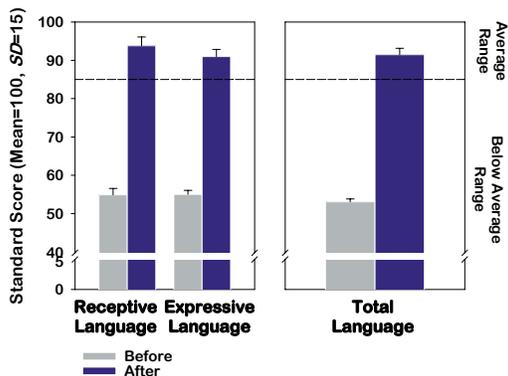

Figure 1. On average, 23 students from all three schools made significant improvements in language ability after participation on the Fast ForWord products.
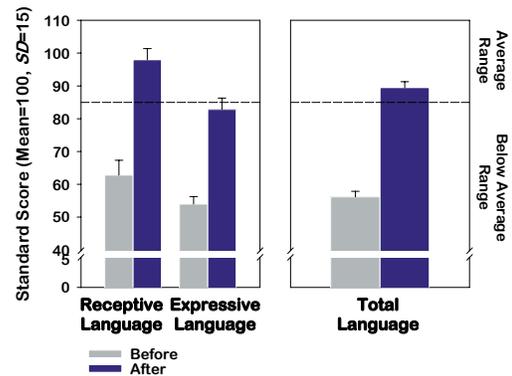

Figure 2. Results from the six students at Key Elementary school in the School District of Philadelphia show that, on average, students had significant language improvements after using the Fast ForWord products.

Number of Students	Average Days Participated	Average Number of Calendar Days	Average Overall Percent Complete	Average Participation Level
23	38	60	74%	90%

Table 2. Usage data showing the number of students who used the Fast ForWord products. Also shown are group averages for the number of days of product use, calendar days between start and finish, the percentage of content covered, and participation level.
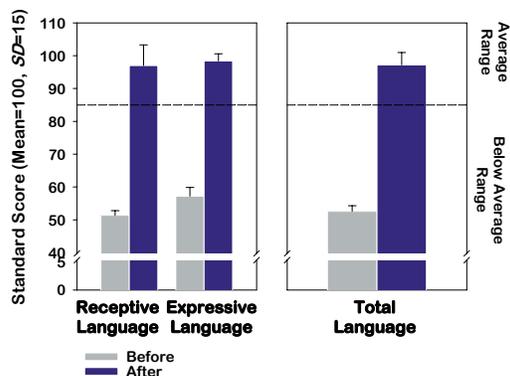
Figure 3. Results from the five students at Southwark Elementary School show that, on average, students had significant language improvements after using the Fast ForWord products.
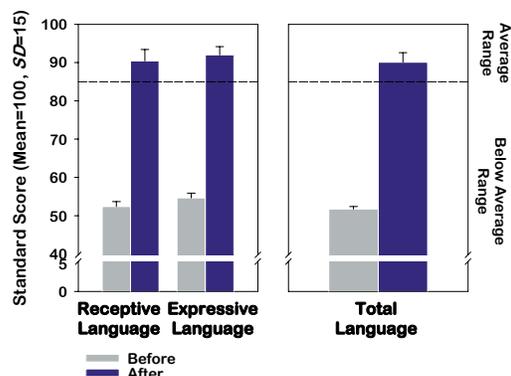

Figure 4. Results from the twelve students at Vare Middle School show that, on average, students had significant language improvements after using the Fast ForWord products.

DISCUSSION

In 1999, three different schools in the School District of Philadelphia used the Fast ForWord products. Students from all three schools showed significant improvements in their language abilities after participation on the Fast ForWord products.

Before using the Fast ForWord products, students were performing in the below average range on the CELF-3. After Fast ForWord product participation, students, on average, made significant gains, moving into the average range in language assessment. The schools had an average gain in language age of 3.5 years in eight weeks.

Administrators in the School District of Philadelphia commented on the language improvement in students who used the Fast ForWord products with one administrator saying, "Students who used the Fast ForWord Language and Fast ForWord Middle & High School programs are processing information more quickly, reading more on their own, and enjoying school much more than they did before training."

CONCLUSION

Language skills are critical for all students, impacting their ability to benefit from instruction, follow instructions, and participate in class discussions.

Strong linguistic skills also provide a critical foundation for building reading and writing skills. Scores from before and after Fast ForWord participation show that, on average, students made substantial increases in their language abilities. This suggests that using Fast ForWord products strengthened the students' foundational skills and helped them benefit more from the classroom curriculum.

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