

Improved Reading Skills by Students in the Niagara Falls City School District who used Fast ForWord® Products

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ABSTRACT

Purpose: This study investigated the effects of the Fast ForWord products on the reading skills of students who used the products within the curriculum in a school setting. **Study Design:** The design of this study was a multiple school study using nationally normed tests. **Subjects:** Study participants were students attending schools in the Niagara Falls City School District in Niagara Falls, New York. **Methods & Implementation:** Before and after participation on the Fast ForWord products, students were evaluated with the Group Reading Assessment and Diagnostic Evaluation (GRADE). **Results:** Overall, students achieved significant gains in both vocabulary and comprehension, with overall grade equivalent scores improving by a full year in the five months between test administrations.

Keywords: New York, elementary school, rural, observational study, Fast ForWord Language Basics, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 1, Fast ForWord to Reading 2, Fast ForWord to Reading 3, Fast ForWord to Reading 4, Group Reading Assessment and Diagnostic Evaluation (GRADE).

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).

The Niagara Falls City School District was interested in evaluating the effectiveness of an optimal learning environment with a focus on early reading and cognitive skills as a way to improve reading skills of students in a school setting. In this study, commercially available computer-based products (Fast ForWord Language Basics, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 1, Fast ForWord to Reading 2, Fast ForWord to Reading 3, Fast ForWord to Reading 4) were used

to evaluate the effectiveness of this approach for improving the reading skills of students.

METHODS

Participants

Niagara Falls, New York is located on the international boundary between the United States and Canada. The city shares its name with the famed Niagara Falls, a set of three massive waterfalls which provide valuable hydroelectric power to both New York and Ontario. The Falls are a very popular tourist destination.

The Niagara Falls City School District serves 7,600 students from Pre-Kindergarten through grade 12. Seven of the thirteen schools in the district have been designated by New York State as “High Performing”.

This report focuses on 329 second grade students from nine schools in the Niagara Falls City School District who used Fast ForWord products during the 2006-2007 school year. Student’s reading skills were assessed before and after Fast ForWord participation. The assessment administered was the Group Reading Assessment and Diagnostic Evaluation (GRADE). School personnel administered the assessment and reported scores for analysis.

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 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 products are computer-based products that combine an optimal learning environment with a focus on early reading and cognitive skills. The products used in this study (Fast ForWord Language Basics, Fast ForWord Language, Fast ForWord Language to Reading, Fast ForWord to Reading 1, Fast ForWord to Reading 2, Fast ForWord to Reading 3, Fast ForWord to Reading 4) include three 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 the products, both help develop certain critical skills as detailed in the following exercise descriptions.

*Inside the Tummy*¹: Participants click and drag colored shapes into matching shape outlines in pre-defined patterns. This task helps participants improve fine motor skills, hand-eye coordination, and computer mousing skills.

*Flying Saucer*¹: Participants identify sounds presented in a sequence, then click on graphic icons associated with those sounds to reproduce the sequence. This task builds auditory discrimination ability, auditory working memory, and sequencing skills.

*Drag Racer*¹: Participants point and click on a (sometimes moving) graphic, then hold the mouse button down to hear a stream of identical sounds. Participants release the mouse button when there is a sound change. This task is designed to improve auditory discrimination and sustained auditory attention. It also develops mousing skills, and the ability to withhold a response until an auditory cue is presented.

*Circus Sequence*² and *Trog Walkers*³: 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*²: Students hear a single syllable that is repeated several times, and then interrupted by a different syllable. Students must respond when they hear a change in the syllable. This exercise improves auditory processing, develops phoneme discrimination, and increases sustained and focused attention.

*Phoneme Identification*², *Polar Cop*³ and *Treasure in the Tomb*³: 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 a specific phoneme. *Polar Cop* also develops sound-letter correspondence skills. *Treasure in the Tomb* also develops grapheme recognition.

*Phonic Match*² and *Bug Out*³: 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* exercise develops auditory word recognition and phoneme discrimination, improves working memory, and increases sound processing speed. The *Bug Out!* exercise develops skill with sound-letter correspondences as well as working memory.

*Phonic Words*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. This exercise increases sound processing speed, improves auditory recognition of phonemes and words, and helps students gain an understanding of word meaning.

*Language Comprehension Builder*²: 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,

¹ Exercise from the Fast ForWord Basics product.

² Exercise from the Fast ForWord Language product.

³ Exercise from the Fast ForWord Language to Reading product.

improves understanding of syntax and morphology, and improves rate of auditory processing.

*Block Commander*²: In Block Commander, a three-dimensional board is filled with familiar shapes that students select and manipulate. The students are asked to follow increasingly complex commands. This exercise increases listening comprehension, improves syntax, develops working memory, improves sound processing speed, and increases the ability to follow directions.

*Start-Up Stories*³: Students follow increasingly complex commands, match pictures to sentences, and answer multiple-choice questions about stories that are presented aurally.

*Bear Bags*⁴ and *Bear Bags: More Lunch*⁵: In these exercises, the participant is asked to help Mama Bear sort words (on pieces of toast) into phoneme-based categories (in lunch bags). They develop phonemic awareness and decoding of single-syllable words. *Bear Bags* also develops understanding of alphabetic principles (phonics) and *Bear Bags: More Lunch* also develops grapheme/phoneme associations.

*Magic Rabbit*⁴ and *Magic Bird*⁵: These exercises combine spelling and word-building practice with spelling patterns and word families commonly studied in 1st grade for *Magic Rabbit* and in 2nd grade for *Magic Bird*. The task is designed to emphasize the relationships between words by showing how one word can be turned into another by simply changing a single letter in any position. Using a click and drag interface, the participant must either select the missing letter to complete a partially spelled word or rearrange scrambled letter tiles to spell a word. These exercises develop spelling and sensitivity to letter-sound correspondences.

*Flying Fish*⁴ and *Fish Frenzy*⁵: In these exercises, a fishing pelican pronounces a word. Then a series of spoken and/or written words (on fish) fly across the pond and the participant clicks on the word when it matches the pronounced word. These exercises develop decoding skills, identification of sight words, and auditory memory.

*Quail Mail*⁴: In Quail Mail, a squirrel mail carrier pulls words out of a mailbag and the participant sorts them into different categories by clicking on the appropriate mailbox. This exercise encourages flexibility during reading and automatic access to the various dimensions of vocabulary.

*Bedtime Beasties*⁴ and *Leaping Lizards*⁵: These exercises use the “cloze task,” in which a written and aurally presented sentence has a word missing. The participant must select the correct word to complete the sentence from four choices. Vocabulary skills and sentence comprehension are developed in these exercises.

*Buzz Fly*⁴ and *Dog Bone*⁵: In these exercises, the participant listens to a passage and answers comprehension questions relating to each passage. The questions are aurally presented and written, and the response choices are presented as pictures. Responses are presented as words or short phrases in *Dog Bone*. These exercises develop listening comprehension and working memory skills as measured by performance on multiple choice questions.

*Ant Antics*⁵: The participant will be presented with a picture and then asked to pick one of the four alternatives that best describes an aspect of that picture. This exercise improves vocabulary skills and sentence comprehension.

*Scrap Cat*⁶: In Scrap Cat, a series of words is visually presented and participants are asked to sort each word into the correct semantic, phonological, syntactic, or morphological category. For this exercise only, the participant can click a button to hear any word and see it defined. This exercise develops decoding, vocabulary, and word recognition skills.

*Canine Crew*⁶: In Canine Crew multiple words are presented together in a grid and participants are asked to find pairs that match on the basis of the current criterion. This criterion shifts from words that rhyme, to synonyms, to antonyms, to homophones, as the participant progresses. This exercise develops vocabulary, decoding, and automatic word recognition.

*Chicken Dog*⁶: Participants hear a word and see it partially spelled. They must complete the word by filling in the missing letter or letter group. Five options are always provided, including options that represent common visual and phonological errors. This exercise develops basic spelling patterns, letter-sound correspondences, and decoding.

*Twisted Pictures*⁶: Participants are presented with a variety of pictures and asked to select the sentence that most accurately describes each picture from among four alternatives. The descriptive sentences

⁴ Exercise from the Fast ForWord to Reading 1 product.

⁵ Exercise from the Fast ForWord to Reading 2 product.

⁶ Exercise from the Fast ForWord to Reading 3 product.

incorporate a wide range of syntactic structures. As the participant progresses, the sentences get longer and more difficult vocabulary is included. This exercise builds sentence comprehension by developing syntax, working memory, logical reasoning, and vocabulary.

*Book Monkeys*⁶: Participants read narrative and expository passages and answer comprehension questions about each passage. The multiple-choice questions demand that the participant use memory for literal detail, generation of inferences, or grasp of among four alternatives. This task develops paragraph comprehension, inferential and cause-and-effect reasoning, working memory, flexible reading, and vocabulary.

*Hog Hat Zone*⁶: In Hog Hat Zone, short passages from classic children's literature are presented, with occasional gaps in the text where words are missing. Participants are asked to fill in each gap with the correct word from among four alternatives. The missing words are morphologically important items such as pronouns, auxiliary verbs, and words with suffixes and prefixes. This task develops paragraph comprehension, complex morphology, flexible reading, and vocabulary.

*Hoof Beat*⁷: The participant is presented with a question and four possible answers. The participant must choose the most appropriate answer. The questions relate to semantics, phonology, morphology, orthography, and syntax. The exercise encourages flexibility during reading and automatic access to the various dimensions of vocabulary and is designed to build vocabulary by showing the participant how words function.

*Jitterbug Jukebox*⁷: The participant hears a word spoken aloud and letters appear on the keys of a jukebox. The participant must spell the word by clicking on the jukebox keys. Jitterbug Jukebox helps participants improve spelling and sensitivity to letter-sound correspondences. This exercise includes many of the 500 most commonly used words in written English including most word families found in 3rd and 4th grade content standards.

*Goat Quotes*⁷: In Goat Quotes four newspapers paraphrase a headline at the top of a news kiosk. The participant must select the correct paraphrase. The exercise is designed to sample the basic syntactic (i.e., grammatical) structures of spoken English generally mastered in the early elementary grades. The exercise

develops logical thinking and working memory skills as well as careful reading.

*Book Monkeys: Book Two*⁷: Participant reads a passage, chart, or schedule and then answers questions related to the material. This exercise develops a participants' ability to read for literal meaning, cause-and-effect relationships, and inferential comprehension. It also develops a participant's working memory as well as vocabulary skills, which are crucial for flexible, fluent reading.

*Stinky Bill's Billboard*⁷: Participants must select the word that accurately completes a sentence. In this exercise, participants improve sentence comprehension while practicing the decoding of words in realistic contexts. This exercise also helps build vocabulary and awareness of word structure.

*Lulu's Laundry Line*⁷: Short passages are presented with occasional gaps where punctuation is missing. The participant must read the words and understand the passage in order to determine the correct punctuation. The exercise develops punctuation skills as well as automaticity for decoding and sentence comprehension.

Assessments:

The GRADE was administered to students in September, 2006 and again in February, 2007. Between these two test administrations, students used Fast ForWord products.

Group Reading Assessment and Diagnostic Evaluation

(GRADE): The GRADE is a norm-referenced, research-based reading assessment. It has eleven levels ranging from P (pre-Kindergarten) to A (Adult/postsecondary) that contain subtests designed to measure specific reading skills. GRADE subtests are scientifically based and aligned to the goals of Reading First.

The subtests used in this study were Vocabulary, Comprehension, and Listening Comprehension. The Vocabulary subtest measures word decoding, recognition, and understanding. Comprehension measures a student's ability to understand sentences and extended text as a whole. The Vocabulary and Comprehension subtests report scores in terms of stanines, NCE's, grade equivalents, percentiles and raw scores. The GRADE also reports a Total score that is a combination of the Comprehension and Vocabulary subtests.

Analysis:

The Vocabulary and Comprehension subtests of the GRADE were reported as normal curve equivalents, which are the most appropriate scores for statistical analyses. Grade equivalents were also reported and are used for descriptive purposes. Listening Comprehension scores were reported as stanines. Stanines are a type of scaled score that range from one to nine, with the average range falling between four and six. All scores were analyzed using repeated

⁷ Exercise from the Fast ForWord to Reading 4 product.

measures analysis of variance (ANOVA) and paired t-tests with 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 level and attendance level). During the 2006-2007 school year, the Niagara Falls City School District chose to use the 50-minute protocol for the Fast ForWord Language and Fast ForWord Language to Reading products, and the 48-minute protocol for the Fast ForWord to Reading 1,

Fast ForWord to Reading 2, and Fast ForWord to Reading 3 products. These protocols call for students to use the products for 48 to 50 minutes a day, five days per week for eight to twelve weeks. Detailed product use is shown in Table 1 for all products that were used by five or more students.

Figure 1 shows the average daily progress through the Fast ForWord Language product exercises for students who had scores available for analysis. The final day shown is determined by the maximum number of days that at least two-thirds of the students participated. For students who used the product fewer than the number of days shown, percent complete is maintained at the level achieved on their final day of product use.

	Number of Students	Days Participated	Number of Calendar Days	Percent Complete	Attendance Level	Participation Level
Fast ForWord Language Basics	4	n/a*	n/a*	n/a*	n/a*	n/a*
Fast ForWord Language	302	34	65	73%	79%	97%
Fast ForWord Language to Reading	228	30	63	60%	75%	98%
Fast ForWord to Reading 1	93	15	24	83%	82%	99%
Fast ForWord to Reading 2	57	24	44	89%	78%	98%
Fast ForWord to Reading 3	41	19	39	53%	76%	99%
Fast ForWord to Reading 4	4	n/a*	n/a*	n/a*	n/a*	n/a*
Total Fast ForWord Product Use	329	63	124			

*Table 1. Usage data showing the number of students who used each Fast ForWord product 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. *Aggregate data is not shown for products used by fewer than five students. Total values reflect the average total number of days that students used products. Note: Students often use multiple products.*

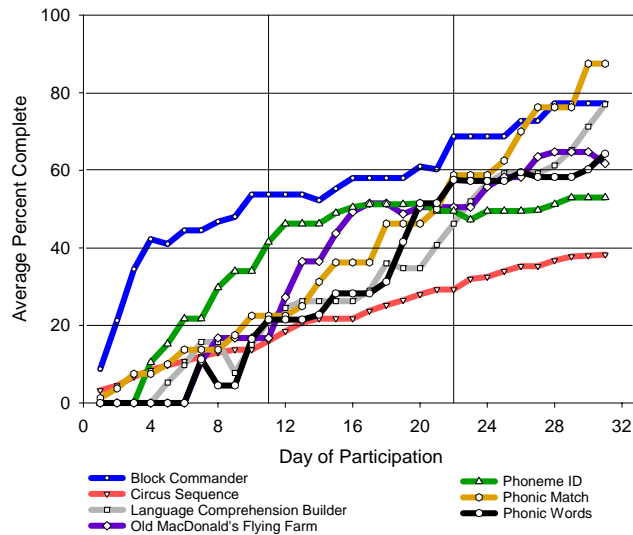


Figure 1. Average daily progress through the Fast ForWord Language product exercises. Results from 302 students are shown.

Assessment Results

Analysis of all students with pre and post scores. At the time of pre-testing in September 2006, before Fast ForWord use, the 329 second-grade participants had an average GRADE Total score of a 2.2 grade equivalent. The GRADE Total score is a composite of the Vocabulary and Comprehension subtests. Five months later, after using the Fast ForWord products, students' performance was at an average grade-level of 3.2 on the total GRADE measure, an improvement of 12 months.

To evaluate the significance of the improvement, an analysis of variance (ANOVA) was performed using normal-curve equivalent (NCE) scores from the Vocabulary and Comprehension subtests. This was followed by post-hoc t-tests. The first analysis included all 329 students who had used Fast ForWord products and for whom pre- and post-test scores were available. Students performed significantly better on the post-test, both for the Vocabulary and the Comprehension subtests. They also demonstrated greater improvements on the Comprehension subtest than on the Vocabulary subtest (Figure 2, Tables 2-3).

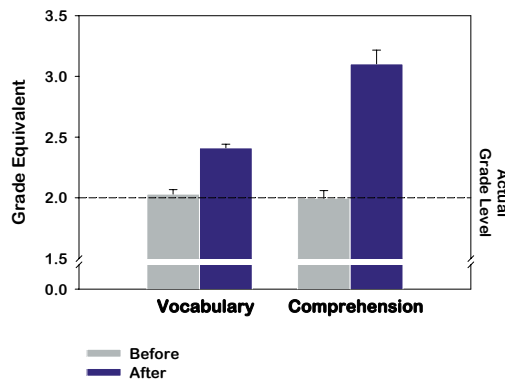


Figure 2. Overall, students made significant gains on both the vocabulary and comprehension portions of the GRADE, with greater gains on comprehension.

ANOVA		
	df	f
Time	1, 328	53.1*
Test	1, 328	58.0*
Time x Test	1, 328	10.8*

Table 2. Overall, gains on the comprehension subtest were greater than gains on the vocabulary subtest. * $p < .05$

Following this initial analysis, students were divided into groups based upon the products they used, and further analyses were done. The first group included 235 students who used a Language product (Fast ForWord Language Basics, Fast ForWord Language, or Fast ForWord Language to Reading) but who did not advance to any of the Reading products (“Language Only”). These students were compared to the group of 71 students who used both Language and Reading products (“Language + Reading”). The remaining 23 students who used Reading products only were not included in this secondary analysis due to the small size of the group.

The initial analysis of variance was repeated with the 306 students who fell into the Language Only or the Language + Reading groups. In this analysis a between-subjects variable of Group was added to investigate the extent to which the effects described above differed between these two largest groups

GRADE subtest	n	Before		After		t statistic
		Mean	SE	Mean	SE	
Vocabulary	329	48.8	1.2	51.3	1.1	3.1*
Comprehension	329	42.4	1.0	47.8	1.1	8.6*
TOTAL	329	43.8	1.1	49.0	1.2	10.0*

Table 3. Overall, the students who used the Fast ForWord products made significant gains in both vocabulary and comprehension. * $p < .05$

(Figure 3, Table 5). As trends for interactions involving Group did emerge ($p < 0.10$), this analysis was followed by separate analyses of variance and post-hoc tests for both the Language Only and the Language + Reading groups individually (Tables 6-9).

Overall, the Language + Reading group had better GRADE scores than the Language Only group did, including both the pre and post scores. This suggests that those students who were already performing well on vocabulary and comprehension, prior to the use of Fast ForWord, were more likely to use both the Language and Reading products.

Both groups of students demonstrated significant gains on the GRADE total score and the Comprehension subtest. Only the Language Only group demonstrated significant gains for the Vocabulary subtest (Figure 3, Tables 6-9).

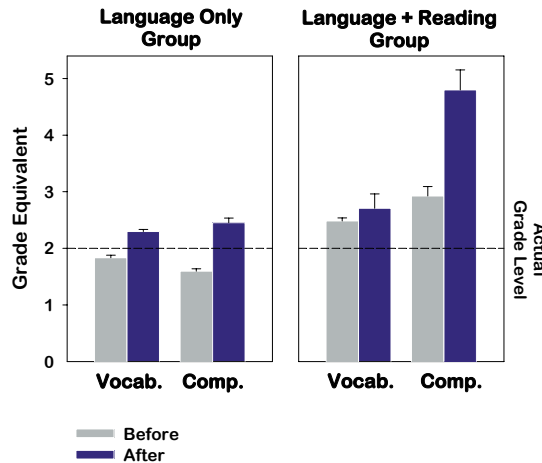


Figure 3. Comparison of the 235 students who used only Language products and the 71 students who used both Language and Reading products.

ANOVA		
	df	f
Group	1, 304	106.6*
Time	1, 304	35.5*
Test	1, 304	31.0*
Time x Group	1, 304	1.0
Test x Group	1, 304	0.3
Time x Test	1, 304	12.3*
Time x Test x Group	1, 304	3.5†

Table 5. A comparison of the Language Only and Language + Reading groups suggests differences in patterns of improvement between the two groups. † $p < .10$ * $p < .05$

ANOVA		
	df	f
Time	1, 234	56.7*
Test	1, 234	42.6*
Time x Test	1, 234	2.8

Table 6. For the 235 Language-only users, gains on the comprehension and vocabulary subtests were not significantly different. * $p < .05$

GRADE subtest	n	Before		After		t statistic
		Mean	SE	Mean	SE	
Vocabulary	235	41.8	1.2	45.5	1.2	4.1*
Comprehension	235	35.9	1.0	41.4	1.1	7.5*
TOTAL	235	36.8	1.0	42.1	1.1	9.1*

Table 7. The 235 students who used the Language products, but not the Reading products, made significant gains in both vocabulary and comprehension. * $p < .05$

ANOVA		
	df	f
Time	1, 70	6.4*
Test	1, 70	7.0*
Time x Test	1, 70	10.1*

Table 8. For the 71 Language + Reading users, gains on the comprehension subtest were greater than gains on the vocabulary subtest. * $p < .05$

GRADE subtest	n	Before		After		t statistic
		Mean	SE	Mean	SE	
Vocabulary	71	64.4	2.2	64.6	1.8	0.1
Comprehension	71	57.2	2.1	63.6	2.3	4.3*
TOTAL	71	59.7	2.0	66.0	2.2	4.8*

Table 9. The 71 students who used both the Language and Reading products made significant gains in comprehension but not vocabulary. Note that the average vocabulary scores, at pre-test, were in the high average range. * $p < .05$

GRADE Listening Comprehension Test. The GRADE also includes a listening comprehension test which is not reflected in either subtest or the total score. Overall, at the time of pre-testing in September 2006, the participating students had an average stanine of 4.4

on this test. Five months later, after using the Fast ForWord products, students' listening comprehension improved to an average stanine of 5.5. A t-test confirmed that this difference was significant (Figure 4 and Table 10).

GRADE subtest	n	Before		After		t statistic
		Mean	SE	Mean	SE	
Listening Comp	329	4.4	.11	5.5	.11	8.8*

Table 10. The 329 students who used the Fast ForWord products made significant gains in the GRADE listening comprehension test. * $p < .05$

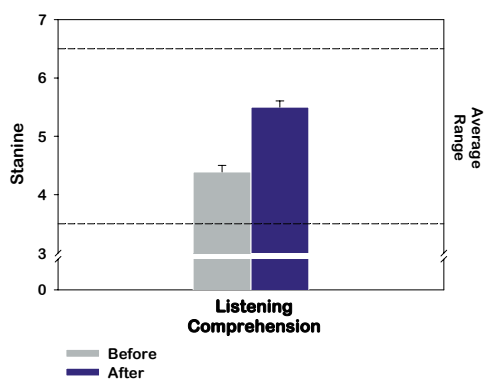


Figure 4. Students made significant improvements on the GRADE listening comprehension test. Results from 329 students are shown.

In addition to significance, effect size is important. Effect size gives information regarding the size of the impact and can be used to compare results across interventions or across studies. Using NCE means and standard deviations, the improvement seen in this study resulted in an effect size (Hedges's G) of + .257. In education, this is moderate effect size and means that average scores increased by 0.257 standard deviations.

DISCUSSION

Students in the Niagara Falls City School District made significant improvements in reading skills following Fast ForWord participation. On average, students were performing in the low-average range of reading ability at the time of the pretest – the 38th percentile. After Fast ForWord use, students significantly improved on both the Vocabulary and Comprehension subtests of the GRADE, with overall reading scores improving by an average of 12 months between pre-test and post-test, raising their percentile rank to the 48th percentile. It is important to note that the NCEs used in the analysis, and whose averages were converted into percentiles for descriptive purposes, are seasonally-corrected, meaning that in order for a student to obtain the same NCE score in the spring as was obtained in the fall, the student must perform at a higher level. An improvement in a student's NCE score between the fall and the spring indicates that the student's performance improved relative to the improvement of his peers.

A secondary analysis compared improvement in the GRADE scores between two large sub-groups of the Niagara Falls students: a group of 235 students who had used Language products but no Reading products ("Language Only") and a group of 71 students who

used both Language and Reading products ("Language + Reading"). A comparison of these two groups suggested first that the 71 Language + Reading students had a higher reading ability at the time of pretest (with the group total reading ability corresponding to the 68th percentile versus the 27th percentile). Further, this analysis showed that whereas the 235 Language Only students improved to a comparable extent on both the Vocabulary and Comprehension subtests of the GRADE (with an average post-participation Total Reading level around the 35th percentile), the improvement of the 71 Language + Reading students was restricted primarily to the Comprehension subtest (with an average post-participation Total Reading level around the 78th percentile.)

Given these group differences, one may be tempted to conclude from the results that using the Language products alone will result in greater improvements in reading ability than using both the Language and Reading products. The large baseline differences in reading ability between the Language Only and the Language + Reading groups, however, suggests a more plausible interpretation for the difference between the two groups. Although both groups showed significant improvements, it appears that students who begin the second grade school year reading slightly below grade level will show a greater improvement in reading ability following Fast ForWord use than will students who begin the second grade school year reading slightly above grade level.

Another study previously conducted by Scientific Learning more directly addresses the question of how the duration of exposure to the Fast ForWord products results in increasing improvements in reading ability (Scientific Learning Corporation, 2005). In this study, conducted in Todd County, SD, 11 fourth-grade students who were using the Fast ForWord products were compared to 10 fourth-grade students who were not, at four different time points, each corresponding to the completion of a Fast ForWord product. The Fast ForWord group improved in reading ability at each time point, relative to the control group.

Finally, the Niagara Falls students also showed significant improvements in listening comprehension, as addressed in a separate subtest of the GRADE. Overall, students improved from an average stanine of 4.4 to 5.5 on this test, after using the Fast ForWord products. Like NCE's, stanines are seasonally-corrected so that improvements in scores indicate that over the time period of the study, the students who

used Fast ForWord products improved more than their peers.

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. The current study reflects significant improvements in reading achievement. This suggests that using the Fast ForWord products strengthened the students' foundational skills and helped them benefit more from the classroom curriculum.

Notes:

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