

There have been numerous research studies conducted using the Fast ForWord software products. The Scientific Learning website [www.scientificlearning.com/results](http://www.scientificlearning.com/results) provides a link or direct access to more than 200 of these studies. Some studies have used experimental designs, including the use of random assignment, while others have been intervention group studies or case studies. Some of the studies have had rapid follow-up showing that students start to reap the benefits in a few weeks while others have been longitudinal and have shown that the benefits endure over years. Several studies have been published in major peer-reviewed journals such as *Science* and the *Proceedings of the National Academy of Sciences* while others have been scrutinized by the doctoral dissertation committees of students working towards their doctoral degrees.

In one study published in the *Proceedings of the National Academy of Sciences* by researchers at Stanford, functional magnetic resonance imaging (fMRI) was used to show differences in the brain activity of children with dyslexia, and those without. After the children with dyslexia used the Fast ForWord Language product, their language and reading scores improved and their brain activity became more similar to that of the children without dyslexia (Temple et al, 2003). In another study published in *Restorative Neurology and Neuroscience* by researchers at Harvard, it was reported that relative to typical readers, children with dyslexia had widespread differences in the way their brains process rapid auditory transitions. The researchers found that the neural circuitry of the children with dyslexia could be changed by focusing on improving rapid auditory processing and oral language skills, and that this remediation resulted in improved reading and language skills, as well as increased brain activity in response to rapidly changing sounds (Gaab et al, 2007).

As reported in *Brain Research*, scientists at the University of Oregon studied the impact of the Fast ForWord products on the selective attention of two groups of children: one group had children with dyslexia, the children in the other group were typical readers. Using event-related brain potentials (ERP's), the scientists found that following Fast ForWord participation, both groups that used the products improved their early reading skills. In addition, there was a large change in the selective attention of both groups that used that used the products relative to a comparison group of typical readers that did not use the products (Stevens et al, 2008).

In addition to traditional journal-based peer-review, studies on Fast ForWord software have been positively reviewed by the What Works Clearinghouse, established in 2002 by the United States Department of Education as a central and trusted peer-reviewed source of scientific evidence of what works in education (<http://ies.ed.gov/ncee/wwc/>). Their review included several independent studies on Fast ForWord products and found many studies which meet the highest research standards of the Clearinghouse. Studies on the Fast ForWord products are among the best in the educational field as evidenced by the fact that out of 887 studies reviewed in the Beginning Reading topic area, only 27 met the high standards of the What Works Clearinghouse and five of those were on the Fast ForWord products.

We also have results from numerous studies where schools or districts independently gather data and request Scientific Learning's assistance on the analysis and reporting. These reports are reviewed for accuracy by educators at the district prior to being shared with others. Some schools target students in a specific grade while others target English language learners or students receiving services for special education or students who did not score at the proficient level on their high stakes test or emotionally or behaviorally disturbed students, or students who could not function in a typical school environment. Since the Fast ForWord products improve students' learning skills, they impact a wide segment of the classroom and participants from a specific school typically have varied backgrounds and skills. As much as possible, this information is documented in the reports.

Across all the studies, data from more than 45,000 students at 746 schools have been analyzed and reported. Few studies manage to incorporate all the best attributes, but many studies incorporate each of the attributes. Therefore, it is important to carefully read the studies and understand the results and how they relate to your district.

For example, Judith Johnston references several studies on the Fast ForWord products and the theory behind them. The Habib et al article demonstrates the significant impact that exposure to modified speech has on the phonological awareness of children with developmental dyslexia. The Gillam et al study (2008) shows that the impact of the Fast ForWord Language product on children with language impairments is comparable to 100 minutes of daily one-on-one intervention with a certified and licensed speech - language pathologist. The Rouse & Krueger study shows the relationship between product use and results – students who had better use demonstrated greater improvements. In addition to these studies, there are hundreds of others that show results for students from different environments and with different needs.

For example, in School District 16, an urban district in New Brunswick, four schools took part in a study: second graders at two schools used the Fast ForWord products, while second graders at two demographically and academically similar schools served as the comparison group. Students in one experimental and one comparison school were involved in a French immersion program while the other two schools were unilingual English. The impact did not differ between the students in the French immersion school and the unilingual English school with the Fast ForWord participants significantly improving their early reading skills and out-performing the students in the comparison group. Overall, the participants' oral vocabulary improved from the 46<sup>th</sup> to the 73<sup>rd</sup> percentile – significantly more than the improvement by the students in the comparison group.

Contrary to what was stated by Judith Johnston, the original studies were done on a prototype of the Fast ForWord Language product and did not include any additional speech and language intervention. Since those studies were published in 1996, research, development, and the increased speed of computers have permitted changes in the product such that there are four different effective protocols: 30-, 40-, 50-, or 90-Minutes

per day, five days per week. The longer the protocol selected, the fewer days required to complete the products.

Continued research allows ongoing improvements to be made in the products. These improvements include additional content, an increase in the motivational feedback provided to the participants and a decrease in the time required to deliver it, and enhanced feedback to teachers letting them know when student progress may be flagging. These improvements have been made following internal and external studies showing that increased content completion and better adherence to the protocol results in greater effects.

Studies on the impact of the Fast ForWord products have covered many demographic groups: English language learners, students eligible for special education services, students with cochlear implants, students considered “at risk for academic failure”, and students identified as gifted and talented, as well as classwide and schoolwide implementations. As with most interventions, the Fast ForWord products don’t impact all the students – in one study of struggling readers, 10% of the students did not show improvements. However, all demographic groups appear to be impacted and, as yet, we have not found a method to identify the students who will not be impacted by the products.

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