



Research Summary: BrainWare SAFARI and Students with Learning Disabilities

April 10, 2017

Background

BrainWare SAFARI is a cognitive training software program that addresses multiple areas of cognitive processing (attention, memory, visual and auditory processing, logic and reasoning and sensory integration) in a digital game-based format. It was derived from over 40 years of collaboration among clinicians in multiple disciplines, including speech pathology, vision development, psychology, and others. The set of therapeutic exercises developed and refined by these clinicians was then incorporated into a computer-based program designed according to key principles of cognitive training. Those principles are listed in Appendix A.

Over the last decade, BrainWare SAFARI has been used with a variety of populations, from low-performing to high-performing students of all economic backgrounds. While BrainWare SAFARI is not uniquely designed for students with learning disabilities, the persistent national academic achievement gap for students identified as having learning disabilities has prompted research and field studies in schools and districts around the U.S. examining the impact of cognitive training on cognitive functioning and academic achievement.

This document summarizes the studies of BrainWare SAFARI with students with learning disabilities. Links to more detailed reports of each study as well as to other published research and field studies with BrainWare SAFARI is available at www.mybrainware.com/safari/research.

Following the study summaries is a discussion of the role of cognitive skills development in special education.

Study Summaries

Effect of Neuroscience-Based Cognitive Skill Training on Growth of Cognitive Deficits Associated with Learning Disabilities in Children Grade 2-4 (2012)

- Schools:** Private and Charter Schools in New York, NY
- Subjects:** 40 students in grades 2, 3, and 4, in 2 schools, diagnosed as having a specific learning disability (SLD), randomly assigned to treatment and non-treatment groups. All students continued to receive the standard reading and math interventions to which they were entitled because of their SLD diagnosis.
- Usage:** 3 to 5 sessions per week, 30-45 minutes per session, 12 weeks
- Assessment:** Woodcock Johnson III Cognitive Battery and Tests of Achievement

Summary of Findings: Students in the study who used BrainWare SAFARI for 12 weeks improved their cognitive functioning by 2.8 years, compared to 2 months for the control group. This improvement raised the students' overall cognitive proficiency level from 64% to 89% where 90% is the expected performance for a normally developing student. Students in the control group improved just one percentage point, from 63% to 64% proficiency. Students in the treatment group improved their reading and math scores by 0.8 and 1.0 grade equivalent respectively over the 12 weeks.

BrainWare SAFARI Shown to Impact Students in Iran with Reading Problems (2012)

Subjects: 35 Iranian children, ages 7 to 12, native Persian speakers, with reading difficulties,
Usage: 5 sessions per week, 50-60 minutes per session, 6 weeks
Only 6 of the 20 exercises in BrainWare SAFARI were used in this study, focusing on Visual Spatial processing and Working Memory.
Assessment: Raven's Progressive Matrices, tests of Reading Words and Reading Pseudowords

Summary of Findings: As reported in two articles, the study showed increases in memory and attention in students diagnosed with reading difficulties. The experimental group showed training effects on non-trained tests as well as transfer effect to visual-auditory sustained attention, visual auditory vigilance/speed, and hyperactivity after training, providing further evidence for shared processes between working memory, attention and reading.

BrainWare SAFARI Cognitive Skills Development in Before and After School Programs with Low Performing Readers (2015)

District: School City of Hammond, Hammond, IN
Subjects: 22 students in grades 3, 4 and 5, in 2 schools, economically disadvantaged, chosen because of poor reading performance
Usage: 4 sessions per week, 45 minutes per session, 10 weeks
Assessment: Cognitive Abilities Test (CogAT)

Summary of Findings: Students improved an average of 13 percentile points on the composite score on the CogAT, consistent with results from previous studies using the CogAT and the CCAT (Canadian Cognitive Abilities Test), including a previous study in one of the same schools with students with a range of abilities. The average pre-test score on the Verbal Reasoning subtest for these students was markedly low, at the 35th percentile, consistent with student selection criteria (low reading performance). On post-test, the average score on Verbal Reasoning increased to the 48th percentile.

Students Increase Effectiveness of Reading and Math Interventions with the Addition of BrainWare SAFARI (2014)

District: Richmond School District, Richmond, WI
Subjects: 21 students in grades 1-6, recommended by teachers as needing extra support
Students also received a reading or math intervention
Usage: 3 sessions per week, 30 minutes per session, 11 weeks
Assessment: AIMSweb rate of improvement (ROI)

Summary of Findings: The majority of students who used BrainWare SAFARI and were provided with a reading intervention received an ROI score greater than the expected ROI, as did the students who used BrainWare SFARI and a math intervention. Students who used BrainWare SAFARI and received an intervention had a greater increase in ROI than students who only received an intervention.

Cognitive Skills Development Helps Close the Gap for Students Performing Below Grade Level (2013)

District: Millville Area School District, Millville, PA
Subjects: 214 students in 3rd through 6th grades, subgroup of students with IEPs
Usage: 3 sessions per week, 30 minutes per session, 14 weeks
Assessment: DIBELS ORF in 3rd and 4th grade, GRADE reading assessment in 5th and 6th grade

Summary of Findings: Test scores were compared to prior year test scores for all students. Students who performed below grade level the prior year experienced significant gains following their use of BrainWare SAFARI and average performance narrowed or closed the gap. For students with IEPs, the 3rd grade students more than doubled their WPM gains and significantly narrowed the gap. The 4th grade students with IEPs also narrowed the gap to grade level on the DIBELS ORF. The 5th grade students with IEPs moved from significantly behind grade level the previous year on the GRADE assessment to ahead of grade level following their use of BrainWare SAFARI. The 6th grade students with IEPs gained twice the expected growth on the GRADE test and narrowed the gap to grade level.

Special Needs Students Benefit from Use of BrainWare SAFARI (2013)

District: Fillmore Unified School District, Fillmore, CA
Subjects: 7 3rd grade students, identified as special needs, as part of a larger study, 5 students ended up in the treatment group and 2 in the non-treatment group
Usage: 3 sessions per week, 30 minutes per session, 11 weeks
Assessment: OLSAT, California State Test (ELA and Math)

Summary of Findings: Two students in the treatment group experienced large gains on the OLSAT and on state test scores following their use of BrainWare SAFARI. Neither of the students in the non-treatment group showed improvement. One of the two students achieved a 27 percentile-point increase on their total OLSAT score. In 2nd grade, this student received a scaled score on the California state test 116 units below the state-wide median. In third grade, following use of BrainWare SAFARI, this student scored 80 units above the state median score, moving from Far Below Basic to Advance on the ELA. The second student achieved a 15 percentile-point increase on the total OSLAT score. In 2nd grade, this student scored 78 units behind the state-wide median on the state test. In 3rd grade, the student closed the gap to the state-wide median to 23 units, moving from Below Basic in ELA to Basic and from Basic to Advanced in Math.

Strengthening Cognitive Processes in Students with Resource Plans (2012-2013)

District: Nativity Catholic School, Brandon, FL
Subjects: 18 students in 3rd and 4^h grades, with resource plans
Usage: 2 to 3 sessions per week, 30 minutes per session, 10 weeks
Assessment: Woodcock Johnson III Cognitive Battery Subtests: Visual Matching 2, Decision Speed, and Pair Cancellation, age equivalent

Summary of Findings: In the Fall implementation, student performance on the three WCJIII subtests improved an average of 1 year 3 months over 10 weeks. In the Spring implementation student performance improved an average of 1 year 6 months. These results are consistent with those from previous studies on these three tests. (NOTE: These subtests were chosen because they could be group-administered, using paper and pencil.)

BrainWare SAFARI at Harbor Beach Community Schools (2009)

District: Harbor Beach Community Schools, Harbor Beach, MI
Subjects: Students aged 7 to 16, recommended by teachers because of learning issues, need for extra support
Usage: 4 sessions per week, 45 minutes per session, 12 weeks
Assessment: Woodcock Johnson III Cognitive Battery

Summary of Findings: The students' average improvement was 3 years 1 month, following their use of BrainWare SAFARI. Each student exhibited improvement in their intellectual ability on the test. Teachers observed significant improvements in academic performance.

Case Study – Two Special Needs Students (2008)

Subjects: 2 male students, ages 9 and 12, with significant learning and processing issues, whose progress in a reading remediation program had plateaued.
Usage: 3 to 6 sessions per week, 30-60 minutes per session, 12 weeks
Assessment: Woodcock Johnson III Cognitive Battery

Summary of Findings: Following their use of BrainWare SAFARI, the boys improved their performance on the cognitive tests by 5 years 4 months and 2 years 2 months respectively. Their parents reported positive changes in attention, tolerance for frustration, pace of work and self-confidence. Both were then able to resume and benefit from further reading remediation.

Case Study – Family with ADD/ADHD (2008)

Subjects: 3 male children, ages 9, 10 and 11, diagnosed as ADD or ADHD
Usage: 3 sessions per week, 60 minutes per session, 11 weeks
Assessment: BrainWare Behavioral Rating Scale

Summary of Findings: Improvements were noted for all three boys, including their attention skills, perceptual processing, life management and self-esteem.

BrainWare SAFARI with Students with Autism Spectrum Diagnoses (2008)

Subjects: 33 Male (28) and female (5) students, ages 5 to 16, with a range of ASD (severe to Asperger's)
Usage: 3 to 5 sessions per week, 30-60 minutes per session, 12 weeks
Assessment: CARS Rating Scale, BrainWare Behavioral Rating Scale

Summary of Findings: Over half of the students were able to persist in use of the program over the duration of the study. Subjects aged 9 and older and those with higher functioning and Asperger's diagnoses demonstrated the most benefit, with improvements noted in perceptual processing, sensorimotor function, attention, thinking (logic and reasoning), and life management skills. Improved interpersonal relationships and greater tolerance for frustration were also observed.

BrainWare SAFARI in a Special Needs School (2007)

School: The Gap School, Sarasota, FL
Subjects: Students aged 11 to 17, with IQs of 70-80
Usage: 2 sessions per week, 30 minutes per session, duration of the school year
Assessment: Detroit Tests of Learning and Aptitude, Gibson Cognitive Battery

Summary of Findings: Students improved their cognitive skills by 9 months on average over the school year while they used BrainWare SAFARI, a greater improvement than typically experienced by this type of student. Persistence and tolerance for frustration were better than with previous paper-based therapy techniques.

Cognitive Skills Development in Special Education

Multiple decades of research and practice have resulted in significant shifts in the way students with learning disabilities are supported in schools in the U.S. and elsewhere. In the U.S., federal policy defines various categories of disabilities that may entitle students to special education services or other educational accommodations. Some of the disabilities identified in the Individuals with Disabilities Education Act (IDEA) constitute barriers to access to education or limitations on the students' ability to participate in certain activities. These would include deafness, blindness and orthopedic disabilities. These types of disabilities may exist even when the learning mechanisms of the brain are still intact and functioning normally. Other disabilities, however directly involve the brain's learning processes. Specific learning disabilities, in particular, are defined as deficits in underlying psychological processes involved in learning. Such deficits may affect visual working memory, verbal working memory, processing speed and short-term memory and other cognitive processes. Intellectual disability also directly impairs the brain's learning capacity. And still other identified disabilities may include under-developed cognitive processes. For example, students with ASD or ADHD typically have issues with attention skills, working memory and other executive functions, which play important roles in learning.

The image below is a conceptual representation of the stages and relationships of mental processes involved in learning. Deficits in any of the skills involved at any stage of processing can impair learning.



Educators who work with students with deficits in underlying cognitive processes that impede their ability to learn to read, write and do math typically use three categories of strategies to help students receiving special education services:

Special Education Strategy	Examples
Accommodation	More time on tests. Verbal instructions instead of (or in addition to) written instructions. Help with note-taking.
Curriculum Modifications	Texts at a lower reading level. Fewer spelling words or math problems. Assignments targeted at lower-level skills (e.g., recall vs. analysis).
Compensatory Strategies	Visual planners Mnemonics Color coding

It is important to understand that the purpose of these strategies is to bypass the cognitive processes that are weak in order to minimize the impact of processing deficits. Thus, for example, if a student has limited working memory capacity and can't remember a set of three instructions, the teacher would eliminate the need to hold three items of information in working memory, and, instead, give the instructions one at a time. That is an example of an accommodation.

These commonly used intervention strategies often do not result in student success. Students receiving special education services continue to lag the general population in academic achievement (NAEP). Recent research suggests that the lack of effectiveness of these strategies is explained by the substantial cognitive deficits that impair the students' learning progress. (Swanson, 2009 and Geary, 2004)

Over the last decade, researchers and educators have begun to explore a fourth strategy, the remediation of cognitive processes known to be weak. (Muller, 2012) The concept is that helping students develop weak cognitive areas will help them learn more like their typically developing peers, rather than working around them or using strategies to bypass them.

A major focus of many research efforts has been on the training of working memory, a cognitive skill also referred to as an executive function, which is highly correlated with a variety of aspects of academic achievement. Numerous studies have shown a positive effect of training on working memory, but not all have shown a transfer of the gains to academic performance. (Holmes and Gathercole, 2013)

BrainWare SAFARI takes a more comprehensive and integrated approach to cognitive skills development, working on 41 skills in the areas of attention, memory (including working memory), visual processing, auditory processing, sensory integration and logic/reasoning. In the studies summarized earlier in this document, both cognitive and academic gains have been significant for students with specific learning disabilities and IDEA categories of disabilities, including ASD and ADHD, as well as students receiving extra resource support.

In developing an IEP (Individualized Education Plan) to include cognitive skills development, the following aspects of the IEP should be considered:

A. Current level of performance

A student's current level of performance on both cognitive and academic measures should be taken into account. Cognitive assessments such as the Woodcock-Johnson III Cognitive Battery, the CAS, the CogAT, or Mindprint can be used to look at a baseline measure of cognitive functioning. It is also usually very helpful to gather parent and teacher observations of behaviors indicative of cognitive development (the BrainWare Behavioral Rating Scale can be used for this).

Formative and summative academic benchmark tests can be used to understand a student's current level of academic performance.

B. Measurable goals

Few IEPs have historically established goals for cognitive growth, since most cognitive testing has been used diagnostically, that is simply to diagnose, without any expectation of significant change. However, when cognitive training is part of the intervention, then repeating a cognitive test following the intervention is appropriate. The cognitive assessments listed above can be administered again following the intervention to document areas of improvement. Behavioral goals should also be specified and can be based on parent and teacher observations gathered to document initial performance. For example, if one of the original observations was that the student was not able to accurately copy assignments from the board, then that could form the basis for a behavioral goal that "X will be able to copy homework assignments accurately from the board."

In developing goals for academic performance, educators should recognize that the goal of a cognitive training intervention is to enable the student to learn as his/her normally developing peers. The research cited above suggests that goals should not just envision progress, but progress toward narrowing or closing the gap to grade-level norms and peer performance.

C. Services

Cognitive training services defined in an IEP should specify the cognitive training tool and and/or materials that will be used. An effective cognitive training tool will meet the criteria listed in the Appendix of this document. The IEP should also define the frequency and duration of use of the training, the role of the individual or coach working with the student, and how progress will be monitored.

D. Participation with non-disabled students

An advantage of computerized cognitive training is that students can work on the program alongside non-disabled students.

Training of cognitive skills with BrainWare SAFARI can significantly remediate underlying weak cognitive processes for many students with learning disabilities. In some cases, students have been able to be mainstreamed more quickly into a general education environment; in other cases, reading- and math-specific interventions have worked more rapidly than prior to the cognitive training. (Avtzon, 2012)

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Appendix – Principles of Effective Cognitive Training

Progressive challenge. One of the principles of good video games is that each level gets progressively more challenging and that's also critical for cognitive skill development. The concept is sometimes referred to as the "zone of proximal development." The user needs to be challenged but not too far above his or her current ability level.

Novelty and changing expectations. More than simple increases in difficulty, effective cognitive training involves novelty and changing expectations.

Cross-Training. If a program develops skills independently, then the brain doesn't get practice at using them together. An effective program needs to work cognitive skills in a comprehensive and integrated way so that the brain will know how to "put it all together."

Feedback. Good cognitive training programs provide instantaneous feedback. This enables us to learn from our mistakes, make immediate adjustments and try again.

Coaching. It is often helpful to have a coach working with the user, whether a parent at home, a teacher with students at school, or a clinician or therapist in their office.

Engagement. In order for the program to deliver significant cognitive growth, it will get hard for user – probably very hard – at some point. That is when engagement and motivation to persist are essential. Motivation to persist can be fostered by good coaching but the extrinsic and intrinsic rewards of the training and the degree to which the program delivers on the sense of developing mastery, builds the sense of autonomy and has an overall purpose are vital.

Protocols to achieve specific goals. A cognitive training program should have a regimen or protocol for usage to deliver the benefits that it claims, based on research. There may be different protocols for different goals or for different types of users, taking into consideration the frequency and intensity needed to result in changes in the strength of neural networks. Just like going to the gym once a week might make you feel less guilty, but doesn't do much for physical strength, flexibility or stamina, it will take multiple times a week for a number of weeks to make a noticeable difference with cognitive training.

Study of the Impact of BrainWare SAFARI on Cognitive Skills and Student Achievement

Purpose of the Study

BrainWare SAFARI cognitive skills development software has been evaluated in over 20 studies, including both peer-reviewed, published research and field studies, with a variety of populations and assessments. Significant gains have been shown on both cognitive and academic measures. The prior research suggests the potential for the program to have a positive impact on a much broader scale in education. The purpose of this study is to conduct independent research that would serve to inform policy decisions regarding the adoption of BrainWare SAFARI across a broad spectrum of elementary schools and student populations.

Researchers

Center for Evaluation and Education Policy at Indiana University (CEEP)
Dr. Patricia Muller, Director of Evaluation and Research and CEEP Associate Director
Dr. John Hitchcock, CEEP Director and Associate Professor of Instructional Technology Systems

Study Confirmatory Questions

- Does participation in BrainWare SAFARI yield greater *growth in cognitive skills*, compared to a control group?
- Does participation in BrainWare SAFARI yield greater *student academic achievement*, compared to a control group?

Planned Study Exploratory Questions

The following are examples, not an exhaustive list of potential exploratory questions:

- Whether gains in cognitive skills are sustained a year later
- Impact of student subgroups (e.g., Special Education status, Gifted status, ELL status, Free and Reduced Lunch status, in addition to the general population of students)
- Implementation fidelity

Study Design

Randomized Controlled Trial (RCT) Design
Designed to meet the What Works Clearinghouse standards

Sample

64 schools, randomly assigned to the treatment and control conditions
Public (both traditional public schools and charter schools) and Private Schools (must administer the ISTEP)
Students in 3rd, 4th and 5th grades in participating schools
Urban, suburban and rural elementary schools

Measures

Cognitive Abilities Test (CogAT), Form 7
Indiana Statewide Testing for Educational Progress Plus (ISTEP+)

Research Timetable

2014-2015 School Year	2015-2016 School Year	2016-2017 School Year
Refine research plan Garner school interest/commitment	Students in treatment schools use BrainWare SAFARI in Fall Control schools follow normal routine	Control schools use BrainWare SAFARI Treatment schools do year-later testing

The conduct and reporting of the study will be entirely independent from The BrainWare Company and any funding sources. One or more reports will be written at the completion of the study, with attempt made to publish, regardless of the findings. There is no fiduciary relationship between The BrainWare Company and CEEP. This does not constitute an endorsement by CEEP of any aspect of the product to be tested. Funding is not contingent on CEEP doing the proposed work.

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A Synopsis of Research Results for BrainWare Safari



BrainWare Safari (BWS) is designed to comprehensively develop the cognitive skills that are most important for learning. Several studies have been completed using BWS in different settings to demonstrate its effectiveness. LEC continues to sponsor additional research on BWS and to cooperate with independent researchers involved with cognitive-behavioral investigations as well as schools and other educational institutions.

Study Identifier	Subject Details	Measures Results Additional		Information
CHA ¹ Phase I Spring 2005	<ul style="list-style-type: none"> 34 children divided into a control and study group (17 each) Worked at home with parents' assistance as needed over 11 weeks 	Subset of Woodcock-Johnson III Cognitive Battery Subset of Woodcock-Johnson Tests of Academic Achievement	<u>Study group</u> <ul style="list-style-type: none"> Avg. cognitive improvement = 4.3 years' Avg. academic improvement = 1.11 years <u>Control Group</u> <ul style="list-style-type: none"> Avg. cognitive improvement = 4 months Avg. academic improvement = 1 month 	Published in Helms D, Sawtelle SM. A study of the effectiveness of cognitive skills therapy delivered in a video-game format. <i>Optom Vis Dev</i> 2007, 38(1):19-26. A similar study with 9 Asian students from Xilin Community Center ³ also showed similar results.
CHA Phase II Summer 2005	<ul style="list-style-type: none"> 11 children from the control group of Phase I used BWS over 15 week summer and were re-tested Worked at home with parents assistance as needed in the summer 	Subset of Woodcock-Johnson III Cognitive Battery Subset of Woodcock-Johnson Tests of Academic Achievement	<ul style="list-style-type: none"> Avg. cognitive improvement = 4.0 years Avg. academic improvement = 1.1 years 	Published in Helms D, Sawtelle SM. A study of the effectiveness of cognitive skills therapy delivered in a video-game format. <i>Optom Vis Dev</i> 2007, 38(1):19-26.
Harbor Beach Community Schools ⁴ Spring 2008	<ul style="list-style-type: none"> 10 students 10 weeks, 45 minutes, 4 times a week Average age 11.1 years Worked in lab with supervision after school 	Subset of Woodcock-Johnson III Cognitive Battery	<ul style="list-style-type: none"> Avg. cognitive improvement = 3.1 years 	<ul style="list-style-type: none"> Independent verification of published results

- CHA is Christian Heritage Academy in Northfield Illinois.
- This notation is used throughout this document for age equivalent scores: 4.3 years means 4 years 3 months.
- The subjects were students in the after-school program at the Xilin Community Center in Naperville, Illinois.
- Harbor Beach Community Schools is in Harbor Beach, Michigan. This study was performed under the supervision of a certified SLP for the Huron Intermediate School District.



A Synopsis of Research Results for BrainWare Safari



Study Identifier	Subject Details	Measures Results Additional		Information
Glenwood School for Boys and Girls 2008-2009 SY	<ul style="list-style-type: none"> 2nd through 8th grades 96 students 51 girls, 45 boys 	Visual Motor Inventory Woodcock-Johnson III Academic Tests: Reading Fluency, Writing Fluency, Math Fluency Woodcock-Johnson III Cognitive Tests: Decision Speed, Pair Cancellation	<ul style="list-style-type: none"> Results are in grade equivalents Cognitive changes range from 1.5 GE in grade 2 to 3.0 GE in grade 7 Academic changes range from 0.5 GE in grade 2 to 2.9 GE in grade 8 	<ul style="list-style-type: none"> Shows the academic benefit of developing cognitive skills Publication planned
CHA 1 year later September 2006	<ul style="list-style-type: none"> All students from Phase I and Phase II were invited, 14 set appointments, and 5 were able to keep those appointments. 	Subset of Woodcock-Johnson III Cognitive Battery	<ul style="list-style-type: none"> All five sustained their cognitive development. Three continued accelerated growth. Two lost some of the gains but remained well above their age & baseline. 	<ul style="list-style-type: none"> Unpublished results.
Edgar Evans Academy Spring 2006	<ul style="list-style-type: none"> 28 4th and 5th grade boys with discipline problems. Avg. chronological age = 11.0 years Avg. cognitive age at pre-test = 8.2 years 	Subset of Woodcock-Johnson Cognitive Battery	<ul style="list-style-type: none"> Avg. intellectual age post-test = 14.2 years Avg. cognitive improvement = 6.0 years Every student in this study showed growth, with many showing multiple year growth. 	<ul style="list-style-type: none"> Teachers recorded behavioral improvements: focus, self-esteem, cooperation, etc. Publication planned.
Coleman Academy Spring 2008	<ul style="list-style-type: none"> 4th, 6th and 7th grades 4th Grade Girls was the only class that used BrainWare according to the implementation plan. 	Academic progress in Reading using DIBELS®	<ul style="list-style-type: none"> Each 4th grade girl improved her reading score, the only class in which each student improved. 4th Grade Girls end of year average ORF score was 144 WPM – 26 points above benchmark, and higher than any other class. 	<ul style="list-style-type: none"> The 4th Grade Girls teacher noted behavioral improvements: making fewer careless errors, memory, grasping new concepts, communication with parents, peers and teachers.

5. Glenwood School for Girls and Boys in Glenwood, IL, is a community supported non-profit organization dedicated to making a difference in the lives of disadvantaged children in the Chicagoland and Fox Valley Regions.

6. Edgar Evans Academy, one of the schools within the Indianapolis Public Schools (IPS).

7. Coleman Academy is one of the schools within Indianapolis Public Schools (IPS).



A Synopsis of Research Results for BrainWare Safari



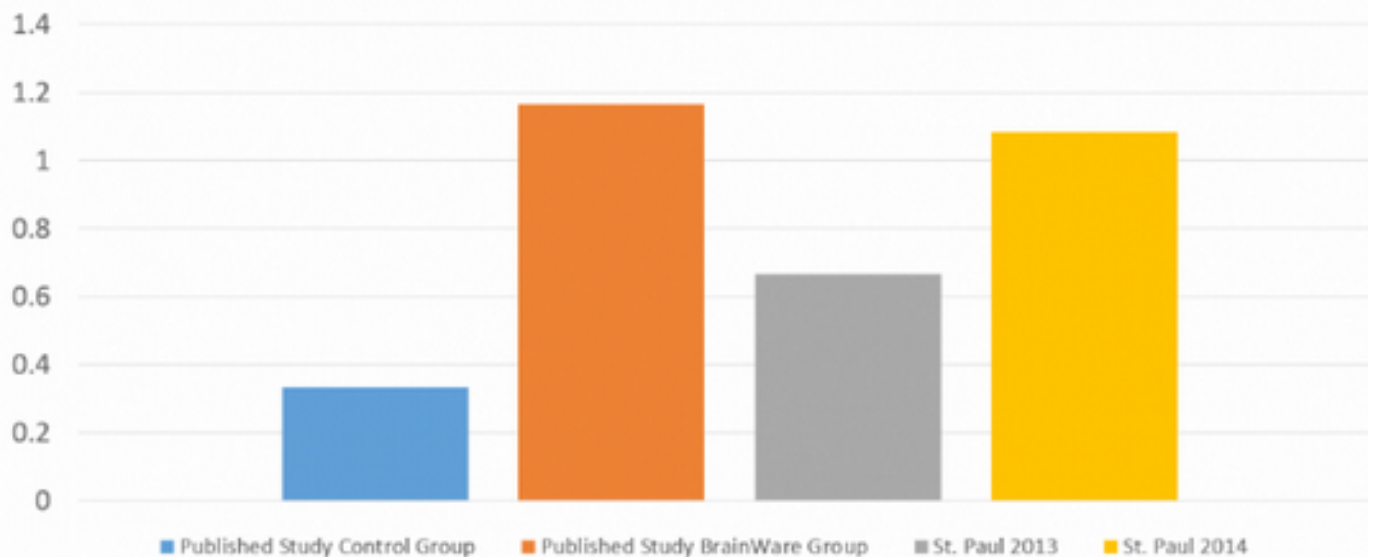
Study Identifier	Subject Details	Measures Results Additional		Information
			<ul style="list-style-type: none"> 4th Grade Girls was the only class that exceeded their end-of-year benchmark. 	
Autism Study ⁸ Winter 2006 -- Spring 2007	<ul style="list-style-type: none"> 33 ASD children ages 5.5 to 16 	Behavioral Rating Scale and Autism Rating Scale (CARS)	<ul style="list-style-type: none"> Increases in Sensorimotor Skills, Perceptual Processing Skills, Attention Skills, Thinking, Life Management Improvements in relationships and less frustration observed. 	<ul style="list-style-type: none"> 52% rate of completion of study among participants -- not all ASD children will respond well. Asperger's Syndrome and High Functioning Autism had highest success rate. 9 years and up had the highest success rate.
Whitney Center Case Study Spring 2006	<p>Two of the Center's most challenged students:</p> <ul style="list-style-type: none"> Case 1: 12.4 year old testing at 7.5 years Case 2: 9.11 year old testing at 9.0 years. 	Subset of Woodcock-Johnson III Cognitive Battery	<ul style="list-style-type: none"> Case 1 improvement = 2.2 years Case 2 improvement = 5.4 years 	<p>Case 1: Parent reports he is paying better attention to directions now and he can work at things for longer without giving up or getting frustrated.</p> <p>Case 2: Parent reports better decision-making, working at a more reasonable pace, and completing his school work both in class and at home much more quickly and confidently.</p>
The Gap School ⁹ 2006-2007 School Year	<ul style="list-style-type: none"> 7 severely challenged students IQ range 70 to 80 Average age of 14 Very low cognitive and academic ability 	Subsets of the Gibson Cognitive Battery and Detroit Tests of Learning Aptitude	<ul style="list-style-type: none"> 9 months cognitive improvement on average Typical interventions with these students results in either a decline or no improvement over the 8-month school year 	<ul style="list-style-type: none"> Each of the 7 students exhibited at least one area of significant growth. BrainWare was not easy for these students. High numbers of attempts were needed to pass even the lowest levels. Level of fun increased motivation so their level of frustration was moderated more than paper-based interventions.

8. Study performed in conjunction with Carole Richards of North Coast Educational Services, Solan, OH. NCES is a center that specializes in helping children with learning disabilities like those with an ASD diagnosis.

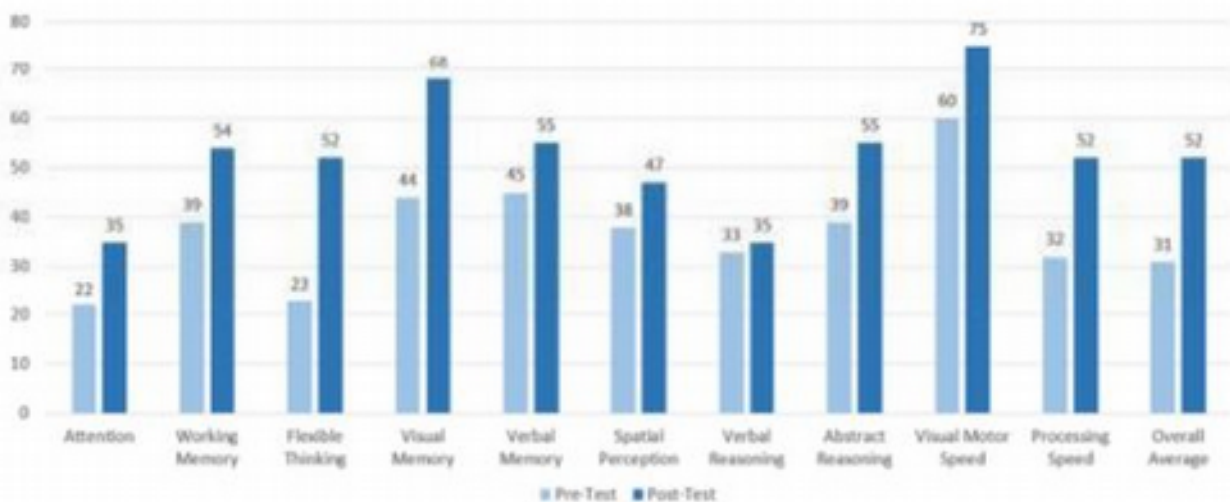
9. Carolyn Gibb, owner and founder of The Whitney Center in Richmond, IN. The Whitney center is a tutoring center that specializes in reading remediation.

10. This study was implemented/tested entirely by the staff at the Gap School in Sarasota Florida. For more information check out their website: <http://www.thegapschool.com>.

St. Paul Catholic School, St Petersburg, FL Age Equivalent Scores on WCJIII Subtests Before and After BrainWare SAFARI Use



Average Percentile Rankings Before and After Using BrainWare SAFARI



Following use of BrainWare SAFARI, these students' average score on the cognitive tests improved by 21 percentile points, with significant growth on all three Executive Functions tests as well as reasoning, memory, and processing speed.

In the context of a Multi-Tiered System of Supports or other student support initiatives, the Mindprint cognitive assessment helps teachers and other school staff determine the root causes for struggling or under-performing students, by pinpointing the non-instructional (i.e., cognitive) reasons for a student's difficulties. This enables truly individualized support with an intervention targeted at developing executive functions, and strategies based on actionable data, rather than guesswork. This enables teachers and administrators to unpack the learning process and be more strategic in the application of resources.