2014 REPORT OF

LearningRx Training Results

EXPANDED EDITION

LearningRx

based on 2011 and 2012 data

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Whereas other programs will not guarantee gains for individuals participating in their programs, LearningRx will. Individual results, however, can vary from the averages presented in this report and from student to student.

Introduction from Dr. Ken Gibson

Dr. Ken Gibson is the founder and CEO of LearningRx, a company with over 85 centers across the country specializing in making kids and adults of all ages measurably smarter through research-based programs that train the brain.

Over 6,000 children and adults received training in 2011 and 2012 at 80 LearningRx Brain Training Centers throughout the United States. Some were college students seeking greater academic success. Others were career or senior adults wanting to stay mentally sharp, or accident victims wanting to regain skills they had lost due to an injury.

The majority, however, were students struggling to do better in school.

Why did their families choose one-on-one brain training over tutoring? Perhaps it's because, dollar for dollar, one-on-one brain training is more than 10 times more effective than tutoring. (Want dollar figures? See page 19.)

Here's why personalized, one-on-one brain training is so effective:

Tutoring reteaches information that wasn't grasped the first time around. LearningRx takes a different approach, strengthening the underlying brain skills that improve how students grasp and learn information the first time it is presented! And since studies show that about 80% of all learning struggles[1] are the result of weak cognitive skills, by strengthening those skills, LearningRx brain training gets to the root of most learning struggles. For a student who has struggled for years, you can't imagine how life changing this can be!

Furthermore, LearningRx brain training is research-based. We are constantly evaluating our results, and applying the latest research to modify and improve our programs.

Not only that, but at LearningRx we measure the gains of every student using the gold standard of cognitive skills testing. This means that LearningRx not only gets unmatched results, we can measure those results scientifically.

In the following report, you'll see some of the impressive results of our personalized, one-on-one brain training programs. (Like 3.1 years of reading gains in as little as six months. See page 12.)

What you can't see in these pages are the lifelong benefits our students and clients of all ages enjoy as a result of brain training. LearningRx clients don't just get better grades and greater IQ; they get faster, sharper brains that help them succeed in every area of life over the course of their entire life. (Did you know that LearningRx brain training raises IQ by an average of 15 points,[2] which statistics link to higher salaries? In fact, statistics prove that even a 10-point increase in IQ can result in as much as $20,000 more in earnings per year! See page 19.)

By the way, I'm pleased to tell you that our data has undergone detailed statistical analysis that supports the statistical significance of these results. I would also like to take this opportunity to invite other researchers to evaluate our training with their own independent studies. We are very transparent about our training results and would be happy to work with you.

The results are in. LearningRx brain training changes lives. Will it change yours, or that of someone you love?

Dr. Ken Gibson
Founder & CEO, LearningRx

1 To learn more about the 80% figure, see page 21.

2 LearningRx brain training raises IQ by an average of 15 points among students who do all of their training in one of our centers, and by an average of 14 points across the board, including clients who did some of their training at home.

About the Statistics in This Report

Dr. Kirk Cameron

Amy L. Moore, M.A.

What does it mean for a result to be "statistically significant"?

Sometimes things happen by chance. Sometimes the relationship between two events is such that it's hard to say what really caused the change in question. Did one thing cause the other, or is coincidence at play?

Measuring the likelihood that an event occurred by chance is the idea behind "statistical significance." If you are a professional (or parent) interested in the statistical significance of the results represented in these pages, you'll want to check out the statistical analysis conducted on our data by Dr. Kirk Cameron, and summarized by Amy Moore, M.A.

Dr. Cameron is the founder and president of MacStat Consulting, Ltd., a statistical consulting firm in Colorado Springs, Colorado. He has has more than 20 years' experience teaching and consulting to private firms and government entities including the USEPA, and the US Air Force.

Ms. Moore has a Masters in Education, and is a college instructor and doctoral candidate in educational psychology with an emphasis on quantitative research.

You can find Ms. Moore's summary in the section on statistical analysis beginning on page 22 of this report. To review Dr. Cameron's complete analysis, visit the website: www.learningrx.com/results

Who Benefited from LearningRx in 2011–2012?

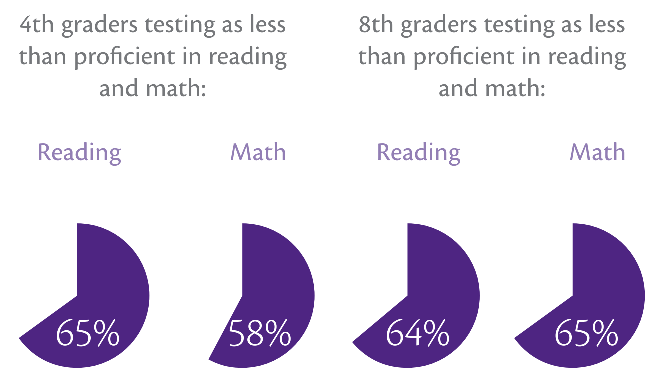
In 2011 and 2012, over 6,000 children, teens, and adults received training at more than 80 LearningRx Brain Training Centers across the country. They came to LearningRx from every age and stage of life, all of them seeking the life changing benefits of a faster, smarter brain.

The majority of our clients were school-aged children and teens struggling to succeed in school—particularly students with reading and attention difficulties. According to the National Report Card, only 37% of fourth and eighth graders in the United States are proficient in reading and math. (That's fewer than four out of ten students!) LearningRx brain training helps these students because our programs strengthen the weak cognitive skills that studies say are at the root of 80% of all learning struggles.

In addition, clients of all ages came to us reporting various issues or diagnoses as reported below.

The Nation's Report Card

US Scores for Reading and Math in 2013

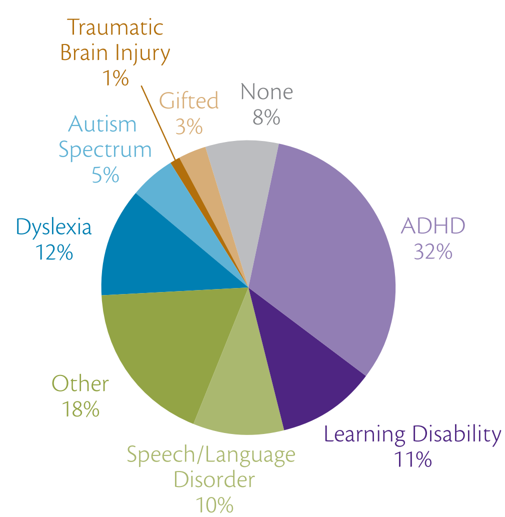


To learn more about the Nation's Report Card, visit: http://www.nationsreportcard.gov

Percentage of Clients Who Came to LearningRx Reporting the Following Symptoms:

Attention issues	65%
Reading struggles	52%
Poor comprehension	47%
Working slowly	46%
Low math skills	45%
Writing struggles	44%
Poor spelling	38%
Avoiding schoolwork	37%
Poor memory	36%
Motivation/behavior issues	35%
Low self-esteem	31%
Loses place/skips words	22%
Reverses letters	22%
Other	17%
Overly active	11%
Works too hard	11%

Percentage of Clients Who Came to LearningRx Having Been Previously Diagnosed Within One of the Following Categories:



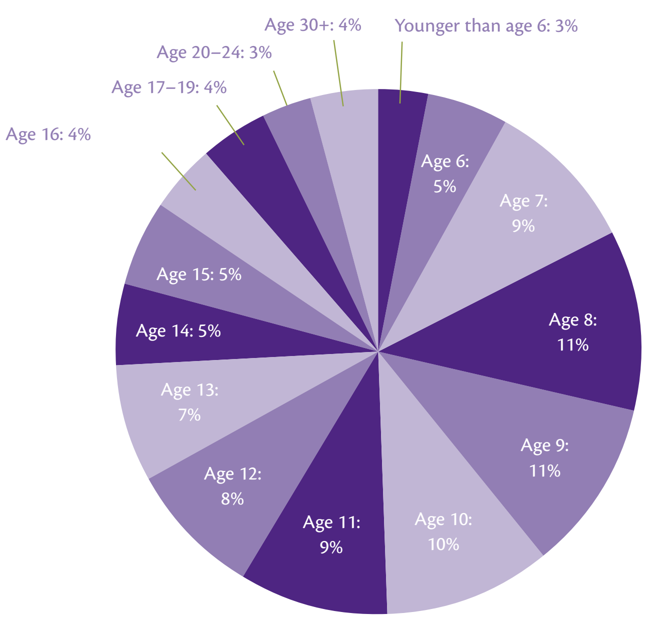
NOTE: LearningRx does not diagnose clients or remove diagnoses. The diagnoses listed in this report are reported by clients, and we are only designating this information based on what clients have told us. All individuals should consult with a medical professional for all matters related to a specific diagnosis.

"I am able to pay attention and stay focused…Thank you!"
"Before coming to LearningRx, I was having a difficult time concentrating and staying focused on tasks. Just a couple weeks after starting my training, I saw improvements in my daily activities. I am able now to remember things I need to do or grocery lists. The most significant improvement is in my attention. Before brain training, I had a hard time paying attention in class and reading required materials. Now I am able to read and actually comprehend what I read the first time. I am also able to sit through a three-hour class and pay attention and stay focused the entire time. Thank you so much!"

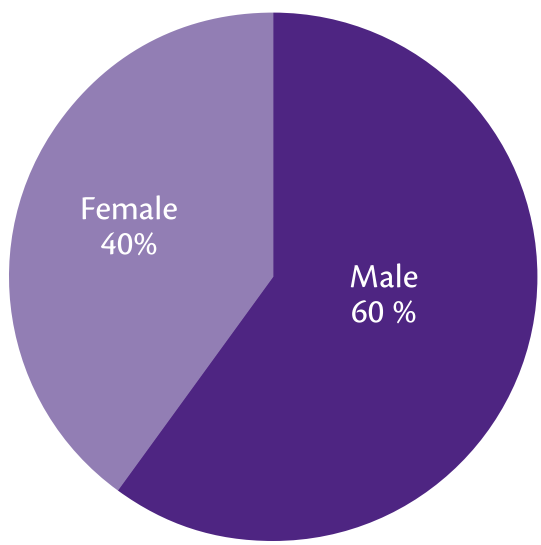
— Amanda in Los Angeles

Finally, the following charts show the distribution of clients who received training at our centers in 2011 and 2012 according to age and gender:

Ages of LearningRx Clients in 2011 and 2012
Average age: 12.3 years



Gender of LearningRx Clients in 2011 and 2012



In summary, the average age of our clients was 12.3 years, with the majority of our clients between the ages of eight and thirteen. Male students outnumbered female clients 60 to 40 percent.

Step One:
Finding the Cause

People come to us for help because they want to read better, learn faster, increase attention skills, develop a sharper memory, or simply process information more quickly. But before we can address any of these issues, we need to know which underlying cognitive skills are weak and causing the problem.

TESTS WE USE:

LearningRx uses the gold standard of assessment tools, including the Woodcock-Johnson Tests of Cognitive Abilities and the Woodcock-Johnson Tests of Achievement. These nationally standardized tests are used across the country by educators and psychologists to measure cognitive skills and academic abilities.

The Woodcock-Johnson tests also generate a General Intellectual Ability (GIA) score, which represents the g factor (often referred to as general intelligence or IQ). We will commonly refer to the GIA score as IQ throughout this report.

These tests, along with learning skills rating scales, allow us to identify any weak skills that are making life harder than it needs to be.

SKILLS WE STRENGTHEN:

There are eight categories of cognitive skills that, when weak, contribute to struggles with thinking, reading, learning, memory, and attention. Our programs target and strengthen these skills. The cognitive skills that our programs improve include the following:

Long-Term Memory: The ability to recall information that was stored in the past.

Processing Speed: The ability to perform simple or complex cognitive tasks.

Logic & Reasoning: The ability to reason, form concepts, and solve problems using unfamiliar information or new procedures.

Short-Term Memory: The ability to apprehend and hold information in immediate awareness while simultaneously performing a mental operation.

Visual Processing: The ability to perceive, analyze, and think in visual images.

Auditory Processing (phonemic awareness): The ability to analyze, blend, and segment sounds.

Attention (three types): Sustained attention is the ability to stay on task for an extended period of time; selective attention is the ability to stay focused and not get distracted; divided attention is the ability to handle more than one task at a time.

Word Attack: The ability to apply phonic and structural analysis skills to pronounce unfamiliar printed words.

ABOUT OUR SCORES:

As you look at the information in this report, you'll see that test scores are commonly presented in three forms:

Age Equivalent Scores may be applicable up to the age of 16 and indicate how one student's scores compare with the average scores of other age groups.

Percentile Scores indicate where a student would rank in a hypothetical group of 100 students. (For example: If a student ranked in the 25th percentile, it would mean that he scored as well or better than 25% of students in the group. If a student ranked in the 87th percentile, it would mean that he scored as well as or better than 87% of students in the group.) Why do we report our gains in percentiles rather than percentages? Percentages don't tell the whole story. A student who starts out performing in the 5th percentile and jumps to the 15th has experienced a 200% gain. That sounds really impressive, but that student is still performing behind 85% of his or her peers. When gains are measured in percentiles, however, you can see what has been accomplished, get a clear picture of how that student is performing in relationship to his peers, and make informed decisions about what interventions may still be needed. (To learn more about the difference between percentiles and percentages, see page 11.)

Standard Scores indicate how far above or below average an individual score falls, using a common scale (ex: "average" of 100). IQ is normally presented as a standard score with "100" being average.

Step Two:
Addressing the Problem

Once we identify which cognitive skills are weak, our trainers provide intense one-on-one training designed to target and strengthen those skills. Here are our six core programs:

ThinkRx is a fully integrated system of cognitive training exercises delivered in an intense, one-on-one environment. ThinkRx quickly identifies and corrects weak skills including: attention, short-term and long-term memory, processing speed, logic & reasoning, and visual and auditory processing.

ReadRx is a revolutionary 'sound-to-code' accelerated reading program modeled after the process by which spoken language is first learned. ReadRx includes the ThinkRx program.

ComprehendRx targets the brain skills critical for reading comprehension. Going far beyond decoding written words, this program strengthens the skills necessary for dramatically improved understanding, retention, and application. ComprehendRx includes ThinkRx and ReadRx.

MathRx is a unique program that tests, trains, and strengthens the core mental skills necessary for overall math success, critical thinking, and problem solving. MathRx includes ThinkRx.

Einstein combines our ThinkRx, ReadRx, and MathRx training programs, and can include ComprehendRx as well.

LiftOff is a school-readiness program designed for preschool, kindergarten, and first grade students. Brain training builds a strong foundation of brain skills for long-term academic success.

In 2011–2012, more than 77% of our clients participated in either ThinkRx or ReadRx programs, with the average length of training running about 18 weeks.

Parents of school-aged children can choose how involved they want to be in their child's training. Parental involvement can range from very little to providing about 80% of the training.

Almost half of parents (48%) selected our "Pro Program," where the full five to six hours of weekly training is done by the center staff. Forty-eight percent opted for our "Partner Program" which allows parents to provide about half the training at home. Four percent of parents went with the "Directed Program," in which they provided the majority of training at home, with one hour provided weekly by the center staff.

Percentage of Students by Program

Program	Percentage	Program Length
ThinkRx	42%	12 weeks
ReadRx[1]	35%	24 weeks
ComprehendRx[2]	n/a	n/a
MathRx[1]	8%	20–24 weeks
Einstein[3]	8%	32 weeks
LiftOff	7%	12 weeks

1 Includes ThinkRx
2 This data is not yet available for ComprehendRx, which was launched in 2014
3 Includes ThinkRx, ReadRx, and MathRx

"Erica's concentration has improved as well as her confidence in everything she does. She has been more willing to try new activities since going through the LearningRx program. Her overall improvement in all of her classes was very exciting to see. The improvement was reflected in her higher grades and not having to struggle with homework."

— **Lorraine from Nebraska**

Percentage of Parental Participation

Parent Participation Per Week	Percentage
5 hours (via the Directed Program)	4%
3 hours (via the Partner Program)	48%
0 hours (via the Pro Program)	48%

Step Three: Measuring the Results of LearningRx Brain Training

RESULT: STRONGER COGNITIVE SKILLS

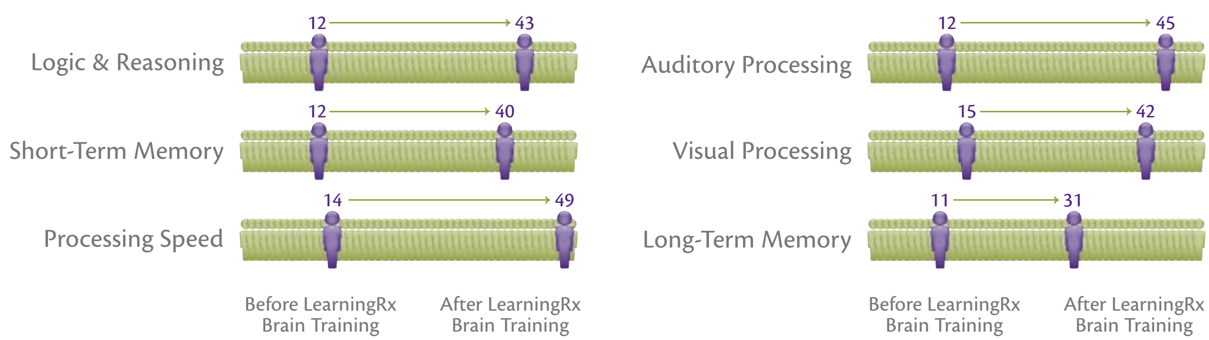
The following graphs show before- and after-training results for more than 6,000 clients who underwent an average of 18 weeks (90 hours) of training. For simplification purposes, all the scores you'll see in this report have been rounded up or down to the nearest whole number.

The graphs show changes in percentile rank. As mentioned, percentile rank indicates where someone would rank in a group of 100 of their peers, with 50 being average. In other words, if 100 students lined up according to how well they performed on a test, a student in the 25th percentile, for example, would be number 25 from the bottom end of the line, having scored equal to or better than 25% (and not as well as 75%) of the other students.

> To learn more about the statistical significance of these results, see the section on statistical analysis on page 22.

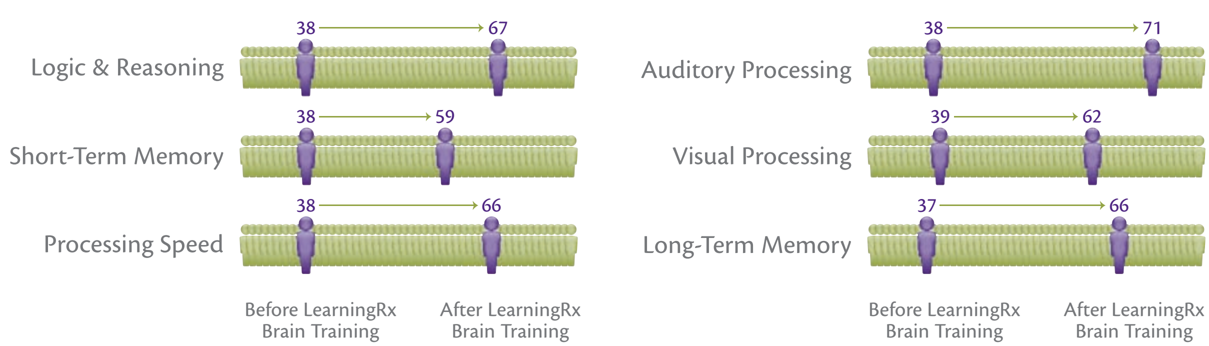
The following chart shows improvements in clients with severe cognitive weaknesses who initially tested in the lowest percentile (25th percentile or lower). After brain training, these clients "moved up in line" an average of 29 percentile points:

Percentile Improvements Among LearningRx Clients with Severe Cognitive Weakness



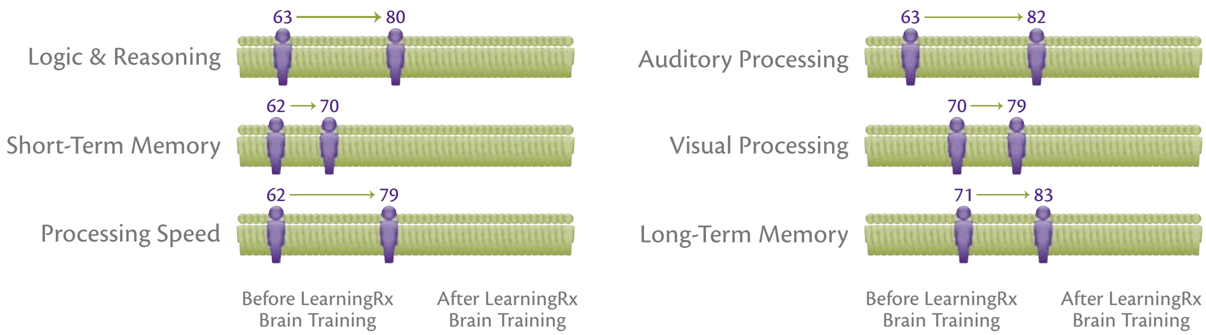
This chart shows improvements in clients with moderate cognitive weakness who initially tested between the 26th and 50th percentile. After brain training, these clients "moved up in line" an average of 27 percentile points:

Percentile Improvements Among LearningRx Clients with Moderate Cognitive Weakness



Finally, this chart shows improvements in clients with above-average cognitive skills who initially tested in the 51st to 75th percentile. These clients "moved up in line" an average of about 14 percentile points:

Percentile Improvements Among LearningRx Clients with Above-Average Cognitive Skills



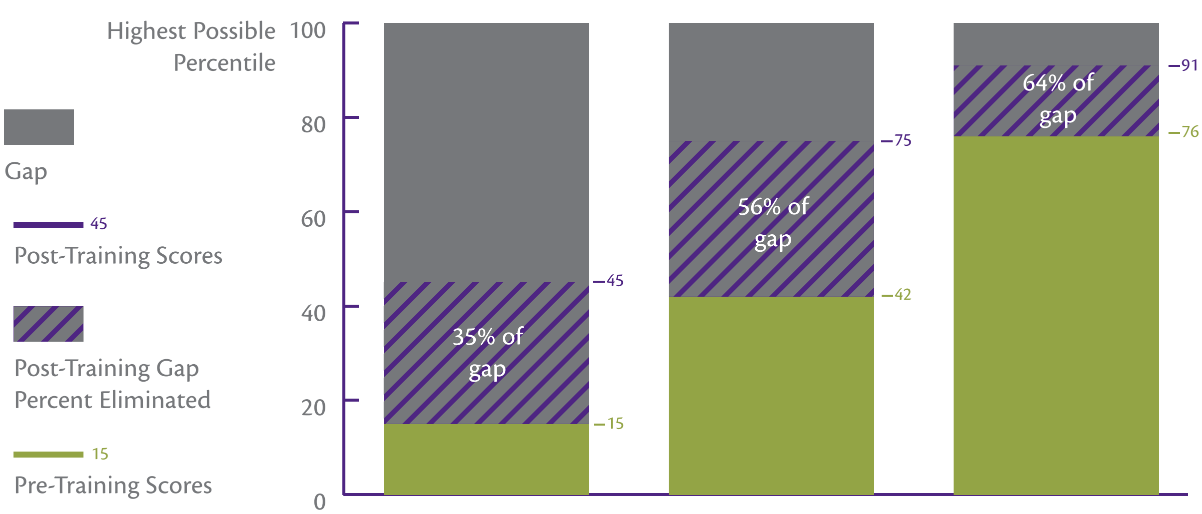
RESULT: NARROWING THE PERFORMANCE GAP

Another way to measure the overall results of LearningRx brain training is to consider the gap between how well someone performed in cognitive function prior to brain training, and the highest possible performance.

Our goal is to eliminate 35% or more of that gap by the time each client completes the recommended LearningRx training program (an average of 18 weeks of training). And if the same client participates in follow-up training a year later, our goal would be to eliminate 35% or more of the remaining gap, and so on.

The following chart shows, on average, how much of the gap was eliminated in 2011 and 2012 based on how big the gap was to begin with:

Narrowing the Performance Gap



RESULT: HIGHER IQ

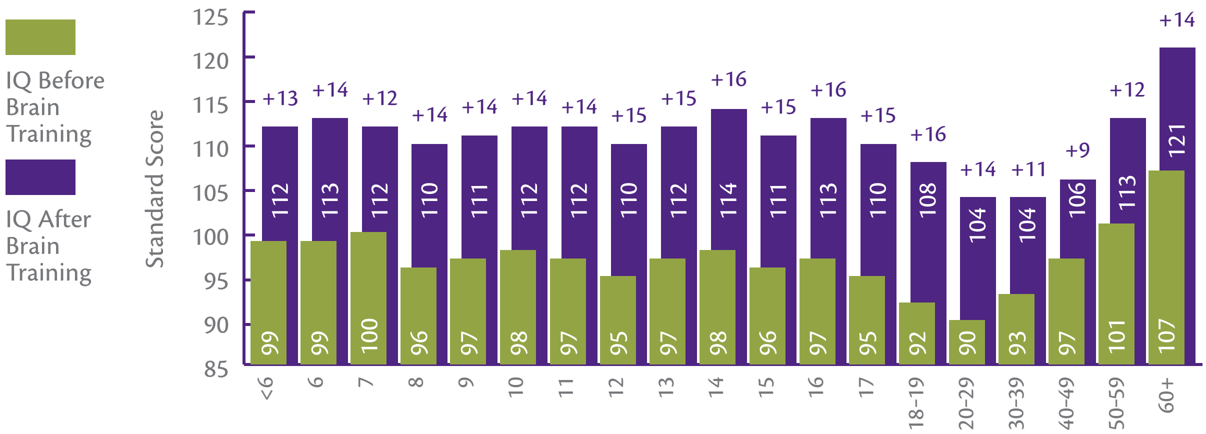
Yet another way to measure the improvements made by LearningRx clients is by tracking gains in overall IQ (referred to as General Intellectual Ability [GIA] in the Woodcock-Johnson assessment results).

After LearningRx brain training, clients experience an average increase in IQ of 15 points.[1] This is based on the experiences of 3,230 LearningRx clients (all the clients for whom we have GIA scores).

In addition, gains in IQ are achieved across all age groups. As seen in the chart below, LearningRx clients from four years old to 80 experienced significant gains in IQ:

Average Gain in IQ Points Among Clients With All Levels of Cognitive Weaknesses[1]

Average Gain in IQ Based on Age of Client

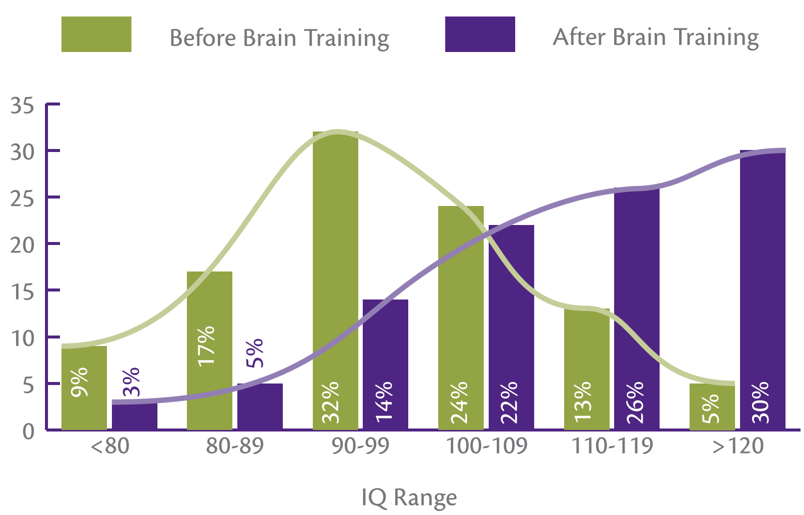


The bell curve provides another way to look at the gains that LearningRx clients make in IQ.

In the chart to the right, the green bars show the distribution of IQ scores of incoming LearningRx clients (before brain training). As you can see, 32% of our clients come to us with IQ scores in the 90-99 range, with just 18% scoring 110 or more in IQ.

The purple bars show how these same clients tested in IQ after one-on-one brain training. You can see that more clients score in the higher IQ ranges after brain training, with 56% scoring 110 or more in IQ.

Percentages of LearningRx Clients Arranged by IQ Scores Before and After One-on-One Brain Training

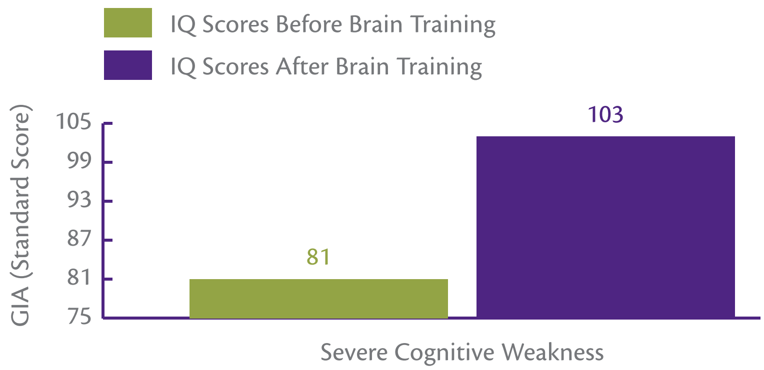


1 LearningRx brain training raises IQ by an average of 15 points among students who do all of their training in one of our centers, and by an average of 14 points across the board, including clients who did some of their training at home.

Finally, based on average IQ scores, this chart shows the gains our students experienced in terms of IQ. For example, before brain training, students who had severe cognitive weaknesses had IQ scores, on average, of 81. After brain training, these same students had IQ scores, on average, of 103. That's a gain of 22 IQ points!

+22 **Average Gain in IQ Points Among Clients With Severe Cognitive Weaknesses**

IQ Scores of LearningRx Clients with Severe Cognitive Weakness Before and After Brain Training



What Is the Difference Between Percentile Points and Percentages?

What would a percentile point increase look like if it were described in terms of percentages? You might be surprised. A large jump in percentile ranking converts to an even larger percentage of improvements in skills. See these examples below:

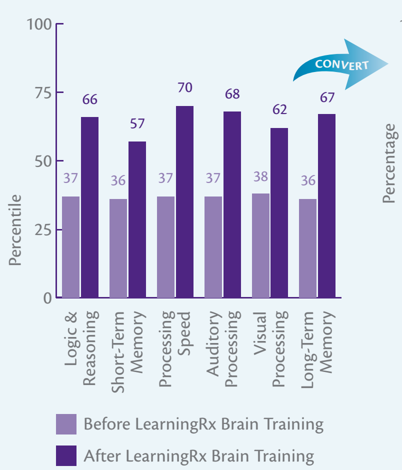
Converting Percentiles into Percentages:

Moving from the 5th to the 15th percentile represents a skills gain of 200%
Moving from the 10th to the 20th percentile represents a skills gain of 100%
Moving from the 50th to the 60th percentile represents a skills gain of 20%

Here's another way of seeing the difference.

LearningRx Improvements Shown in Percentile Points

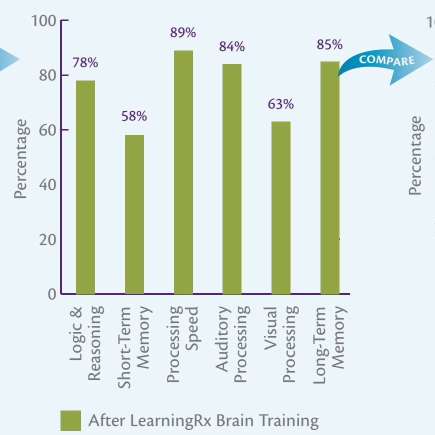
Improvements after brain training among students with moderate cognitive weakness



In the chart above, you can see the average gains experienced by our students with moderate cognitive weaknesses, as represented in percentile points.

LearningRx Improvements Shown in Percentages

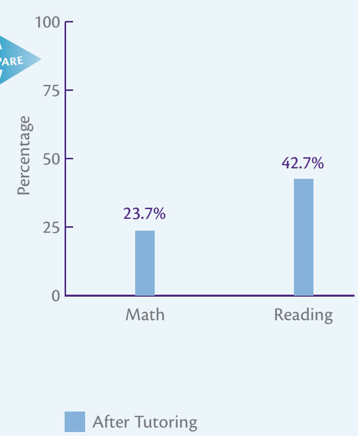
Improvements after brain training among students with moderate cognitive weakness



This chart shows what those exact same gains look like in terms of percentage of skills gained.

Another Company's Improvements Shown in Percentages

As reported by a national company among students who completed their tutoring program



By the way, when we say LearningRx brain training is more effective than tutoring, we mean it! This chart shows the percentage of skills gained as reported by a nationwide tutoring company! Compare their percentages to ours!

HOW BRAIN TRAINING HELPS SPECIFIC DIAGNOSES

LearningRx does not assign diagnostic labels. Our clients, however, often report having received a diagnosis prior to coming to LearningRx. In the following pages, you will find statistics as they relate to specific diagnoses.

How Brain Training Helps Clients with ADHD

The most common diagnosis with which clients come to LearningRx is Attention Deficit Hyperactivity Disorder (referred to here as ADHD).

ADHD begins in childhood, with many children with ADHD continuing to struggle into adolescence and adulthood.

LearningRx offers hope and help to children and adults with ADHD. That's because the exercises in our program target the underlying cognitive skills—including sustained attention, divided attention, selective attention, and processing speed—that strengthen attention skills.

To learn more about the statistical significance of these results, see the section on statistical analysis on page 22.

The following chart shows overall post-training gains made by clients who came to us with a prior diagnosis of ADHD and who tested at or below the 50th percentile. On average, these clients moved up between 25 and 33 percentile points, which represents a 3.1 to 5.7 year gain.

Skill Tested	Percentile Gain
General Intellectual Ability (GIA)	31
Logic & Reasoning	30
Processing Speed	31
Auditory Processing	33
Long-Term Memory	32
Short-Term Memory	26
Visual Processing	25

How Brain Training Helps Clients with Reading Problems and Dyslexia

Reading, perhaps more than any other academic challenge, depends on strong cognitive skills for consistent success. Efficient auditory processing is at the core of all reading success. Studies by the Department of Education have suggested that poor auditory processing skills contribute to over 88% of the nation's reading problems!

LearningRx testing quickly identifies specific auditory processing deficits. Of all the improvements that LearningRx brain training consistently produces, the improvements in reading skills are among the most dramatic and life changing.

Dyslexia is a learning disability that hinders a person's ability to read, write, spell, and sometimes speak. The most common learning disability in children, dyslexia can persist into adulthood, although the sooner dyslexia is addressed, the more favorable the outcome.

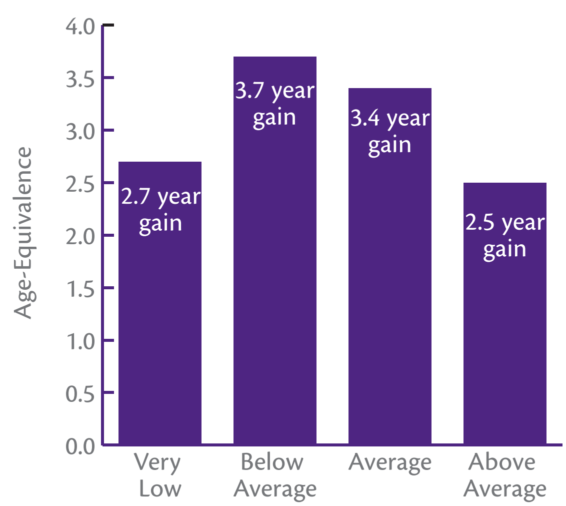
During 2011 and 2012, 2,604 clients were enrolled in the ReadRx training program. After less than six months in the program, these clients gained between 2.7 to 3.7 years in age-equivalent reading skills. The average reading improvement was 3.1 years in less than six months. Reading improvement is measured with the word attack test. Word attack is the ability to apply phonic and structural analysis skills to pronounce unfamiliar printed words.

Average Gain in Reading After Six Months for All ReadRx Students

+3.1 years

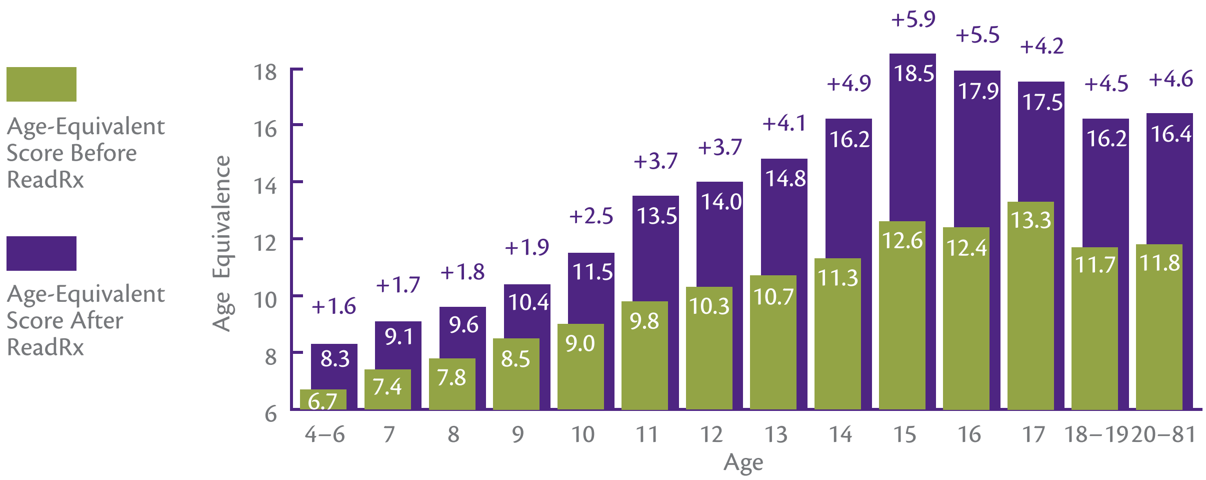
What's significant is that these gains were consistent regardless of where a student initially ranked in reading. Students who tested significantly behind their peers—and students who tested at average or even above average—still experienced gains in reading skills.

Average Age-Equivalent Gains in Reading After Brain Training by Severity of Reading Problem



Another interesting trend we see is that the older students are at the point when they come to us for help, the farther behind their peers they tend to have fallen. In 2011 and 2012, for example, our average 10-year-old student initially tested at 12 months behind in age-equivalent scores, our average 13-year-old student initially tested 2.3 years behind, and our average 16-year-old student initially tested 3.5 years behind. The good news is that these students typically see a larger improvement in reading skills than younger students who have less catching up to do.

Average Age-Equivalent Gains in Reading Before and After ReadRx (by Age)



"We couldn't picture a life for our daughter in which she couldn't read. Now, we don't have to."

"Our daughter's struggles began in kindergarten. By third grade, testing revealed that she suffered from dyslexia. Simply having a diagnosis, however, didn't help. In spite of tutoring, her frustration with reading increasingly eroded her self-esteem and kept her from participating in class.

"This is where LearningRx entered our lives. The director told us we could expect reading gains ranging from three to five years. Both my wife and I are in education, and we know things like this just don't happen. We were wrong! Our daughter's reading confidence increased. Choppiness smoothed out. For the first time she began to sound like a natural reader.

"Now, after three quarters in middle school, our daughter has gotten all A's with only two B's. We are absolutely thrilled and amazed. LearningRx results are undeniable. Would I recommend it to a parent with a struggling reader? Unequivocally yes! We couldn't picture a life for our daughter in which she couldn't read. Now we don't have to. Thank you, LearningRx!"

— Miles from California

"I'm loving school so much more!"

"School this year seems so much easier. I'm remembering what teachers are saying and paying attention more. I still talk tons but I stop when I know it's time to learn something. Thanks so much for all the help—I'm loving school so much more and me and my mom don't fight as much anymore and I'm able to do things on the weekend! Thanks again!"

— **Victoria from Wisconsin**

How Brain Training Helps Clients with Learning Disabilities

Anyone who struggles to learn or read—or who wants to read, learn, think, remember, or pay attention better than before—can benefit from LearningRx.

The following chart shows post-training gains made by clients who came to us with a prior diagnosis of a learning disability and who tested at or below the 50th percentile. On average, these clients moved up between 20 and 26 percentile points in IQ, logic & reasoning, processing speed, auditory processing, long-term memory, short-term memory, and visual processing, for an average gain of 23 percentile points:

To learn more about the statistical significance of these results, see the section on statistical analysis on page 22.

Skill Tested	Percentile Gain
General Intellectual Ability (GIA)	24
Logic & Reasoning	23
Processing Speed	24
Auditory Processing	26
Long-Term Memory	24
Short-Term Memory	20
Visual Processing	21

How Brain Training Helps Clients with Speech and Language Disorders

The following chart shows post-training gains made by children or adults who came to us with a prior diagnosis of a speech or language disorder, and who tested at or below the 50th percentile. On average, these clients moved up between 20 and 28 percentile points in IQ, logic & reasoning, processing speed, auditory processing, long-term memory, short-term memory, and visual processing, for an average percentile gain of 24 points in IQ and cognitive skills. These clients also gained 3 years in age-equivalent scores.

Skill Tested	Percentile Gain
General Intellectual Ability (GIA)	24
Logic & Reasoning	25
Processing Speed	25
Auditory Processing	28
Long-Term Memory	24
Short-Term Memory	23
Visual Processing	20

How Brain Training Helps Clients with Autism Spectrum Disorders

Children and adults who come to us diagnosed with Autism Spectrum Disorder (ASD) benefit from brain training in two ways. First, one-on-one brain training takes place in the kind of structured, positive environment in which these individuals truly thrive. Second, since many people with ASD (which includes autism, Asperger Syndrome, and Pervasive Developmental Disorder), display weaknesses in the very cognitive skills that LearningRx programs target and strengthen, the impact of brain training on their quality of life can be significant.

The following chart shows post-training gains made by children and adults who came to us with a prior diagnosis of autism, Asperger Syndrome, or PDD who tested at or below the 50th percentile. On average, these clients moved up between 19 to 24 percentile points in IQ and cognitive skills.

Percentile Point Gains in LearningRx Clients Performing Below Average and Previously Diagnosed with Autism, Asperger Syndrome, or PDD

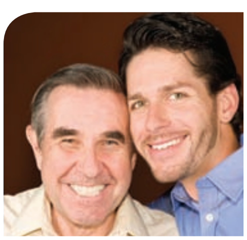
Skill Tested	Percentile Gain
General Intellectual Ability (GIA)	19
Logic & Reasoning	19
Processing Speed	24
Auditory Processing	23
Long-Term Memory	24
Short-Term Memory	20
Visual Processing	20

How Brain Training Helps Clients with Traumatic Brain Injuries (TBI)

Every year, millions of people in the U.S. sustain head and brain injuries. In addition, large numbers of soldiers returned home from Iraq and Afghanistan having sustained traumatic brain injuries from concussions caused by explosions. According to the Pentagon, an estimated one in five soldiers who regularly work away from base has suffered at least one concussion.

When the brain is injured, connections between cells are damaged and the processing of information is impacted. TBI patients struggle with cognitive functions such as thinking, memory, reasoning, information processing, and communication.

LearningRx brain training strengthens those weak cognitive skills, enabling clients with traumatic brain injuries to experience measurable—often dramatic—improvements in cognitive skills. When cognitive skills are stronger, thinking, remembering, reasoning, learning, reading, and communicating are easier. And that makes life easier.



"LearningRx turned my son back into a man."

"After someone with a TBI comes home, what then? How do you get them back where they can function, have a job, do their thing? Two years after his motorcycle accident, my 33-year-old son had the brain function of a child. LearningRx turned him from a child back into a man."

— James from Texas

The following chart shows the percentile gains experienced by adults with TBI after participating in one-on-one brain training with LearningRx:

Percentile Gains Made by TBI Patients After Brain Training

Skill Tested	Percentile Gain
Processing Speed	17
Long-Term Memory	27
Auditory Processing	15
Short-Term Memory	19
Visual Processing	19
Logic & Reasoning	15

Here's another study you might find interesting. In 2009, in one of our centers, we had the privilege of assisting 10 soldiers who had recently returned from the war in Iraq and Afghanistan with traumatic brain injuries. The majority of these injuries were the result of blasts from roadside bombs (also known as "improvised explosive devices" or IEDs).

The results charted below demonstrate the effectiveness of brain training for the soldiers we had the honor of working with in 2009.

Percentile Gains in IQ and Cognitive Skills Made by 10 Soldiers with TBI

Skill Tested	Percentile Gain
General Intellectual Ability (GIA)	37
Short-Term Memory	35
Long-Term Memory	34
Auditory Processing	31
Visual Processing	26
Visual Comprehension	24
Logic & Reasoning	23
Executive Processing Speed	21

Step Four: Measuring the Value of LearningRx Brain Training

MEASURING VALUE BASED ON SATISFACTION

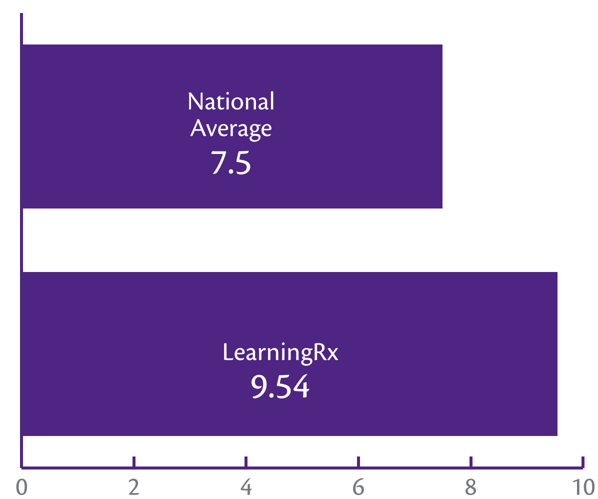
One of our very intentional goals as a company is to "WOW" our customers.

Every year, we receive hundreds of testimonies from clients who are thrilled with the life changing results they've experienced because of brain training at LearningRx (you've had a chance to read some of these real-life stories in the pages of this report). The stories shared by our students and their families are a powerful indicator of the value of the programs we offer.

We also take the time to measure the satisfaction of each and every LearningRx client using a well-known rating scale.

The Satisfaction Rating asks clients, "On a scale of 0 to 10 (10 being highest), how likely are you to recommend LearningRx to a friend or colleague?" Our 2011 and 2012 satisfaction rating, based on over 4,800 customers, was 9.54 out of 10. This is nearly 27% higher than the national average (among services that measure customer satisfaction) and one of the highest ratings in the country.

"On a Scale of 0 to 10, How Likely Are You to Recommend This Company to a Friend or Colleague?"



MEASURING VALUE BASED ON RETENTION OF GAINS

LearningRx students and their families are clearly happy with our one-on-one brain training programs. But do the results last? Are the gains made in cognitive skills permanent?

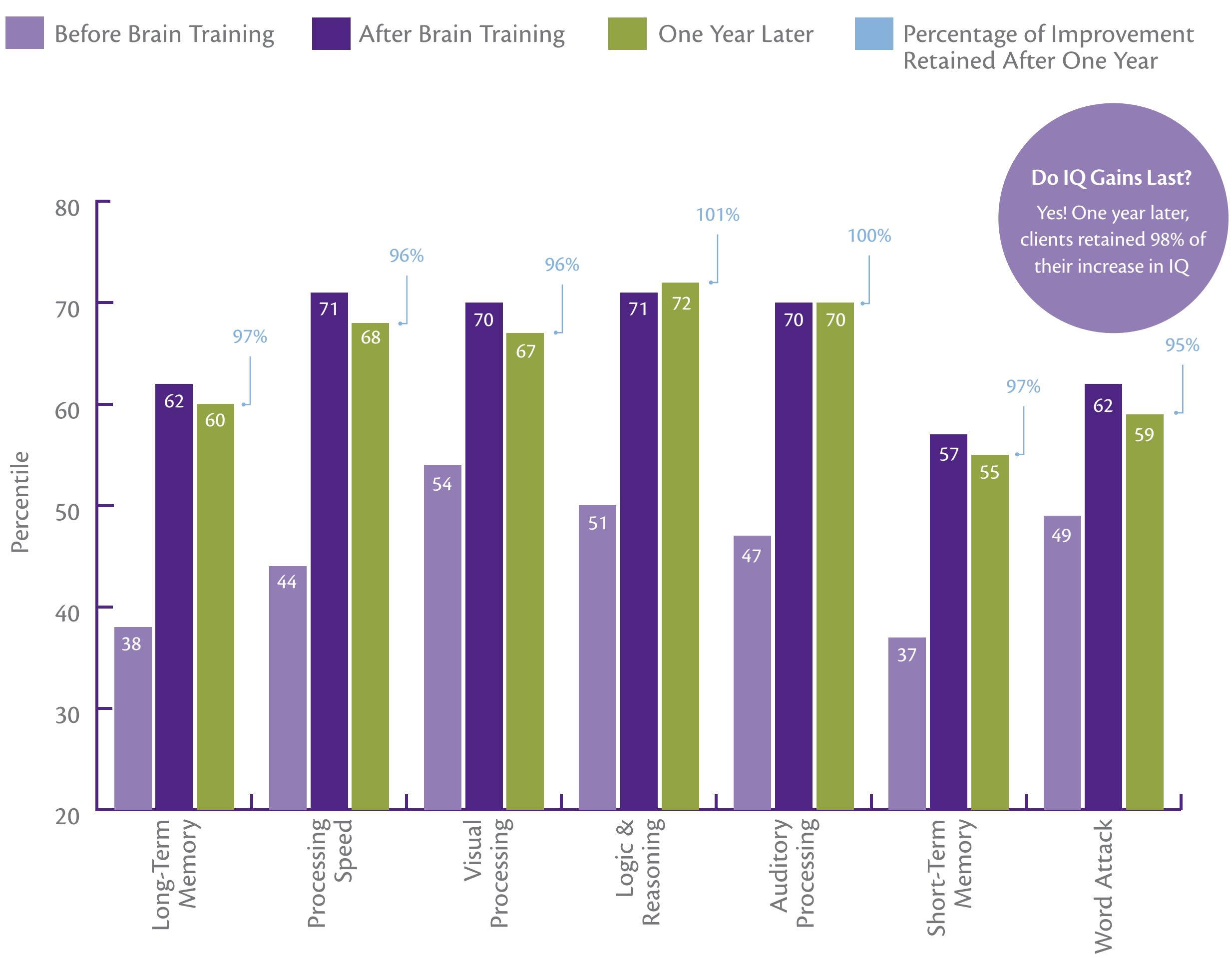
Our method of brain training is designed to move new skills to a subconscious level for permanent results, and one-year follow-up studies confirm that this is indeed what occurs.

The chart on the next page shows the retention of gains one year later. Notice that in one category—Logic & Reasoning—the gains were not only retained, they continued to grow.

"Last summer, LearningRx changed my son…forever. How much difference can three months make? It could end your child's learning struggle by the next school year! Most important is his `I CAN DO IT!' attitude! Last year at this time, he wouldn't have attempted doing one math problem without guidance. Now, Aaron is willing to try anything. He is also proud that many of his friends call him about their homework seeking his help. I told him I was going to email you and he said to tell you all hello and to make sure you knew he was on the honor roll just like the kid on the LearningRx commercial he hears on the [radio]! Thank you! Keep making miracles happen for other children!"

— Ardell from Texas

One-Year Retention of Gains Based on Percentile Scores



MEASURING VALUE BASED ON COST

It's good to know that LearningRx brain training programs create satisfied clients and lasting results. But for something to be of exceptional value, it also has to make sense financially.

Below are net reading gains reported by a 2005 Chicago Public School study on over 56,000 students after one year of tutoring. The following chart shows the average net gain in reading made by students enrolled in 30 different tutoring programs, as well as the average net gain made by students enrolled in the six best-performing tutoring programs. Finally, it shows the average net gain in reading for LearningRx students.

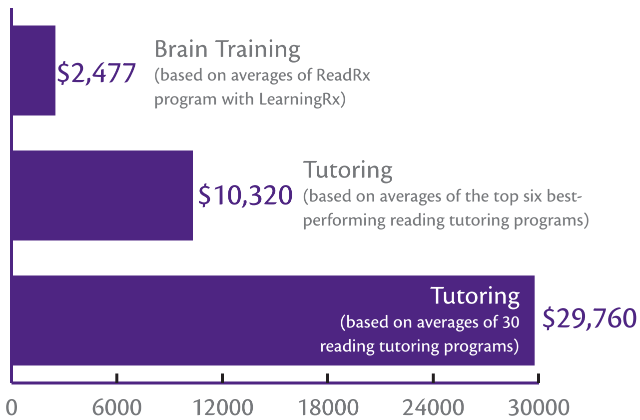
Based on regional hourly fees for group tutoring and one-on-one brain training ($40 an hour for tutoring and $80 per hour for LearningRx brain training), the following chart shows what it costs to obtain a one-year reading gain with LearningRx, as opposed to the average cost of obtaining the same gain with any of the 30 tutoring programs (including the six best-performing tutoring programs).

Cost Comparison Between LearningRx and Tutoring to Achieve a One-Year Reading Gain

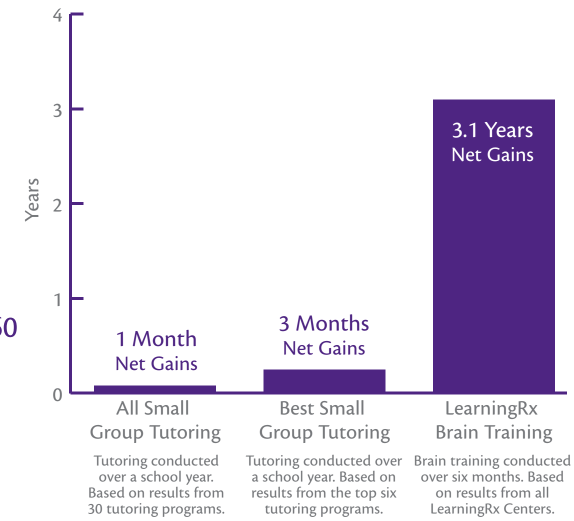
	Number of Students in Study	Net Reading Gains in Years	Sessions Required to Get Gains	Sessions Needed for a Year Gain	Likely Fee per Hour Session	Investment Required for a Year Gain	Investment Required for a Three-Year Gain
LearningRx ReadRx training (2011 and 2012)	2,604	3.1	96	31	$80	**$2,477**	$7,432
Average of the top 6 of the 30 Reading Tutoring Programs (Chicago 2005)	1,983	0.24	62	258	$40	**$10,320**	$30,960
Average of 30 Reading Tutoring Programs (Chicago 2005)	61,466	.09	67	744	$40	**$29,760**	$89,280

Even calculating the hourly rate for one-on-one brain training at twice the hourly rate for tutoring, LearningRx still costs less than half of what the very best tutoring programs charge—*and only 10 percent of what the majority of tutoring programs charge*—for the same result!

Averages of Dollars Spent to Obtain a One-Year Gain in Reading Skills



Reading Improvements—Average Skill Years Gained



MEASURING VALUE BASED ON RETURN ON INVESTMENT

There is yet another way of measuring value, and it has to do with calculating financial returns received on your investment.

According to the National Longitudinal Survey conducted by the US Department of Labor's Bureau of Labor Statistics, there is a significant relationship between IQ and earnings.

Of course, factors other than IQ can influence how much money someone makes over a lifetime. Some of these factors are environmental, such as the socioeconomic status of parents and the quantity and quality of educational opportunities. In a fascinating study published in the *American Economic Review* in 2002[1], however, these environmental influences were largely removed by studying the IQs and incomes of 733 pairs of siblings.

IQ Group Sibling Sample (733 pairs)

IQ Range	Income at Age 30 (adjusted for 2014)	College Grads
120+	$91,252	82%
110–119	$78,087	56%
90–109	$68,020	19%
80–89	$50,820	5%
<80	$30,460	3%

1 From the National Longitudinal Survey conducted by the US Department of Labor's Bureau of Labor Statistics. Murray, Charles. 2002. "IQ and Income Inequality in a Sample of Sibling Pairs from Advantaged Family Backgrounds." American Economic Review, 92(2): 339-343.

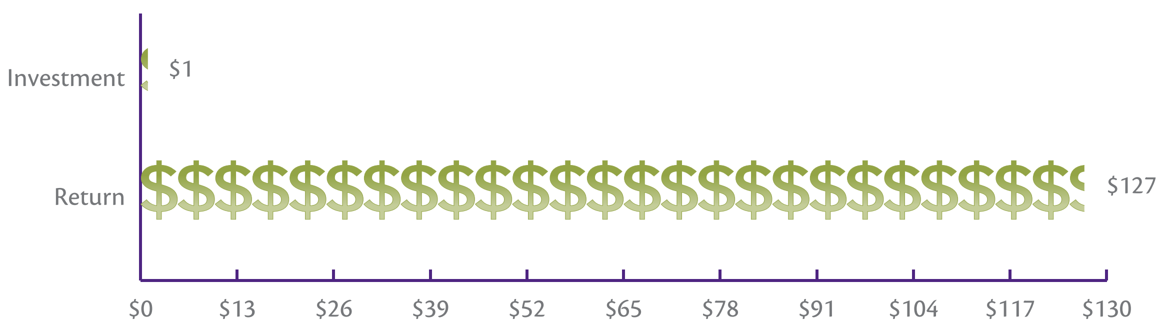
"I feel like I can achieve my goals on my own."
"LearningRx has helped me in many ways. Two of them are in the areas of academics and athletics. Before I took the program, I would become confused with my assignments in football plays. After I took the program, I knew not only my responsibilities, but those of my teammates as well. In the area of academics, now I am getting mostly A's. My confidence has shot up. I feel more independent in my studies. For me, I feel like I can achieve my goals on my own. Before, my goals were achieved with someone holding my hand. Now I am a more independent person, and I like that."

— DeShaun from Ohio

The study showed that, other things being equal, a person's IQ significantly and directly impacts their lifetime earnings. Based on the study results, a gain of even 10 IQ points can result in a $10,067 to $20,360 increase in annual earnings. Multiply that by 40 years of earnings and the numbers become even more significant.

Since LearningRx training results in higher IQ by an average of 15 points,[1] this allows us to calculate a financial return on dollars invested at LearningRx, and is an important factor when measuring the value of brain training. Based on these numbers, the return in increased income over a lifetime averages out to be $127 for every $1 invested in brain training at LearningRx.

Return on Investment



CONCLUSION

The numbers tell the story. After brain training at LearningRx, our clients of all ages really do experience the life changing results of a faster, smarter brain.

1 LearningRx brain training raises IQ by an average of 15 points among students who do all of their training in one of our centers, and by an average of 14 points across the board, including clients who did some of their training at home.

Evidence for the statement "80% of all learning difficulties are caused by weak cognitive skills"

The "80%" figure comes from a review of scientifically-based studies and papers from the past 15 years and from our own data and experience testing over 20,000 students.

Below are some key factors that need to be considered when dealing with the prevalent rates and causes of learning problems.

1) Definition of learning problems, learning struggles, learning disabilities, and similar terms. These terms will mean different things to different people and fields of study.
    a. We all, at times, experience some type of learning struggle or difficulty. Therefore, it would be possible to include 100% of the population in a set called "people with learning problems." This would result in a much lower prevalence percentage due to the fact that there are so many reasons why a person might occasionally have trouble learning.
    b. Learning disability and its subgroups have been defined by government authorities (see below) but those numbers are based on only those who have selectively been identified—not the total population. Thus, the prevalence percentage on a cognitive basis might be higher.
    c. The percentage of the prevalence of a significant cognitive weakness as the basis for a learning problem will vary greatly depending upon how it is defined. For example, from a low of around 40% (if you include anyone that has any difficulty reading at any time) to close to 100% (if you include only the poorest 5% of readers).
    d. Our figure of 80% is based upon the assumption that those students in the lowest 25th percentile of school performance have problems learning.
2) A reason for different prevalence percentages can be due to whether one or multiple cognitive skills are being considered as causes of learning problems. For example, if three different cognitive skills are critical for carrying out a learning task but only one is tested for, your prevalent rate will be inaccurate. It would be as if, wanting to know the percentage of people watching TV at any one moment, you counted only those watching in their living room but ignored those watching elsewhere. Your findings will be much lower than reality.

With the above two factors in mind, let's start by looking at things other researchers are saying that support the 80% figure we use.

They break down learning disabilities into five to seven groups with reading-related disabilities comprising between 70% to 90% of all learning disabilities.

About 85% of those LD students have a primary learning disability in reading and language processing. (LD Online)

Of all students with specific learning disabilities, 70%–80% have deficits in reading. (ICD-10 and DSM-IV codes: F81.0/315.00 - http://en.wikipedia.org/wiki/Learning_disabilities)

Of those with reading disabilities, 88% have a significant cognitive skill weakness (phonemic awareness).

88% of people with dyslexia share a common phonologic weakness.

Subtypes of reading disability: Variability around a phonological core.

By Morris, Robin D.; Stuebing, Karla K.; Fletcher, Jack M.; Shaywitz, Sally E.; Lyon, G. Reid; Shankweiler, Donald P.; Katz, Leonard; Francis, David J.; Shaywitz, Bennett A. Journal of Educational Psychology. Vol 90(3), Sep 1998, 347–373.

Abstract: Results support the view that children with a reading disability usually display impairments on phonological awareness measures, with discriminative variability on other measures involving phonological processing, language, and cognitive skills. (PsycINFO Database Record (c) 2008 APA, all rights reserved).

M. Wolf and P.G. Browers, The Double-Deficit Hypothesis for the Developmental Dyslexias, Journal of Educational Psychology 91 (1999) 415–38: The 88% number includes only the phonological awareness factor and does not include other cognitive skills weaknesses that were identified as significant contributing factors [like] rapid serial naming and verbal short-term memory.

A 2004 LearningRx study of 1,495 third to fifth grade students with reading difficulties showed 77% had significantly weak, and another 20% showed below average, phonological awareness skills.

"I see a huge difference in Andrew after LearningRx. He is less frustrated and seems to enjoy getting his schoolwork completed in a timely manner. He also has the confidence to complete his homework alone rather than me having to stand by him the entire time. Spelling is also less frustrating. I recommend LearningRx to anyone who needs to go beyond tutoring and make lifelong changes for a successful future for their child. Again, thank you!"

— Mari from Arizona

Summary of Statistical Analysis

LearningRx students were tested using 11 cognitive scales from the Woodcock-Johnson III – Tests of Cognitive Abilities and 6 achievement scales from the Woodcock-Johnson III – Tests of Achievement before and after cognitive training interventions lasting between 12 and 32 weeks. Statistical analysis was conducted on the pre-test and post-test data from students (*n* = 5,636) who completed cognitive training programs at LearningRx Brain Training Centers in 2011 and 2012. Positive gains were achieved across all age groups, genders, and learning disabilities. With few exceptions, results from paired *t*-test analyses on scale, percentile, and age-equivalent measures of general intellectual ability (GIA) revealed that the positive gains were statistically significant across all age groups, genders, and learning disabilities. GIA scores are composite totals of the first 7 cognitive tests on the WJ III measuring comprehension, long-term memory, visual processing, auditory processing, reasoning, and short-term memory. The mean gain in *GIA IQ* scale score for all students was 14.2 points with a range of 11.2 to 14.6 points gained. The mean gain in *GIA IQ* scale score for students who went through LearningRx's "Pro Program" (meaning all training was done in a LearningRx Center) was 14.6 points. The greatest gains were noted among students with ADHD and related attention issues (*Mean* = 14.3 points) while the lowest, but still positive, gains were noted for female students with autism spectrum disorder (*Mean* = 11.2 points). The mean gain in *GIA percentile* was 25.75 points with a range of 12.9 to 26.2 gained. The greatest gains were noted among students with attention deficits (*Mean* = 26.2) and dyslexia (*Mean* = 26.4), while the lowest, but still positive, gains were noted among female students with autism spectrum disorder (*Mean* = 12.9). The mean *GIA age-equivalent* gain for all students was 3.7 years with a range of 4.35 to 2.6 years overall. The greatest gains were noted for adult male students with traumatic brain injuries (*Mean* = 4.35 years) while the lowest, but still positive, gains were noted for female students with autism spectrum disorders (*Mean* = 2.6 years).

Results from paired *t* tests on pre-test and post-test scores from the extended battery of WJ III – COG scales and select scales from the WJ III - Tests of Achievement indicate statistically significant gains across all age groups, genders, and learning disabilities on measures of *long-term memory*, *visual processing*, *sound blending*, *processing speed*, *auditory working memory*, *verbal comprehension*, *working memory*, *reading fluency*, *math fluency*, *word attack*, and *sound awareness*. Statistically significant gains in *logic & reasoning* were noted across all age groups, genders, and learning disabilities except for adult male students with traumatic brain injury. However, the sample size (*n* = 5) for the male TBI subgroup was small and positive gains (*Mean* = 29.8 points) were nonetheless noted. The overall gains for students in *passage comprehension* were statistically significant (*Mean* = 14.8 point gain) except for the subsamples of girls with ADD/ADHD (*n* = 19), boys with dyslexia (*n* = 6), and all students with speech delay (*n* = 11) who achieved positive, but not statistically significant, gains. Overall gains in *applied math problems* across all age groups, genders, and learning disabilities were statistically significant except for the subsamples of boys with dyslexia (*n* = 12) and autism spectrum disorder (*n* = 8) who achieved positive, but not statistically significant, gains. Similarly, all students except the subsamples of students with autism spectrum disorder (*n* = 35), boys with speech delay (*n* = 39), and adult female students with TBI (*n* = 5) realized statistically significant gains in *quantitative concepts*. Finally, overall gains in *spelling of sounds* across all age groups, genders, and learning disabilities were statistically significant except for the subsample of adult female students with TBI (*n* = 12) who achieved positive, but not statistically significant, gains.

To determine if age and/or gender were statistically significant predictors of cognitive training gains, multiple regression analyses were conducted for each learning disability. Overall results indicate that gender is not a significant predictor of score gains. That is, gender is not typically related to the gains made by students following cognitive training. Age does appear to be a significant predictor of gains in several areas, but the proportion of explained variance in gains among the age groups is small. That is, age has a small relationship with score gains.

This report summarizes the results of all LearningRx students and also delineates results by learning disability, including ADHD, dyslexia, autism spectrum disorder, speech and language disorder, general learning disability, and traumatic brain injury. The tables represent the paired *t* test statistical analyses on pre-test and post-test scores. Narratives following each table include a general summary of the *t* test results along with results of multiple regression analyses on age and gender as predictors of cognitive training gains. A full report with all *t* test and MR data output along with box plots of confidence intervals can be accessed in the online supplement to this report.

General Intellectual Ability (GIA) for all LearningRx Students

WJ III GIA	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
GIA Age Equiv.	F	1231	4 – 81	11	4.3	14.7	5.8	3.7	3	3.5 – 3.9	42.98	< .001
	M	1808	3 – 79	11.2	4.5	14.9	5.8	3.7	3.0	3.6 – 3.9	53.23	< .001
GIA Percentile	F	1231	4 – 81	44.5	26.3	70.3	26.6	25.7	17.6	24.7 – 26.7	51.17	< .001
	M	1808	3 – 79	44.4	26.9	70.2	26.9	25.8	18.1	24.9 – 26.6	60.39	< .001
GIA IQ Score	F	1231	4 – 81	97	14.1	111.1	15.8	14.1	8.7	13.6 – 14.6	56.96	< .001
	M	1808	3 – 79	96.6	15.1	111	16.8	14.3	9.3	13.9 – 14.8	65.57	< .001

Statistical analysis using paired samples *t* tests of pre-test and post-test means of General Intellectual Ability (GIA) indicated that all LearningRx students achieved statistically significant gains in GIA across all three measures of age-equivalency, percentile, and IQ score. Female students (*n* = 1231) achieved a mean gain of 3.7 years, percentile increase of 25.7, and 14.1 IQ score points from pre-test to post-test. Male students (*n* = 1808) achieved a mean gain of 3.7 years, percentile increase of 25.8, and 14.3 IQ score points from pre-test to post-test.

Multiple regression (MR) analyses were performed to determine if age and/or gender were significant predictors of gains in GIA for LearningRx students. Results indicate that the overall regression for GIA Age Equivalency was significant (F (5, 3033) = 100.2, p < .001). Age was related to percentile gains for age groups 7-12 (t = 11.3, p < .001), 12-16 (t = 21.2, p < .001), 16-24 (t = 13.2, p < .001), and 24-100 (t = 8.38, p < .001). Gender was not a significant predictor of score gains (t = .52, p = .60), but the proportion of variance explained by the model ($R2$ = .14) was 14%. Therefore, age does appear to have a relationship with the gains in IQ Age Equivalency across all age groups.

MR results indicate that the overall regression for GIA percentile was significant (F (5, 3033) = 9.68, p < .001). Age was related to percentile gains for age groups 7-12 (t = 4.4, p < .001), 12-16 (t = 6.06, p < .001), and 16-24 (t = 4.48, p < .001). However, gender was not a significant predictor of gains (t = .33, p = .74) and the proportion of variance explained by the model ($R2$ = .015) was only 1%. Therefore, age and gender do not appear to have a notable relationship with GIA percentile gains.

MR results indicate that the overall regression for GIA IQ Score was significant (F (5, 3033) = 10.22, p < .001). Age was related to percentile gains for age groups 7-12 (t = 3.2, p = .001), 12-16 (t = 5.48, p < .001), 16-24 (t = 2.72, p = .006), and 24-100 (t = 2.32, p = .019). However, gender was not a significant predictor of score gains (t = .15, p = .87), and the proportion of variance explained by the model ($R2$ = .016) was only 1%. Therefore, age and gender do not appear to have a notable relationship with the gains in IQ Score.

Results by Cognitive Area for All LearningRx Students

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	%ile Gain *M*	*SD*	95% CI	*t*	*p*
Comp-Knowl *C1 Verbal*	F	1595	4 – 88	46.6	25.9	58.5	25.8	11.9	17.4	11.0 – 12.7	27.22	< .001
	M	2346	3 – 79	49.0	26.5	61.2	26.1	12.2	17.5	11.5 – 12.9	33.8	< .001
LTMem *C2 Vis-Aud*	F	2153	4 – 88	35.5	27.1	62.0	27.7	26.5	23.3	25.5 – 27.4	52.6	< .001
	M	3223	3 – 79	36.2	27.1	61.2	28.0	25.0	23.7	24.2 – 25.8	59.93	< .001
LTMem *C12 Retrieval*	F	525	5 – 76	43.3	28.4	57.9	28.2	14.6	23.3	12.6 – 16.6	14.4	< .001
	M	747	4 – 71	35.0	26.4	49.1	27.4	14.1	22.7	12.5 – 15.8	16.98	< .001
Vis Proc *C3 Spatial Rel*	F	2146	4 – 88	49.4	22.7	66.2	21.4	16.8	17.5	16.1 – 17.5	44.4	< .001
	M	3209	3 – 79	54.4	23.1	70.5	21.1	16.1	18.2	15.5 – 16.8	50.17	< .001
Aud Proc *C4 Sound Blend*	F	1581	4 – 88	71.5	24	85.7	17.2	14.2	18.3	13.3 – 15.1	30.79	< .001
	M	2374	3 – 79	68.3	26.3	84.2	19.4	15.9	19.3	15.1 – 16.7	40.06	< .001
Logic/Reason *C5 Concept Form*	F	2144	4 – 88	49.4	27.8	70.4	25.5	20.9	20.3	20.1 – 21.8	47.88	< .001
	M	3204	3 – 79	49.7	28.4	70.1	26.1	20.4	21.1	19.6 – 21.1	54.57	< .001
Logic/Reason *C15 Analysis-Syn*	F	275	6 – 47	43.6	27.8	61.6	25.8	18.	24.5	15.1 – 20.9	12.2	< .001
	M	369	6 – 50	46.6	27.9	63.2	27.3	16.5	26.3	13.8 – 19.2	12.08	< .001
Process Speed *C6 Visual match*	F	1656	4 – 88	40.5	27.9	55.4	28.6	15.	20.5	14.0 – 16.0	29.67	< .001
	M	2416	3 – 79	31.8	26.4	45.8	29.1	14.	21.7	13.1 – 14.8	31.66	< .001
Process Speed *C16 Decision*	F	458	5 – 51	51.	28.9	69.6	28.	18.6	23.1	16.5 – 20.7	17.22	< .001
	M	622	4 – 58	40.1	28.7	60.5	28.7	20.5	24.9	18.5 – 22.4	20.52	< .001
Exec Process *C20 Pair Cancel*	F	2122	4 – 88	46.9	23.4	70.6	23.1	23.7	20.5	22.9 – 24.6	53.21	< .001
	M	3186	3 – 79	43.2	23.7	67.4	23.9	24.2	21.7	23.5 – 25.	63.03	< .001
WMem *C7 Num Reverse*	F	2116	4 – 88	38.6	26.9	56.9	27.8	18.3	24.3	17.3 – 19.3	34.62	< .001
	M	3138	4 – 79	39.	27.2	58.	27.3	19.	24.8	18.1 – 19.8	42.78	< .001
WMem *C9 Auditory*	F	1195	4 – 81	52.9	27.8	66.5	24.6	13.6	22.7	12.3 – 14.8	20.67	< .001
	M	1699	4 – 79	51.2	28.1	65.9	25.7	14.7	23.6	13.5 – 15.8	25.63	< .001

Statistical analysis using paired samples t tests on pre-test and post-test means indicate that all students achieved statistically significant gains across all measures of cognitive abilities tested using nine tests from the Standard Battery and four tests for the Extended Battery of the WJ III – COG.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III-COG for students. Gender did not emerge as a predictor in any of the tests. Age was a predictor of gains on several tests, but the relationship between age and score gains is very small in most cases. Results by cognitive area are below.

Verbal Comprehension. MR results indicate the overall regression for gains on Test 1, Verbal Comprehension, was significant (F (5, 3935) = 3.13, p = .007). However, the proportion of variance explained by the model ($R2$ = .003) was less than 1%. Therefore, age and gender did not predict percentile gains in verbal comprehension for LearningRx students overall.

Long-Term Memory. MR results indicate that the overall regression for Test 2, Visual-Auditory Learning, was significant (F (5, 5370) = 27.36, p < .001). Gender was a significant predictor of score gains (t = 2.5, p = .01), with a negative slope indicating that estimated scores for male students are 1.66 points lower than scores of female students. Age was related to long-term memory gains for age groups 7-12 (t = 5.79, p < .001), 12-16 (t = 10.12, p < .001), 16-24 (t = 8.47, p < .001), and 24-100 (t = 3.1, p = .001), but the proportion of variance explained by the model ($R2$ = .024) was only 2%. Therefore, gender and age have only a very small relationship with visual and auditory learning gains for LearningRx students overall. The overall regression for Test 12, Retrieval Fluency, was not significant (F (5, 1266) = .76, p = .57). Therefore, age and gender did not predict gains in retrieval fluency for LearningRx students overall.

Visual Processing. MR results indicate that the overall regression for Test 3, Spatial Relations, was significant (F (5, 5349) = 26.5, p < .001). However, gender was not a significant predictor of score gains (t = 1.5, p = .11). Age was related to gains for age groups 7-12 (t = 3.79, p < .001), 12-16 (t = 9.45, p < .001), 16-24 (t = 7.96, p < .001), and 24-100 (t = 4.02, p < .001), but the proportion of variance explained by the model ($R2$ = .02) was only 2%. Therefore, age has a very small relationship with visual processing gains for LearningRx students overall.

Auditory Processing. MR results indicate that the overall regression Test 4, Sound Blending, was significant (F (5, 3949) = 7.41, p < .001). Gender was a significant predictor of score gains (t = 2.5, p = .009). A positive slope indicated male students had an estimated score gain of 1.59 points greater than female students. Age was related to gains for age groups 12-16 (t = 4.3, p < .001) and 16-24 (t = 3.3, p < .001), but the proportion of variance explained by the model ($R2$ = .009) was less than 1%. Therefore, age does not have a notable relationship with auditory processing gains for LearningRx students overall.

Logic and Reasoning. MR results indicate the overall regression for percentile gains on Test 5, Concept Formation, was significant (F (5, 5342) = 6.9, p < .001). However, gender was not a significant predictor of score gains (t = 1.09, p = .27). Age was related to gains for age groups 7-12 (t = 5.4, p < .001) and 12-16 (t = 2.9, p = .003), but the proportion of variance explained by the model ($R2$ = .006) was less than 1%. MR results indicate the overall regression for percentile gains on Test 15, Analysis-Synthesis, was not significant (F (5, 638) = .52, p = .75). Therefore, age and gender did not predict percentile gains in logic and reasoning for LearningRx students overall.

Processing Speed. MR results indicate the overall regression for percentile gains on Test 6, Visual Matching, was significant (F (5, 4066) = 6.43, p < .001). However, gender was not a significant predictor of score gains (t = 1.67, p = .09). Age was related to gains for age groups 12-16 (t = 4.7, p < .001) and 16-24 (t = 2.6, p = .008), but the proportion of variance explained by the model ($R2$ = .007) was less than 1%. MR results indicate the overall regression for percentile gains on Test 16, Decision Speed, was not significant (F (5, 1074) = .91, p = .47). Therefore, age and gender did not predict percentile gains in visual matching or decision speed. However, MR results indicate that the overall regression for Test 20, Pair Cancellation, was significant (F (5, 5302) = 66.18, p < .001). However, gender was not a significant predictor of score gains (t = .34, p = .72). Age was related to gains for age groups 7-12 (t = 12.3, p < .001), 12-16 (t = 16.6, p < .001), 16-24 (t = 13.1, p < .001), and 24-100 (t = 4.74, p < .001), and the proportion of variance explained by the model ($R2$ = .05) was 5%. Therefore, age has a small relationship with pair cancellation gains for LearningRx students overall.

Working Memory. MR results indicate that the overall regression for Test 7, Numbers Reversed, was significant (F (5, 5248) = 8.25, p < .001). However, gender was not a significant predictor of score gains (t = .73, p = .46). Age was related to gains for age groups 7-12 (t = 3.7, p < .001), 12-16 (t = 6.12, p < .001), and 16-24 (t = 3.76, p < .001), but the proportion of variance explained by the model ($R2$ = .007) was less than 1%. MR results also indicate the overall regression for percentile gains on Test 9, Auditory Working Memory, was not significant (F (5, 2888) = 2.1, p = .06). Therefore, age and gender did not predict percentile gains on working memory tests for LearningRx students overall.

Results by Achievement Area for All LearningRx Students

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Reading *A2 Fluency*	F	149	6 – 76	45.7	26.2	58.5	25.4	12.8	15.7	10.2 – 15.3	9.94	< .001
	M	173	6 – 48	42.7	27.8	54.1	27.7	11.3	15.5	9.0 – 13.7	9.64	< .001
Reading *A9 Pass Comp*	F	41	5 – 19	38.6	25.1	53.4	23.6	14.8	22.	7.9 – 21.8	4.32	< .001
	M	59	5 – 48	38.	22.6	50.4	24.1	12.4	20.8	7 – 17.8	4.58	< .001
Math *A6 Fluency*	F	854	5 – 69	35.	27.5	49.8	29.9	14.8	19.3	13.5 – 16.1	22.37	< .001
	M	1186	5 – 71	34.7	28.3	47.5	30.9	12.8	19.	11.7 – 13.9	23.23	< .001
Math *A10 Applied Prob*	F	106	5 – 37	35.1	23.6	46.	24.	11.	16.6	7.8 – 14.2	6.81	< .001
	M	124	4 – 50	41.7	24.7	46.4	25.4	4.7	15.8	1.9 – 7.5	3.34	.001
Math *A18 Quantitative*	F	285	5 – 51	37.3	24.9	49.7	25.4	12.4	19.9	10. – 14.7	10.48	< .001
	M	404	4 – 53	41.5	25.1	51.5	26.2	10.	19.8	8.1 – 11.9	10.17	< .001
Phono Aware *A13 Word Attack*	F	2122	4 – 88	47.3	25.4	59.9	23.5	12.6	17.6	11.9 – 13.4	33.06	< .001
	M	3186	3 – 79	47.5	25.8	60.5	23.9	13.	18.1	12.3 – 13.6	40.37	< .001
Phono Aware *A20 Spell Sounds*	F	1079	4 – 81	46.9	26.5	58.7	24.4	11.8	22.	10.5 – 13.1	17.61	< .001
	M	1586	3 – 58	44.4	27.1	56.4	25.5	11.9	22.3	10.8 – 13.	21.34	< .001

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Phono Aware *A21 Sound Aware*	F	2111	4 – 88	50.	29.5	72.9	26.1	22.9	22.7	22. – 23.9	46.41	< .001
	M	3186	3 – 79	49.5	29.7	71.9	27.3	22.5	23.1	21.6 – 23.3	54.91	< .001

LearningRx students were administered four tests from the Standard Battery and three tests for the Extended Battery of the Woodcock Johnson III – Tests of Achievement. Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students achieved statistically significant gains across all measures of reading, math, and phonological awareness skills.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -ACH for LearningRx students overall. Gender and age emerged as predictors in math skills, but no notable relationships were found among reading or phonological awareness skills. Results by achievement area are below:

Reading. MR results indicate the overall regression for percentile gains on Test 2, Reading Fluency, was not significant (F (5, 316) = 2.18, p = .06). Multiple regression results indicate the overall regression for percentile gains on Test 9, Passage Comprehension, was not significant (F (5, 94) = 2.0, p = .08). Therefore, age and gender did not predict percentile gains in reading measures for LearningRx students overall.

Math. MR results indicate that the overall regression for Test 6, Math Fluency, was significant (F (5, 2034) = 13.61, p < .001). Gender was a significant predictor of score gains (t = 2.2, p = .02). A negative slope indicated that the estimated percentile gain for male students was 1.9 points lower than the gain for female students. Age was related to gains for age groups 7-12 (t = 4.2, p < .001), 12-16 (t = 7.4, p < .001), 16-24 (t = 5.01, p < .001), and 24-100 (t = 2.14, p = .03), but the proportion of variance explained by the model (*R2* = .03) was only 3%. Therefore, age has only a small relationship with gains on math fluency in these age groups. MR results indicate the overall regression for Test 10, Applied Problems, was significant (F (5, 224) = .4.9, p < .001). Gender was a significant predictor of score gains (t = 2.8, p = .004). A negative slope indicated that the estimated percentile gain for male students was 6.05 points lower than the gain for female students. Age was related to gains for age group 7-12 (t = 3.0, p = .002), and the proportion of variance explained by the model (*R2* = .09) was 9%. Therefore, age has a relationship with gains on math fluency for this age group. MR results indicate the overall regression for percentile gains on Test 18, Quantitative Concepts, was significant (F (5, 683) = 2.37, p = .03). Gender was not a significant predictor of gains (t = 1.4, p = .14). Age was related to gains for age group 16-24 (t = 2.2, p = .02), but the proportion of variance explained by the model (*R2* = .017) was only 1%. Therefore, age has no notable relationship with gains on quantitative concepts for LearningRx students overall.

Phonological Awareness. MR results indicate that the overall regression for Test 13, Word Attack, was significant (F (5, 5302) = 4.4, p < .001). However, gender was not a significant predictor of gains (t = .37, p = .70). Age was related to gains for age groups 12-16 (t = 2.3, p = .02) and 24-100 (t = 2.09, p = .03), but the proportion of variance explained by the model (*R2* = .004) was less than 1%. Next, MR results indicate the overall regression for Test 20, Spelling of Sounds, was not significant (F (5, 2659) = 1.1, p = .35). MR results also indicate that the overall regression for Test 21, Sound Awareness, was significant (F (5, 5291) = 13.21, p < .001). However, gender was not a significant predictor of score gains (t = .96, p = .33). Age was related to gains for age groups 7-12 (t = 7.01, p < .001), 12-16 (t = 4.78, p < .001), and 16-24 (t = 3.84, p < .001), but the proportion of variance explained by the model (*R2* = .01) is only 1%. Therefore, age was not a notable predictor of percentile gains in any phonological awareness test for LearningRx students overall.

Results on General Intellectual Ability (GIA) for Students with ADD/ADHD

WJ III GIA	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
GIA *Age Equiv.*	F	314	5 – 73	11.2	4.6	15	6	3.7	3.1	3.4 – 4.1	21.63	< .001
	M	639	4 – 56	11.6	4.5	15.4	5.9	3.8	3.1	3.6 – 4.1	31.46	< .001
GIA *Percentile*	F	314	5 – 73	39.3	26.5	65.5	29.1	26.2	18.5	24.1 – 28.2	25.03	< .001
	M	639	4 – 56	43.7	26.3	69.6	27	25.9	18.7	24.4 – 27.3	35.09	< .001
GIA *IQ Score*	F	314	5 – 73	94.4	14.4	108.9	16.8	14.5	9.1	13.5 – 15.5	28.35	< .001
	M	639	4 – 56	96.4	14.6	110.6	16.4	14.1	8.8	13.4 – 14.8	40.46	< .001

Statistical analysis using paired samples *t* tests of pre-test and post-test means of General Intellectual Ability (GIA) indicate that all LearningRx students diagnosed with ADD/ADHD realized statistically significant gains in GIA across all three measures of age-equivalency, percentile, and IQ score. Female students with ADD/ADHD (n = 314) achieved a mean gain of 3.7 years, 26.2 percentile points, and 14.5 IQ score points from pre-test to post-test. Male students with ADD/ADHD (n = 639) achieved a mean gain of 3.8 years, 25.9 percentile points, and 14.1 IQ score points from pre-test to post-test.

Multiple regression (MR) analyses were performed to determine if age and/or gender were significant predictors of gains in GIA for LearningRx students. Results indicate that the overall regression for GIA Age Equivalency was significant (F (5,947) = 24.53, p < .001). Gender was not a significant predictor of score gains (t = 6.13, p = .65), but the proportion of variance explained by the model (*R2* = .114) was 11%. Therefore, age does appear to have a relationship with the gains in IQ Age Equivalency across all age groups.

MR results indicate that the overall regression for GIA Percentile was not significant (F (5,947) = 1.69, p = .132); and GIA IQ score was not significant (F (5,947) = 1.16, p = .323). Therefore, age and gender do not appear to have a relationship with the gains in GIA Percentile or GIA IQ score for students with ADD/ADHD.

Results by Cognitive Area for Students with ADHD

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Comp-Knowl	F	390	5 – 73	43.9	26.1	56.0	26.6	12.0	17.0	10.3 – 13.7	13.96	< .001
C1 Verbal	M	823	4 – 56	49.3	26.1	61.	25.6	11.7	17.	10.6 – 12.9	19.82	< .001
LTMem	F	545	5 – 73	34.6	27.7	60.1	28.9	25.5	23.9	23.5 – 27.5	24.91	< .001
C2 Vis-Aud	M	1113	4 – 56	35.5	27.4	60.4	28.1	24.9	23.1	23.6 – 26.3	36.02	< .001
LTMem	F	149	5 – 62	41.3	30.3	56.5	29.7	15.2	24.7	11.2 – 19.2	7.51	< .001
C12 Retrieval	M	259	4 – 43	35.1	26.8	49.2	27.4	14.1	22.5	11.4 – 16.9	10.12	< .001
Vis Proc	F	543	5 – 73	48.2	22.7	65.3	21.9	17.2	17.7	15.7 – 18.7	22.62	< .001
C3 Spatial Rel	M	1105	4 – 56	54.4	23.2	70.8	21.3	16.4	17.5	15.4 – 17.4	31.15	< .001
Aud Proc	F	395	5 – 73	69.4	24.8	84.8	17.4	15.3	17.7	13.6 – 17.1	17.23	< .001
C4 Sound Blend	M	830	4 – 56	69.1	25.6	84.7	18.5	15.6	19	14.3 – 16.9	23.54	< .001
Logic/Reason	F	543	5 – 73	44.8	27.2	66	26.9	21.2	20.8	19.5 – 23	23.8	< .001
C5 Concept Form	M	1110	4 – 56	47.5	27.9	68.7	25.8	21.2	21.3	20 – 22.5	33.25	< .001
Logic/Reason	F	69	7 – 42	40.2	26.9	57.9	27.6	17.7	26.9	11.2 – 24.1	5.45	< .001
C15 Analysis-Syn	M	144	7 – 50	45.9	28.1	60.5	29.0	14.6	26.4	10.3 – 19	6.64	< .001
Process Speed	F	419	5 – 73	37.1	28.2	50.1	30.7	13	20.1	11.1 – 14.9	13.27	< .001
C6 Visual Match	M	842	4 – 56	30.7	26.1	44.5	28.2	13.9	21.4	12.4 – 15.3	18.81	< .001
Process Speed	F	130	5 – 42	53.1	29	68.3	29.1	15.2	23.2	11.2 – 19.3	7.49	< .001
C16 Decision	M	238	5 – 50	40.9	29.2	59.3	27.0	18.4	24.8	15.3 – 21.6	11.49	< .001
Exec Process	F	543	5 – 73	43.8	23.5	67.7	24.1	23.8	20.5	22.1 – 25.6	27.12	< .001
C20 Pair Cancel	M	1106	4 – 56	42.6	23.9	67.5	23.4	25	21.1	23.7 – 26.2	39.31	< .001
WMem	F	539	5 – 73	33.7	26.8	53.8	29.1	20.1	24.6	18 – 22.2	19.01	< .001
C7 Num Reverse	M	1095	5 – 56	38.0	27.1	56.0	27.6	17.9	24.0	16.5 – 19.4	24.74	< .001
WMem	F	302	5 – 61	45.8	27.4	60.3	25.7	14.5	24.4	11.7 – 17.3	10.32	< .001
C9 Auditory	M	581	4 – 54	48.7	28.6	63.9	25.8	15.2	23.0	13.3 – 17.0	15.93	< .001

Statistical analysis using paired samples t tests on pre-test and post-test means indicate that all students with ADHD achieved statistically significant gains across all measures of cognitive abilities tested.

MR analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -COG for students with ADD/ADHD. Gender did not emerge as a predictor in any of the tests. Age was a predictor of gains on several tests. Results by cognitive area are below.

Verbal Comprehension. MR results indicate the overall regression for percentile gains on Test 1, Verbal Comprehension, was not significant (F (5, 1207) = .2.12, p = .06). Therefore, age and gender did not predict percentile gains in verbal comprehension for this sample.

Long-Term Memory. MR results indicate that the overall regression for Test 2, Visual and Auditory Learning, was significant (F (5, 1652) = 6.76, p < .001). However, gender was not a significant predictor of score gains (t = .52, p = .60). Age was related to long-term memory gains for age groups 12-16 (t = 3.7, p < .001) and 16-24 (t = 5.03, p < .001), but the proportion of variance explained by the model ($R2$ = .02) was only 2%. Therefore, age has a very small relationship with visual and auditory learning gains for those age groups. The overall regression for Test 12, Retrieval Fluency, was not significant (F (5, 402) = .442, p = .81). Therefore, age and gender did not predict gains in retrieval fluency.

Visual Processing. MR results indicate that the overall regression for Test 3, Spatial Relations, was significant (F (5, 1642) = 8.03, p < .001). However, gender was not a significant predictor of score gains (t = .85, p = .39). Age was related to gains for age groups 12-16 (t = 3.8, p < .001), 16-24 (t = 4.90, p < .001), and 24-100 (t = 2.61, p = .01), but the proportion of variance explained by the model ($R2$ = .02) was only 2%. Therefore, age has a very small relationship with spatial relations gains for those age groups.

Auditory Processing. The overall regression for percentile gains on Test 4, Sound Blending, was not significant (F (5, 1219) = .803, p = .54). Therefore, age and gender did not predict percentile gains in auditory processing.

Logic and Reasoning. MR results indicate the overall regression for percentile gains on Test 5, Concept Formation, was not significant (F (5, 1647) = 1.85, p = .09). MR results indicate the overall regression for percentile gains on Test 15, Analysis-Synthesis, was not significant (F (5, 207) = .49, p = .78). Therefore, age and gender did not predict percentile gains in logic and reasoning tests for this sample of students.

Processing Speed. MR results indicate the overall regression for percentile gains on Test 6, Visual Matching, was not significant (F (5, 1255) = 2.08, p = .06). Multiple regression results indicate the overall regression for percentile gains on Test 16, Decision Speed, was not significant (F (5, 362) = .82, p = .53). Therefore, age and gender did not predict percentile gains in visual matching or decision speed. However, MR results indicate that the overall regression for Test 20, Pair Cancellation, was significant (F (5, 1643) = 15.71, p < .001). However, gender was not a significant predictor of score gains (t = .94, p = .34). Age was related to gains for age groups 7-12 (t = 4.10, p < .001), 12-16 (t = 7.46, p < .001), 16-24 (t = 6.66, p < .001), and 24-100 (t = 2.43, p = .014), but the proportion of variance explained by the model ($R2$ = .04) was only 4%. Therefore, age has a very small relationship with pair cancellation gains all age groups.

Working Memory. MR results indicate that the overall regression for Test 7, Numbers Reversed, was significant (F (5, 1628) = 2.64, p = .02). However, gender was not a significant predictor of score gains (t = 1.8, p = .06). Age was related to gains for age groups 7-12 (t = 2.15, p = .031) and 12-16 (t = 3.06, p = .002), but the proportion of variance explained by the model ($R2$ = .008) was less than 1%. MR results indicate the overall regression for percentile gains on Test 9, Auditory Working Memory, was not significant (F (5, 877) = .95, p = .44). Therefore, age and gender did not predict percentile gains in either working memory test for this sample.

Results by Achievement Area for Students with ADHD

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Reading *A2 Fluency*	F	38	6 – 30	35.6	24.3	53.4	25.0	17.8	16.8	12.3 – 23.4	6.53	< .001
	M	61	6 – 22	41.4	26.5	52.8	28.3	11.4	16.3	7.3 – 15.6	5.48	< .001
Reading *A9 Pass Comp*	F	12	8 – 19	37.8	28.4	47.8	22.3	10.0	26.8	-7 – 27.0	1.29	.223
	M	21	6 – 48	37.8	21.1	52.6	27.1	14.9	17.9	6.7 – 23	3.8	.001
Math *A6 Fluency*	F	228	6 – 59	27.9	25.1	42.0	30.1	14.1	18.2	11.8 – 16.5	11.72	< .001
	M	436	5 – 54	30.8	27.5	44.5	29.9	13.7	17.9	12.0 – 15.4	15.99	< .001
Math *A10 Applied Prob*	F	34	6 – 18	30.4	20.3	38.5	23.6	8.0	12.8	3.6 – 12.5	3.65	.001
	M	55	6 – 50	39.3	24.1	43.7	24.6	4.3	14.1	.5 – 8.1	2.28	.002
Math *A18 Quantitative*	F	79	6 – 42	36.6	25.0	47.2	26.7	10.6	20.1	6.1 – 15.1	4.67	< .001
	M	152	4 – 50	40.7	25.3	50.7	26.2	10.0	18.6	7 – 13	6.62	< .001
Phono Aware *A13 Word Attack*	F	538	5 – 73	45.2	25.1	57.6	24.3	12.4	15.9	11.1 – 13.8	18.1	< .001
	M	1099	4 – 56	47.3	24.8	59.9	23.5	12.6	17.8	11.5 – 13.6	23.34	< .001
Phono Aware *A20 Spell Sounds*	F	277	5 – 61	42.5	25.6	53.9	24.2	11.4	20.6	8.9 – 13.8	9.18	< .001
	M	515	4 – 48	44.5	25.8	55.2	24.9	10.7	20.9	8.9 – 12.5	11.64	< .001
Phono Aware *A21 Sound Aware*	F	536	5 – 73	46.9	29.9	70.0	26.7	23.1	23.8	21.1 – 25.2	22.49	< .001
	M	1097	4 – 56	49.3	29.2	71.9	26.9	22.6	22.9	21.2 – 24.0	32.71	< .001

Statistical analysis using paired samples t tests on pre-test and post-test means indicate that all students with ADHD achieved statistically significant gains across all measures of reading, math, and phonological awareness skills tested except for one. Female students with ADD/ADHD did not achieve statistically significant gains in passage comprehension, but did achieve a positive mean 10 percentile point gain nonetheless.

MR analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -ACH for students with ADD/ADHD. Gender did not emerge as a predictor in any of the tests. Age was a predictor of gains on several tests. Results by achievement area are below:

Reading. MR results indicate the overall regression for percentile gains on Test 2, Reading Fluency, was not significant (F (5, 93) = 1.39, p = .23). MR results indicate the overall regression for percentile gains on Test 9, Passage Comprehension, was not significant (F (5, 27) = .95, p = .46). Therefore, age and gender did not predict percentile gains in reading measures for this sample of students.

Math. MR results indicate that the overall regression for Test 6, Math Fluency, was significant (F (5, 658) = 2.79, p = .01). However, gender was not a significant predictor of score gains (t = .30, p = .76). Age was related to gains for age groups 12-16 (t = 3.09, p = .002) and 16-24 (t = 2.9, p = .003), but the proportion of variance explained by the model ($R2$ = .02) was only 2%. Therefore, age has only a small relationship with gains on math fluency in these age groups, and no relationship with the remaining age groups. MR results indicate the overall regression for percentile gains on Test 10, Applied Problems, was not significant (F (5, 83) = .60, p = .69). MR results indicate the overall regression for percentile gains on Test 18, Quantitative Concepts, was not significant (F (5, 225) = 1.32, p = .25). Therefore, age and gender did not predict gains in applied math problems and quantitative concepts in this sample of students.

Phonological Awareness. MR results indicate that the overall regression for Test 13, Word Attack, was significant (F (5, 1631) = 2.81, p = .01). However, gender was not a significant predictor of score gains (t = .00, p = .99). Age was related to gains for age groups 12-16 (t = 2.93, p = .003), but the proportion of variance explained by the model ($R2$ = .008) was less than 1%. Next, MR results indicate the overall regression for Test 20, Spelling of Sounds, was not significant (F (5, 786) = .521, p = .76). MR results also indicate that the overall regression for gains on Test 21, Sound Awareness, was significant (F (5, 1627) = 4.4, p < .001). However, gender was not a significant predictor of score gains (t = .62, p = .53). Age was related to gains for age groups 7-12 (t = 3.66, p < .001), 12-16 (t = 2.76, p = .005), and 16-24 (t = 3.07, p = .002), but the proportion of variance explained by the model ($R2$ = .01) is only 1%. Therefore, age was not a notable predictor of gains in any of the phonological awareness tests for this sample of students.

Results on General Intellectual Ability (GIA) for Students with Dyslexia

WJ III GIA	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
GIA	F	153	4 – 43	10.1	3.5	13.5	5.2	3.4	2.8	2.9 – 3.8	14.78	< .001
Age Equiv.	M	212	5 – 48	9.8	3.1	12.9	4.8	3.1	2.5	2.8 – 3.5	17.94	< .001
GIA	F	153	4 – 43	32.6	22.2	59.	28.6	26.4	17.5	23.6 – 29.2	18.66	< .001
Percentile	M	212	5 – 48	35.2	23.3	60.1	27.6	24.9	19.3	22.3 – 27.5	18.73	< .001
GIA	F	153	4 – 43	90.6	13.9	104.3	15.1	13.6	8.2	12.3 – 14.9	20.67	< .001
IQ Score	M	212	5 – 48	92.	13.6	104.5	15.5	12.5	8.9	11.3 – 13.7	20.33	< .001

Statistical analysis using paired samples t tests of pretest and posttest means of General Intellectual Ability (GIA) indicate that all students with dyslexia realized statistically significant gains in GIA across all three measures of age-equivalency, percentile, and IQ score. Female students with Dyslexia (n = 153) achieved a mean 3.4 year age gain, 26.4 percentile gain, and 13.6 IQ score points from pre-test to post-test. Male students with dyslexia (n = 212) achieved a mean 3.1 year age gain, 24.9 percentile points, and 12.5 IQ score points from pre-test to post-test.

Multiple regression (MR) analyses were performed to determine if age and/or gender were significant predictors of gains in GIA for students with dyslexia. Results indicate that the overall regression for GIA Age Equivalency was significant (F (5,359) = 16.3, p < .001). Gender was not a significant predictor of score gains (t = .28, p = .77), but the proportion of variance explained by the model ($R2$ = .18) was 18%. Therefore, age does appear to have a relationship with the gains in IQ Age Equivalency across all age groups.

Multiple regression results indicate that the overall regression for GIA Percentile was not significant (F (5,359) = 1.05, p = .38); and GIA IQ score was not significant (F (5,359) = 1.85, p = .101). Therefore, age and gender do not appear to have a relationship with the gains in GIA Percentile or GIA IQ score for students with dyslexia.

Results by Cognitive Area for Students with Dyslexia

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Comp-Knowl	F	195	4 – 43	40.9	25.7	51.3	26.7	10.3	15.6	8.1 – 12.6	9.25	< .001
C1 Verbal	M	290	5 – 48	40.7	23.5	53.4	24.4	12.6	18.5	10.5 – 14.8	11.62	< .001
LTMem	F	262	4 – 57	30.2	24.	54.4	28.6	24.2	21.7	21.6 – 26.8	18.07	< .001
C2 Vis-Aud	M	383	5 – 48	30.4	24.5	54.4	28.6	24.	25.	21.5 – 26.5	18.77	< .001
LTMem	F	96	6 – 35	39.3	28.2	53.2	27.8	13.8	21.4	9.5 – 18.2	6.35	< .001
C12 Retrieval	M	104	6 – 26	32.9	26.3	45.9	26.4	13.1	22.7	8.6 – 17.5	5.86	< .001
Vis Proc	F	262	4 – 57	44.9	21.	62.5	20.5	17.6	17.6	15.5 – 19.8	16.24	< .001
C3 Spatial Rel	M	381	5 – 48	52.2	23.9	67.2	20.1	15.	19.2	13.1 – 17.0	15.31	< .001
Aud Proc	F	199	4 – 43	66.9	24.2	81.2	19.8	14.3	17.5	11.8 – 16.7	11.51	< .001
C4 Sound Blend	M	298	5 – 48	63.2	26.7	79.2	21.5	16.	21.8	13.5 – 18.5	12.69	< .001
Logic/Reason	F	259	4 – 57	44.4	26.6	66.8	25.9	22.5	21.3	19.9 – 25.1	16.97	< .001
C5 Concept Form	M	380	5 – 48	45.7	27.2	66.8	25.6	21.1	21.3	19. – 23.3	19.34	< .001
Logic/Reason	F	36	7 – 42	40.5	31.1	59.2	24.8	18.7	24.9	10.3 – 27.1	4.51	< .001
C15 Analysis-Syn	M	40	8 – 26	37.	24.3	52.8	28.	15.8	26.2	7.4 – 24.1	3.81	< .001
Process Speed	F	206	4 – 57	27.9	24.4	41.4	27.4	13.5	21.1	10.6 – 16.4	9.15	< .001
C6 Visual Match	M	295	5 – 48	23.5	21.9	35.2	26.6	11.7	20.6	9.4 – 14.1	9.79	< .001
Process Speed	F	65	6 – 42	47.	29.6	64.5	31.5	17.4	24.2	11.4 – 23.4	5.8	< .001
C16 Decision	M	74	5 – 26	34.4	27.6	54.4	29.6	20.	23.4	14.6 – 25.4	7.34	< .001

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Exec Process	F	260	4 – 57	42.4	22.5	65.4	23.5	23.	20.2	20.5 – 25.5	18.33	< .001
C20 Pair Cancel	M	381	5 – 48	39.5	21.3	64.1	24.	24.6	20.6	22.5 – 26.7	23.29	< .001
WMem	F	257	5 – 57	27.6	22.9	46.	27.9	18.4	24.3	15.4 – 21.4	12.16	< .001
C7 Num Reverse	M	375	5 – 48	29.9	23.2	46.9	27.1	16.9	24.5	14.4 – 19.4	13.39	< .001
WMem	F	171	4 – 57	46.8	27.	60.9	22.6	14.1	23.	10.6 – 17.6	8.02	< .001
C9 Auditory	M	250	5 – 48	44.6	26.4	59.	25.5	14.4	22.7	11.5 – 17.2	10.01	< .001

Students with Dyslexia were administered nine tests from the Standard Battery and four tests for the Extended Battery of the Woodcock Johnson III – Tests of Cognitive Abilities. Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students with dyslexia achieved statistically significant gains across all measures of cognitive abilities tested.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -COG for students with dyslexia. Gender did not emerge as a predictor in any of the tests. Age was a predictor of gains on special relations and pair cancellation tasks. Results by cognitive area are below:

Verbal Comprehension. MR results indicate the overall regression for Test 1, Verbal Comprehension, was not significant (F (5, 479) = .53, p = .74). Therefore, age and gender did not predict percentile gains in verbal comprehension for students with dyslexia.

Long-Term Memory. MR results indicate that the overall regression for Test 2, Visual and Auditory Learning, was not significant (F (5, 639) = 1.83, p = .103). The overall regression for Test 12, Retrieval Fluency, was not significant (F (5, 194) = .445, p = .81). Therefore, age and gender did not predict gains on either measure of long-term memory.

Visual Processing. MR results indicate that the overall regression for Test 3, Spatial Relations, was significant (F (5, 637) = 4.41, p < .001). However, gender was not a significant predictor of score gains (t = 1.3, p = .17). Age was related to gains for age groups 12-16 (t = 2.3, p = .017), 16-24 (t = 2.61 p = .009), and 24-100 (t = 3.77, p < .001), but the proportion of variance explained by the model (*R2* = .03) was only 3%. Therefore, age has a small relationship with spatial relations gains for those age groups.

Auditory Processing. MR results indicate that the overall regression for Test 4, Sound Blending, was not significant (F (5, 491) = 1.71, p = .12). Therefore, age and gender did not predict percentile gains in auditory processing.

Logic and Reasoning. MR results indicate the overall regression for Test 5, Concept Formation, was not significant (F (5, 633) = 1.08, p = .36). MR results indicate the overall regression for Test 15, Analysis-Synthesis, was not significant *(F (5, 70) = .09, p = .99)*. Therefore, age and gender did not predict percentile gains on tests of logic and reasoning.

Processing Speed. MR results indicate the overall regression for Test 6, Visual Matching, was not significant (F (5, 495) = 1.14, p = .33). MR results indicate the overall regression for Test 16, Decision Speed, was not significant (F (5, 133) = 1.1, p = .35). Therefore, age and gender did not predict percentile gains in visual matching or decision speed. However, MR results indicate that the overall regression for Test 20, Pair Cancellation, was significant (F (5, 635) = 5.9, p < .001). Gender was not a significant predictor of score gains (t = 1.26, p = .20) but age was related to gains for age groups 7-12 (t = 3.76, p < .001), 12-16 (t = 4.02, p < .001), 16-24 (t = 3.51, p < .001), and 24-100 (t = 4.3, p < .001). However, the proportion of variance explained by the model (*R2* = .04) was only 4%. Therefore, age had a very small relationship with pair cancellation gains for all age groups.

Working Memory. MR results indicate that the overall regression for Test 7, Numbers Reversed, was not significant (F (5, 626) = 1.73, p = .12). MR results indicate the overall regression for percentile gains on Test 9, Auditory Working Memory, was not significant (F (5, 415) = .42, p = .82). Therefore, age and gender did not predict percentile gains in tests of working memory for students with dyslexia.

Results by Achievement Area for Students with Dyslexia

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Reading	F	18	8 – 21	32.4	21.3	50.7	25.3	18.3	17.3	9.7 – 26.9	4.48	< .001
A2 Fluency	M	14	7 – 19	31.1	19.8	47.5	31.3	16.4	18.3	5.8 – 27	3.35	< .001
Reading	F	14	8 – 17	34.5	21.1	53.9	19.3	19.4	25.4	4.8 – 34.1	2.86	.01
A9 Pass Comp	M	6	7 – 48	31.5	19.3	36.	18.2	4.5	25.7	-22.5 – 31.5	.43	.68
Math	F	117	7 – 42	21.9	22.3	34.7	27.2	12.8	18.1	9.5 – 16.1	7.67	< .001
A6 Fluency	M	157	5 – 48	21.7	22.6	32.1	27.6	10.4	18.3	7.5 – 13.3	7.14	< .001
Math	F	16	7 – 28	22.9	14.2	34.3	17.8	11.4	15.5	3.2 – 19.7	2.96	.01
A10 Applied Prob	M	12	7 – 16	44.6	25.7	47.8	26.1	3.2	14.8	6.2 – 12.6	.75	.47

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Math *A18 Quantitative*	F	43	6 – 42	25.6	23.4	41.3	27.7	15.7	20.2	9.5 – 22.	5.1	< .001
	M	45	7 – 19	30.	22.	36.5	24.9	6.6	18.6	1 – 12.1	2.36	.02
Phono Aware *A13 Word Attack*	F	260	4 – 57	32.3	22.7	46.8	23.2	14.5	15.6	12.6 – 16.4	14.92	< .001
	M	377	5 – 48	31.2	21.5	45.2	23.	14.	16.4	12.3 – 15.7	16.6	< .001
Phono Aware *A20 Spell Sounds*	F	166	5 – 43	37.1	23.9	47.4	22.9	10.3	18.2	7.5 – 13.1	7.29	< .001
	M	240	5 – 48	33.4	24.3	44.5	24.3	11.1	19.3	8.6 – 13.5	8.87	< .001
Phono Aware *A21 Sound Aware*	F	258	4 – 57	36.1	26.3	61.	28.7	27.9	23.6	25. – 30.8	18.98	< .001
	M	379	5 – 48	37.5	27.	63.4	30.4	25.9	24.	23. – 28.3	21.04	< .001

Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students with dyslexia achieved statistically significant gains across all measures of reading and math fluency, and phonological awareness skills. Male students with dyslexia achieved positive, but not statistically significant, gains on passage comprehension and applied math problems.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -ACH for students with Dyslexia. Gender did not emerge as a predictor in any of the tests, and age was a predictor of gains only on sound awareness. Results by achievement area are below:

Reading. MR results indicate the overall regression for percentile gains on Test 2, Reading Fluency, was not significant (F (5, 27) = 2.67, p = .053). MR results indicate the overall regression for percentile gains on Test 9, Passage Comprehension, was not significant (F (5, 14) = 2.11, p = .12). Therefore, age and gender did not predict percentile gains in reading measures for this sample of students.

Math. MR results indicate that the overall regression for Test 6, Math Fluency, was not significant (F (5, 268) = 1.66, p = .14). Multiple regression results indicate the overall regression for percentile gains on Test 10, Applied Problems, was significant (F (5, 22) = 3.17, p = .02). However, gender was not a significant predictor of score gains (t = .99, p = .33). Age was not significant for any age group, but the proportion of variance explained by the model ($R2$ = .41) was 41%. However, the sample size for this test is too small to draw conclusions about the regression model. It is unclear what relationship age and gender have on applied math problems in this sample. Multiple regression results indicate the overall regression for percentile gains on Test 18, Quantitative Concepts, was not significant (F (5, 82) = 1.14, p = .34). Therefore, age and gender did not predict gains in math fluency or quantitative concepts in these samples of students.

Phonological Awareness. MR results indicate that the overall regression for percentile gains on Test 13, Word Attack, was not significant (F (5, 631) = 1.01, p = .41). Next, MR results indicate the overall regression for percentile gains on Test 20, Spelling of Sounds, was not significant (F (5, 400) = .1.77, p = .11). Therefore, age and gender did not predict gains in Word Attack or spelling of sounds for students in these samples. MR results do indicate that the overall regression for gains on Test 21, Sound Awareness, was significant (F (5, 631) = 2.98, p = .01). However, gender was not a significant predictor of score gains (t = 1.06, p = .28). Age was related to gains for age group 7-12 (t = 3.51, p < .001), but the proportion of variance explained by the model ($R2$ = .02) is only 2%. Therefore, age was a very small predictor of gains in sound awareness for this sample of students.

Results on General Intellectual Ability (GIA) for Students with Autism Spectrum Disorder

WJ III GIA	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
GIA *Age Equiv.*	F	25	7 – 21	11.3	5.1	13.9	5.9	2.6	2.6	1.5 – 3.6	4.94	< .001
	M	117	4 – 40	10.8	5.3	13.6	6.1	2.8	3.1	2.2 – 3.3	9.69	< .001
GIA *Percentile*	F	25	7 – 21	33.	33.2	46.	36.	12.9	15.	6.8 – 19.1	4.32	< .001
	M	117	4 – 40	33.2	31.2	51.1	34.4	17.9	17.5	14.7 – 21.1	11.05	< .001
GIA *IQ Score*	F	25	7 – 21	87.6	25.8	98.8	26.9	11.2	9.	7.5 – 14.9	6.23	< .001
	M	117	4 – 40	87.8	23.1	100.4	23.8	12.6	9.2	10.9 – 14.3	14.81	< .001

Statistical analysis using paired samples *t* tests of pre-test and post-test means of General Intellectual Ability (GIA) indicate that students diagnosed with Autism Spectrum Disorders (ASD) realized statistically significant gains in GIA across all three measures of age-equivalency, percentile, and IQ score. Female students with ASD (n = 25) achieved a mean 2.6 year gain, 12.9 percentile gain, and 11.2 IQ score points from pre-test to post-test. Male students with ASD (n = 117) achieved a mean 2.8 year gain, 17.9 percentile gain, and 12.6 IQ score points from pre-test to post-test.

Multiple regression (MR) analyses were performed to determine if age and/or gender were significant predictors of gains in GIA for students with ASD. Results indicate that the overall regression for GIA Age Equivalency was significant (F (5,136) = 2.44, p = .03). Gender was not a significant predictor of score gains (t = .005, p = .99). Age was related to gains for age groups 7-12 (t = 2.83, p = .005) and 24-100 (t = 2.26, p = .025), and the proportion of variance explained by the model ($R2$ = .08) is 8%. Therefore, age does appear to have a relationship with the gains in IQ Age Equivalency in this sample.

MR results indicate that the overall regression for GIA Percentile was not significant (F (5,136) = .78, p = .56); and GIA IQ score was not significant (F (5,136) = 1.58, p = .16). Therefore, age and gender do not appear to have a relationship with the gains in GIA percentile or GIA IQ score for students with ASD.

Results by Cognitive Area for Students with Autism Spectrum Disorder

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Comp-Knowl	F	35	7 – 21	37.5	32.3	45.6	32.9	8.	19.7	1.2 – 14.8	2.4	.02
C1 Verbal	M	142	4 – 40	41.	31.7	48.9	32.3	8.	15.7	5.3 – 10.6	6.04	< .001
LTMem	F	54	4 – 26	33.6	30.5	54.9	33.9	21.3	21.8	15.4 – 27.3	7.18	< .001
C2 Vis-Aud	M	216	4 – 40	33.5	29.3	52.4	31.8	18.9	22.	15.9 – 21.8	12.6	< .001
LTMem	F	15	7 – 15	30.2	29.	41.6	35.3	11.3	15.6	2.7 – 20.	2.81	.01
C12 Retrieval	M	42	4 – 37	29.3	27.6	36.2	26.1	6.9	21.2	0.3 – 13.5	2.1	.04
Vis Proc	F	53	4 – 26	43.	26.9	56.8	26.8	13.7	18.1	8.7 – 18.7	5.52	< .001
C3 Spatial Rel	M	213	4 – 40	50.3	26.1	65.1	25.5	14.8	17.1	12.5 – 17.1	12.57	< .001
Aud Proc	F	35	7 – 21	61.7	31.2	78.4	25.7	16.7	21.6	9.3 – 24.2	4.59	< .001
C4 Sound Blend	M	147	4 – 40	59.	29.6	76.2	24.7	17.2	18.6	14.1 – 20.2	11.19	< .001
Logic/Reason	F	53	4 – 26	38.7	33.8	52.9	34.9	14.2	19.2	8.9 – 19.4	5.38	< .001
C5 Concept Form	M	211	4 – 40	39.3	32.3	55.	34.	15.8	21.3	12.9 – 18.7	10.75	< .001
Logic/Reason	F	10	10 – 21	41.5	34.6	58.3	28.7	16.8	23.5	0.0 – 33.6	2.26	.04
C15 Analysis-Syn	M	23	6 – 25	42.3	34.5	58.4	31.8	16.1	22.7	6.3 – 25.9	3.41	.002
Process Speed	F	30	7 – 21	31.8	29.	43.8	33.4	12.1	21.3	4.1 – 20.	3.1	.004
C6 Visual Match	M	143	4 – 40	25.8	26.8	38.5	31.3	12.7	21.4	9.1 – 16.2	7.08	< .001
Process Speed	F	16	9 – 21	31.1	32.6	50.4	40.4	19.2	28.	4.3 – 34.1	2.75	.014
C16 Decision	M	36	6 – 37	28.9	31.7	43.7	34.2	14.8	29.8	4.7 – 24.9	2.97	.005
Exec Process	F	53	5 – 26	32.7	25.7	50.9	30.2	18.2	21.7	12.2 – 24.2	6.12	< .001
C20 Pair Cancel	M	211	4 – 40	30.4	23.2	51.9	28.9	21.5	23.4	18.4 – 24.7	13.38	< .001
WMem	F	48	5 – 25	30.2	26.5	48.2	30.6	18.1	24.7	10.9 – 25.2	5.07	< .001
C7 Num Reverse	M	199	4 – 40	34.4	29.3	49.5	31.4	15.1	23.4	11.9 – 18.4	9.13	< .001
WMem	F	24	7 – 21	37.6	34.8	53.8	31.5	16.3	22.7	6.7 – 25.8	3.52	.001
C9 Auditory	M	105	4 – 37	36.1	31.3	50.1	32.6	14.	22.7	9.6 – 18.4	6.32	< .001

Statistical analysis using paired samples t tests on pre-test and post-test means indicate that all students with Autism Spectrum Disorder achieved statistically significant gains across all measures of cognitive abilities tested.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -COG for students with Autism. Gender did not emerge as a predictor in any of the tests, and age was only related to verbal comprehension. Results by cognitive area are below:

Verbal Comprehension. MR results indicate the overall regression for percentile gains on Test 1, Verbal Comprehension, was significant (F (5, 171) = 3.07, p = .01). However, gender was not a significant predictor of score gains (t = .10, p = .91). Age was related to long-term memory gains for age groups 7-12 (t = 3.7, p < .001), 12-16 (t = 2.4, p = .017), and 16-24 (t = 3.14, p = .001). The proportion of variance explained by the model ($R2$ = .08) was 8%. Therefore, age was related to gains in verbal comprehension for this sample.

Long-Term Memory. MR results indicate that the overall regression for Test 2, Visual and Auditory Learning, was not significant (F (5, 264) = .50, p = .77). The overall regression for Test 12, Retrieval Fluency, was not significant (F (5, 51) = .631, p = .67). Therefore, age and gender did not predict gains in test of long-term memory.

Visual Processing. MR results indicate that the overall regression for Test 3, Spatial Relations, was not significant (F (5, 260) = 1.56, p =.171). Therefore, age and gender were not related to gains in visual processing for students with ASD.

Auditory Processing. MR results indicate that the overall regression for Test 4, Sound Blending, was not significant (F (5, 176) = .409, p = .84). Therefore, age and gender did not predict percentile gains in auditory processing for students with ASD.

Logic and Reasoning. MR results indicate the overall regression for percentile gains on Test 5, Concept Formation, was not significant (F (5, 258) = .374, p = .86). MR results indicate the overall regression for percentile gains on Test 15, Analysis-Synthesis, was not significant (F (5, 27) = .28, p = .91). Therefore, age and gender did not predict percentile gains on tests of logic and reasoning.

Processing Speed. MR results indicate the overall regression for percentile gains on Test 6, Visual Matching, was not significant (F (5, 241) = .51, p = .76). Multiple regression results indicate the overall regression for percentile gains on Test 16, Decision Speed, was not significant (F (5, 46) = 1.08, p = .38). Therefore, age and gender did not predict percentile gains in visual matching or decision speed. Finally, MR results indicate that the overall regression for Test 20, Pair Cancellation, was not significant (F (5, 258) = 2.08, p = .06). Therefore, age and gender did not have a relationship with gains on tests of processing speed for students with ASD.

Working Memory. MR results indicate that the overall regression for Test 7, Numbers Reversed, was not significant (F (5, 241) = .51, p = .76). MR results indicate the overall regression for Test 9, Auditory Working Memory, was not significant (F (5, 123) = .47, p = .79). Therefore, age and gender did not predict gains on tests of working memory for this sample.

Results by Achievement Area for Students with Autism Spectrum Disorder

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Reading *A2 Fluency*	F	5	8 – 21	41.4	33.8	60	24.3	18.6	13.1	2.3 – 34.8	3.18	.03
	M	11	6 – 37	36.5	34.7	43.9	37.7	7.4	10.7	0.2 – 14.6	2.28	.04
Reading *A9 Pass Comp*	F	2	8 – 15	49.	49.5	82.	19.8	33.	29.7	n/a	n/a	n/a
	M	4	10 – 18	45.8	21.9	56.2	23.8	10.5	17.6	n/a	n/a	n/a
Math *A6 Fluency*	F	22	7 – 21	20.7	29.9	32.2	31.8	11.5	17.4	3.7 – 19.2	3.09	.005
	M	78	6 – 37	26.7	30.7	37.8	33.7	11.1	17.4	7.2 – 15	5.62	< .001
Math *A10 Applied Prob*	F	4	14 – 15	19.2	11.	23.5	12.1	4.2	4.6	n/a	n/a	n/a
	M	8	9 – 16	42.2	26.9	49.2	27.	7.	13.4	-4.2 – 18.2	1.48	.18
Math *A18 Quantitative*	F	10	13 – 21	41.1	33.7	49.6	29.5	8.5	24.7	-9.2 – 26.2	1.09	.30
	M	25	4 – 25	44.9	26.5	46.1	28.1	1.2	17.	-5.8 – 8.2	.36	.72
Phono Aware *A13 Word Attack*	F	53	4 – 26	43.6	30.5	52.9	30.	9.3	19.4	3.9 – 14.6	3.48	.001
	M	215	4 – 40	47.4	28.7	58.1	28.	10.7	16.7	8.5 – 13	9.42	< .001
Phono Aware *A20 Spell Sounds*	F	22	5 – 21	33.4	31.1	46.1	32.1	12.7	19.1	4.2 – 21.1	3.11	.005
	M	103	4 – 37	39.5	30.5	49.6	29.2	10.1	20.3	6.1 – 14.	5.03	< .001
Phono Aware *A21 Sound Aware*	F	52	4 – 26	38.1	33.5	55.9	33.4	17.8	21.8	11.7 – 23.9	5.88	< .001
	M	212	4 – 40	40.6	32.8	59.3	34.8	18.7	20.9	15.9 – 21.5	13.04	< .001

Statistical analysis using paired samples t tests on pre-test and post-test means indicate that all students with ASD achieved statistically significant gains in reading and math fluency, and on all tests of phonological skills. Nonsignificant, but positive, gains were made by male students on tests of applied math and by all students on quantitative concepts. Missing data limits conclusions for passage comprehension and female student scores on applied math problems.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on several tests of the WJ III -ACH for students with ASD. Small sample sizes precluded MR analysis on both reading tests, applied math, and quantitative concepts. Gender did not emerge as a predictor in any of the tests, and age was only a predictor of gains on sound awareness. Results by achievement area are below:

Math. MR results indicate that the overall regression for Test 6, Math Fluency, was not significant (F (5, 94) = 1.52, p = .19). Therefore, age and gender did not predict gains in math fluency for this sample of students with ASD.

Phonological Awareness. MR results indicate that the overall regression for Test 13, Word Attack, was not significant (F (5, 262) = .54, p = .74). MR results also indicate the overall regression for Test 20, Spelling of Sounds, was not significant (F (5, 119) = .726, p = .60). Therefore, age and gender did not predict gains on Word Attack or Spelling of Sounds for students in this sample. However, MR results indicate that the overall regression for Test 21, Sound Awareness, was significant (F (5, 258) = 2.54, p = .028). Gender, though, was not a significant predictor of score gains (t = .07, p = .94). Age was related to gains for age group 24-100 only (t = 2.3, p = .02), but the proportion of variance explained by the model (*R2* = .046) is only 4%. Therefore, age was a small predictor of gains in sound awareness in this sample of students.

Results on General Intellectual Ability (GIA) for Students with Learning Disability

WJ III GIA	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
GIA	F	133	6 – 43	9.4	3.5	12.4	5.2	3.0	2.6	2.5 – 3.4	13.07	< .001
Age Equiv.	M	220	5 – 48	10.	3.9	13.2	5.2	3.2	2.9	2.8 – 3.6	16.43	< .001
GIA	F	133	6 – 43	20.5	19.5	43.1	29.2	22.6	18.	19.5 – 25.6	14.46	< .001
Percentile	M	220	5 – 48	26.	23.4	49.2	30.2	23.3	19.	20.8 – 25.8	18.19	< .001
GIA	F	133	6 – 43	83.2	14.9	96.1	16.2	12.8	8.1	11.4 – 14.2	18.34	< .001
IQ Score	M	220	5 – 48	85.	17.5	98.6	18.	13.6	8.7	12.4 – 14.8	23.23	< .001

Statistical analysis using paired samples t tests of pre-test and post-test means of General Intellectual Ability (GIA) indicate that students with a learning disability realized statistically significant gains in GIA across all three measures of age-equivalency, percentile, and IQ score. Female students with a learning disability (n = 133) achieved a mean 3.0 year gain, 22.6 percentile gain, and 12.8 IQ score points from pre-test to post-test. Male students with a learning disability (n = 220) achieved a mean gain of 3.2 years, 23.3 percentile points, and 13.6 IQ score points from pre-test to post-test.

Multiple regression (MR) analyses were performed to determine if age and/or gender were significant predictors of gains in GIA for students with a learning disability. Results indicate that the overall regression for GIA Age Equivalency was significant (F (5,347) = 7.83, p < .001). Gender was not a significant predictor of score gains (t = 36, p = .71), but the proportion of variance explained by the model ($R2$ = .101) was 10%. Therefore, age does appear to have a relationship with the gains in IQ Age Equivalency across all age groups.

Multiple regression results indicate that the overall regression for GIA Percentile was not significant (F (5,347) = 1.58, p = .162); and GIA IQ score was not significant (F (5,347) = 1.18, p = .317). Therefore, age and gender do not appear to have a relationship with the gains in GIA Percentile or GIA IQ score for students with a learning disability.

Results by Cognitive Area for Students with Learning Disability

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Comp-Knowl	F	167	6 – 51	27.4	23.2	37.6	25.7	10.2	15.1	7.9 – 12.5	8.74	< .001
C1 Verbal	M	279	5 – 48	33.5	25.	43.8	27.7	10.4	17.8	8.3 – 12.5	9.72	< .001
LTMem	F	235	6 – 57	21.4	22.4	43.1	29.6	21.7	20.6	19. – 24.3	16.12	< .001
C2 Vis-Aud	M	383	4 – 52	25.	24.9	46.7	30.3	21.6	24.2	19.2 – 24.1	17.48	< .001
LTMem	F	62	7 – 43	29.9	26.8	44.3	29.7	14.5	21.3	9.1 – 19.9	5.36	< .001
C12 Retrieval	M	98	6 – 28	22.2	20.5	38.1	25.8	15.8	22.1	11.4 – 20.3	7.07	< .001
Vis Proc	F	235	6 – 57	37.3	21.5	54.6	23.6	17.2	17.8	14.9 – 19.5	14.85	< .001
C3 Spatial Rel	M	380	4 – 52	44.1	25.7	60.7	25.5	16.6	19.2	14.7 – 18.5	16.82	< .001
Aud Proc	F	170	6 – 51	59.	26.8	77.1	21.8	18.1	19.2	15.2 – 21.	12.33	< .001
C4 Sound Blend	M	288	5 – 48	55.7	29.1	72.9	25.9	17.3	19.6	15. – 19.5	14.92	< .001
Logic/Reason	F	236	6 – 57	31.	26.4	49.2	31.6	18.2	21.6	15.5 – 21.	12.97	< .001
C5 Concept Form	M	380	4 – 52	34.6	27.6	54.6	30.3	20.1	21.6	17.9 – 22.3	18.12	< .001
Logic/Reason	F	29	7 – 42	26.8	25.8	38.3	29.8	11.5	20.6	3.7 – 19.4	3.02	.005
C15 Analysis-Syn	M	47	8 – 38	36.6	24.9	55.1	30.1	18.5	25.8	10.9 – 26.1	4.93	< .001
Process Speed	F	174	6 – 57	24.2	24.8	36.6	28.7	12.4	16.	10. – 14.8	10.27	< .001
C6 Visual Match	M	277	5 – 48	19.4	21.6	33.2	26.8	13.8	18.4	11.6 – 16.	12.48	< .001
Process Speed	F	53	6 – 42	38.6	30.2	55.4	34.3	16.8	22.7	10.5 – 23	5.38	< .001
C16 Decision	M	81	5 – 38	30.5	25.9	46.9	28.7	16.4	22.6	11.4 – 21.4	6.55	< .001
Exec Process	F	235	6 – 57	34.4	23.3	55.1	29.7	20.8	21.8	18. – 23.6	14.61	< .001
C20 Pair Cancel	M	376	4 – 52	32.9	23.4	56.	27.5	23.2	20.3	21.1 – 25.2	22.16	< .001
WMem	F	227	6 – 57	22.1	22.4	39.8	27.9	17.8	22.8	14.8 – 20.8	11.73	< .001
C7 Num Reverse	M	365	4 – 52	27.6	25.	43.9	28.1	16.3	24.1	13.8 – 18.8	12.93	< .001

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
WMem *C9 Auditory*	F	151	6 – 57	34.2	25.8	48.5	25.6	14.4	22.4	10.8 – 17.9	7.89	< .001
	M	213	5 – 47	37.1	26.9	50.3	27.5	13.2	21.3	10.4 – 16.1	9.08	< .001

Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students with a learning disability achieved statistically significant gains across all measures of cognitive abilities tested.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -COG for students with a learning disability. Gender did not emerge as a predictor in any of the tests. Age was a small predictor of gains on pair cancellation and concept formation tasks. Results by cognitive area are below.

Verbal Comprehension. MR results indicate the overall regression for percentile gains on Test 1, Verbal Comprehension, was not significant (F (5, 440) = .235, p = .94). Therefore, age and gender did not predict percentile gains in verbal comprehension for this sample.

Long-Term Memory. MR results indicate that the overall regression for Test 2, Visual and Auditory Learning, was not significant (F (5, 612) = .644, p = .66). The overall regression for Test 12, Retrieval Fluency, was not significant (F (5, 154) = 1.11, p = .35). Therefore, age and gender did not predict gains on either test of long-term memory for this sample of students with a learning disability.

Visual Processing. MR results indicate that the overall regression for Test 3, Spatial Relations, was not significant (F (5, 609) = 1.18, p = .31). Therefore, age and gender do not appear to have a relationship with gains in visual processing for this group.

Auditory Processing. MR results indicate that the overall regression for Test 4, Sound Blending, was not significant (F (5, 452) = .561, p = .72). Therefore, age and gender did not predict percentile gains in auditory processing.

Logic and Reasoning. MR results indicate the overall regression for Test 5, Concept Formation, was significant (F (5, 610) = 4.32, p < .001). However, gender was not a significant predictor of score gains (t = 1.07, p = .28). Age was related to gains for age groups 7-12 (t = 3.84, p < .001) and 12-16 (t = 2.67, p = .007), but the proportion of variance explained by the model ($R2$ = .034) was only 3%. Therefore, age has a very small relationship with gains on concept formation. MR results indicate the overall regression for Test 15, Analysis-Synthesis, was not significant (F (5, 70) = .467, p = .79). Therefore, age and gender did not predict percentile gains in on this skill for students with a learning disability.

Processing Speed. MR results indicate the overall regression for percentile gains on Test 6, Visual Matching, was not significant (F (5, 445) = .932, p = .45). Multiple regression results indicate the overall regression for percentile gains on Test 16, Decision Speed, was not significant (F (5, 128) = .905, p = .47). Therefore, age and gender did not predict percentile gains in visual matching or decision speed. However, MR results indicate that the overall regression for Test 20, Pair Cancellation, was significant (F (5, 605) = 5.29, p < .001). Gender, though, was not a significant predictor of score gains (t = 1.36, p = .17). Age was related to gains for age groups 7-12 (t = 3.22, p = .001), 12-16 (t = 4.62, p < .001), 16-24 (t = 2.68, p =.007), and 24-100 (t = 3.54, p < .001), but the proportion of variance explained by the model ($R2$ = .04) was only 4%. Therefore, age has a very small relationship with pair cancellation gains for all age groups.

Working Memory. MR results indicate that the overall regression for Test 7, Numbers Reversed, was not significant (F (5, 586) = 1.16, p = .32). MR results indicate the overall regression for Test 9, Auditory Working Memory, was not significant (F (5, 358) = .36, p = .87). Therefore, age and gender did not predict percentile gains in tests of working memory for this sample.

Results by Achievement Area for Students with Learning Disability

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Reading *A2 Fluency*	F	15	6 – 31	33.6	26.2	43.1	26.8	9.5	12.6	2.5 – 16.5	2.9	.01
	M	15	8 – 40	27.9	22.3	39.8	30.8	11.9	12.7	4.9 – 19.	3.63	.002
Reading *A9 Pass Comp*	F	3	11 – 19	45.	41.3	28.3	21.4	-16.7.	29.1	n/a	n/a	n/a
	M	4	11 – 21	27.8	29.4	50.8	28.8	23	18.2	n/a	n/a	n/a
Math *A6 Fluency*	F	99	6 – 43	19.4	23.5	31.1	28.2	11.6	19.	7.8 – 15.4	6.1	< .001
	M	158	5 – 47	18.6	23.	29.1	29.5	10.6	16.2	8. – 13.1	8.18	< .001
Math *A10 Applied Prob*	F	11	8 – 28	18.5	21.1	30.2	24.3	11.6	14.4	2.0 – 21.3	2.69	.02
	M	11	9 – 21	29.7	20.	35.3	21.6	5.5	10.7	-1.6 – 12.7	1.72	.11
Math *A18 Quantitative*	F	33	7 – 42	21.9	21.1	29.8	27.1	7.9	18.6	1.3 – 14.5	2.43	.02
	M	46	6 – 38	34.1	21.9	41.4	25.3	7.3	21.2	1. – 13.6	2.35	.02
Phono Aware *A13 Word Attack*	F	235	6 – 57	31.7	22.1	44.2	24.1	12.5	13.9	10.7 – 14.3	13.76	< .001
	M	378	4 – 52	30.7	24.4	44.	25.8	13.3	16.7	11.6 – 15.	15.43	< .001

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Phono Aware	F	133	6 – 43	34.3	22.8	44.9	24.1	10.5	16.7	7.7 – 13.4	7.3	< .001
A20 Spell Sounds	M	209	5 – 48	29.2	23.6	38.4	23.8	9.2	17.6	6.8 – 11.6	7.55	< .001
Phono Aware	F	236	6 – 57	27.8	24.3	50.3	30.6	22.5	23.	19.5 – 25.4	15.01	< .001
A21 Sound Aware	M	378	4 – 52	29.6	27.4	52.5	33.	22.8	24.2	20.4 – 25.3	18.34	< .001

Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students with learning disabilities achieved statistically significant gains across all measures of reading, math, and phonological awareness skills tested except for one. Male students achieved positive, but nonsignificant, gains in applied math problems.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -ACH for students with a learning disability. Small sample size precluded MR analysis for passage comprehension. Gender did not emerge as a predictor in any of the tests. Age was a predictor of gains on math fluency, applied math problems, and sound awareness. Results by achievement area are below:

Reading. MR results indicate the overall regression for percentile gains on Test 2, Reading Fluency, was not significant (F (5, 24) = 1.58, p = .20). Therefore, age and gender did not predict gains in reading fluency for this sample of students.

Math. MR results indicate that the overall regression for Test 6, Math Fluency, was significant (F (5, 251) = 2.52, p = .02). However, gender was not a significant predictor of score gains (t = .30, p = .76). Age was related to gains for age groups 7-12 (t = 2.41, p = .016), 12-16 (t = 3.44, p < .001), 16-24 (t = 2.05, p = .04), and 24-100 (t = 1.99, p = .04), but the proportion of variance explained by the model ($R2$ = .04) was only 4%. Therefore, age had a small relationship with gains on math fluency, particularly for the 12-16 age group. Multiple regression results indicate the overall regression for percentile gains on Test 10, Applied Problems, was also significant (F (5, 17) = 3.75, p = .02). Gender was not a significant predictor, but age was related to gain for the 24-100 age group (t = 3.45, p = .003). The proportion of variance explained by the model ($R2$ = .046) was only 4%, so age had a small relationship with gains on applied problems. Multiple regression results indicate the overall regression for percentile gains on Test 18, Quantitative Concepts, was not significant (F (5, 73) = .51, p = .76). Therefore, age and gender did not predict gains in applied math problems and quantitative concepts in this sample of students.

Phonological Awareness. MR results indicate that the overall regression for Test 13, Word Attack, was not significant (F (5, 607) = .50, p = .77). Next, MR results indicate the overall regression for Test 20, Spelling of Sounds, was not significant (F (5, 336) = 1.25, p = .28). Therefore, age and gender did not predict gains in Word Attack or Spelling of Sounds for students in this sample. MR results also indicate that the overall regression for Test 21, Sound Awareness, was significant (F (5, 608) = 5.77, p < .001). However, gender was not a significant predictor of score gains (t = .04, p = .96). Age was related to gains for age groups 7-12 (t = 4.33, p < .001) and 12-16 (t = 2.6, p = .009), but the proportion of variance explained by the model ($R2$ = .045) is only 4%. Therefore, age was a small predictor of gains in sound awareness for this sample of students, particularly for the 7-12 age group.

Results on General Intellectual Ability (GIA) for Students with Speech/Language Disorder

WJ III GIA	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
GIA	F	107	5 – 60	8.6	3.	11.4	5.2	2.9	2.7	2.4 – 3.4	11.07	< .001
Age Equiv.	M	203	4 – 63	9.	3.5	11.9	5.2	2.8	2.4	2.5 – 3.2	16.94	< .001
GIA	F	107	5 – 60	29.	26.4	51.6	32.	22.6	18.	19.2 – 26.1	13.01	< .001
Percentile	M	203	4 – 63	27.	23.2	50.2	31.	23.3	17.7	20.8 – 25.7	18.74	< .001
GIA	F	107	5 – 60	86.8	18.1	100.5	18.5	13.7	9.	12 – 15.5	15.75	< .001
IQ Score	M	203	4 – 63	85.8	16.9	99.3	18.5	13.4	8.6	12.3 – 14.6	22.28	< .001

Statistical analysis using paired samples *t* tests of pre-test and post-test means of General Intellectual Ability (GIA) indicate that all students with a speech/language disorder realized statistically significant gains in GIA across all three measures of age-equivalency, percentile, and IQ score. Female students with a speech/language disorder (n = 107) achieved a mean gain of 2.9 years, 22.6 percentile points, and 13.7 IQ score points from pretest to posttest. Male students with a speech/language disorder (n = 203) achieved a mean gain of 2.8 years, 23.3 percentile points, and 13.4 IQ score points from pre-test to post-test.

Multiple regression (MR) analyses were performed to determine if age and/or gender were significant predictors of gains in GIA. Results indicate that the overall regression for GIA Age Equivalency was significant (F (5,304) = 18.3, p < .001). Gender was not a significant predictor of score gains (t = .69, p = .49), but the proportion of variance explained by the model ($R2$ = .23) was 23%. Therefore, age does appear to have a relationship with the gains in IQ Age Equivalency across all age groups.

MR results indicate that the overall regression for GIA Percentile was not significant (F (5,304) = .63, p = .67); and GIA IQ score was not significant (F (5,304) = .82, p = .53). Therefore, age and gender do not appear to have a relationship with the gains in GIA Percentile or GIA IQ score for students with a speech/language disorder.

Results by Cognitive Area for Students with Speech/Language Disorder

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Comp-Knowl	F	138	5 – 60	34.	25.	45.	27.8	11.	17.6	8.1 – 14.	7.37	< .001
C1 Verbal	M	257	4 – 63	34.2	25.7	45.1	29.	10.9	16.9	8.8 – 13.	10.35	< .001
LTMem	F	194	4 – 60	27.2	27.8	46.9	29.7	19.7	22.6	16.5 – 23.	12.15	< .001
C2 Vis-Aud	M	374	4 – 63	29.4	27.2	49.7	30.8	20.3	23.3	18.0 – 22.7	16.88	< .001
LTMem	F	54	5 – 28	.37.6	31.6	51.	31.1	13.4	21.1	7.6 – 19.2	4.67	< .001
C12 Retrieval	M	99	4 – 63	26.5	24.4	39.6	29.2	13.1	24.4	8.3 – 18.	5.36	< .001
Vis Proc	F	193	4 – 60	41.8	23.5	57.8	24.	16.	18.	13.5 – 18.6	12.4	< .001
C3 Spatial Rel	M	372	4 – 63	45.4	24.7	60.3	25.3	14.9	18.7	13 – 16.9	15.38	< .001
Aud Proc	F	141	4 – 60	56.8	27.1	76.9	21.	20.1	23.	16.3 – 24.	10.4	< .001
C4 Sound -Blend	M	264	4 – 63	52.8	29.5	70.5	26.9	17.7	20.	15.3 – 20.1	14.37	< .001
Logic/Reason	F	193	4 – 60	37.8	30.4	57.3	32.4	19.6	21.3	16.5 – 22.6	12.73	< .001
C5 Concept Form	M	370	4 – 63	37.8	30.1	56.4	31.4	18.6	22.4	16.3 – 20.9	15.95	< .001
Logic/Reason	F	22	7 – 28	43.2	27.3	54.8	28.6	11.5	21.5	2. – 21.1	2.51	.02
C15 Analysis-Syn	M	36	6 – 28	37.1	29.5	51.8	27.9	14.7	26.9	5.6 – 23.8	3.27	.002
Process Speed	F	142	4 – 60	33.1	27.8	46.9	29.7	13.8	18.2	10.8 – 16.9	9.07	< .001
C6 Visual Match	M	276	4 – 63	24.4	24.	37.4	29.4	13.	19.4	10.7 – 15.3	11.13	< .001
Process Speed	F	37	5 – 28	42	32.8	55.7	33.	13.6	24.9	5.3 – 21.9	3.33	.002
C16 Decision	M	72	5 – 28	33.1	27.4	45.7	29.5	12.7	27.2	6.2 – 19.1	3.94	< .001
Exec Process	F	190	5 – 60	39.7	23.4	60.	26.	20.3	19.8	17.5 – 23.1	14.14	< .001
C20 Pair Cancel	M	363	4 – 63	35.3	23.4	56.8	27.1	21.5	21.8	19.2 – 23.7	18.74	< .001
WMem	F	183	5 – 60	29.9	26.3	46.6	28.5	16.7	22.7	13.4 – 20.1	9.99	< .001
C7 Num Reverse	M	345	4 – 63	28.8	24.9	45.5	27.9	16.7	25.2	14 – 19.4	12.3	< .001
WMem	F	115	4 – 60	40.9	29.3	57.3	26.5	16.5	22.4	12.3 – 20.6	7.88	< .001
C9 Auditory	M	192	4 – 51	35.1	28.3	48.8	28.6	13.7	23.7	10.3 – 17.1	8.00	< .001

Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students with speech/language disorder achieved statistically significant gains across all measures of cognitive abilities tested.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -COG for students with speech/language disorder. Gender did not emerge as a predictor in any of the tests. Age was only a predictor of gains on visual-auditory learning and pair cancellation tests. Results by cognitive area are below:

Verbal Comprehension. MR results indicate the overall regression for Test 1, Verbal Comprehension, was not significant (F (5, 389) = .486, p = .78). Therefore, age and gender did not predict percentile gains in verbal comprehension for this sample of students with speech and language disorder.

Long-Term Memory. MR results indicate that the overall regression for Test 2, Visual and Auditory Learning, was significant (F (5, 562) = 2.82, p = .01). However, gender was not a significant predictor of score gains (t = .07, p = .94). Age was related to long-term memory gains for age groups 7-12 (t = 2.09, p = .03), 12-16 (t = 3.23, p = .001) and 16-24 (t = 2.48, p = .013), but the proportion of variance explained by the model (*R2* = .024) was only 2%. Therefore, age has a very small relationship with visual and auditory learning gains for those age groups. The overall regression for Test 12, Retrieval Fluency, was not significant (F (5, 147) = .257, p = .93). Therefore, age and gender did not predict gains in retrieval fluency.

Visual Processing. MR results indicate that the overall regression for Test 3, Spatial Relations, was not significant (F (5, 559) = 1.29, p = .26). Therefore, age and gender had no relationship with spatial relations gains for students with speech and language disorder.

Auditory Processing. MR results indicate that the overall regression for age equivalency on Test 4, Sound Blending, was not significant (F (5, 399) = .89, p = .48). Therefore, age and gender were not related to percentile gains in auditory processing for this sample of students.

Logic and Reasoning. MR results indicate the overall regression for percentile gains on Test 5, Concept Formation, was not significant (F (5, 557) = 1.53, p = .17). MR results indicate the overall regression for percentile gains on Test 15, Analysis-Synthesis, was not significant (F (5, 52) = 1.42, p = .23). Therefore, age and gender did not relate to gains in logic and reasoning.

Processing Speed. MR results indicate the overall regression for percentile gains on Test 6, Visual Matching, was not significant (F (5, 412) = .29, p = .91). Multiple regression results indicate the overall regression for percentile gains on Test 16, Decision Speed, was not significant (F (5, 103) = .65, p = .66). Therefore, age and gender did not predict percentile gains in visual matching or decision speed. However, MR results indicate that the overall regression for Test 20, Pair Cancellation, was significant (F (5, 547) = 7.14, p < .001). Gender, though, was not a significant predictor of score gains (t = .94, p = .34). Age was related to gains for age groups 7-12 (t = 3.71, p < .001), 12-16 (t = 5.83, p < .001), and 16-24 (t = 2.27, p = .02), but the proportion of variance explained by the model ($R2$ = .06) was only 6%. Therefore, age had a small relationship with pair cancellation gains, particularly for the 12-16 age group of students with speech and language disorder.

Working Memory. MR results indicate that the overall regression for Test 7, Numbers Reversed, was not significant (F (5, 522) = .75, p = .58). MR results indicate the overall regression for Test 9, Auditory Working Memory, was not significant (F (5, 301) = 1.25, p = .28). Therefore, age and gender did not predict percentile gains on tests of working memory for this sample of students with speech and language disorder.

Results by Achievement Area for Students with Speech/Language Disorder

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Reading *A2 Fluency*	F	12	7 – 19	35.4	27.5	51.3	28.6	15.9	10.	9.6 – 22.3	5.53	< .001
	M	17	6 – 19	26.3	25.2	38.8	29.	12.5	11.8	6.5 – 18.6	4.38	< .001
Reading *A9 Pass Comp*	F	5	11 – 19	35.	29.2	52.8	32.4	17.8	24.3	-12.3 – 47.9	1.64	.176
	M	6	5 – 19	36.5	33.7	51.8	31.6	15.4	24.6	-10.4 – 41.2	1.53	.186
Math *A6 Fluency*	F	79	5 – 60	31.3	28.2	44.4	31.7	13.1	18.9	8.9 – 17.4	6.16	< .001
	M	146	5 – 63	25.1	25.7	35.8	32.	10.7	18.5	7.7 – 13.8	7.01	< .001
Math *A10 Applied Prob*	F	12	6 – 28	30.6	27.1	49.6	25.2	19.	18.3	7.4 – 30.6	3.59	.004
	M	5	10 – 14	17.4	19.5	31.2	28.1	13.8	13.	-2.4 – 29.9	2.37	.076
Math *A18 Quantitative*	F	26	7 – 28	30.5	24.6	43.1	28.8	12.6	15.7	6.3 – 18.9	4.1	< .001
	M	39	4 – 23	32	23.9	36.7	24.5	4.6	20.4	-2. – 11.2	1.42	.163
Phono Aware *A13 Word Attack*	F	191	4 – 60	38.8	26.9	51.1	25.6	12.3	16.9	9.8 – 14.7	10.04	< .001
	M	366	4 – 63	37.2	26.6	51.4	27.2	14.2	17.3	12.4 – 16.	15.66	< .001
Phono Aware *A20 Spell Sounds*	F	111	5 – 60	40.4	26.1	50.6	25.5	10.2	20.6	6.3 – 14	5.2	< .001
	M	206	4 – 28	36.	27.5	47.3	27.6	11.3	20.1	8.5 – 14.	8.06	< .001
Phono Aware *A21 Sound Aware*	F	189	4 – 60	34.5	28.8	58.6	31.	24.1	22.4	20.9 – 27.3	14.76	< .001
	M	368	4 – 63	31.3	27.9	54.1	32.3	22.8	22.7	20.4 – 25.1	19.21	< .001

Statistical analysis using paired samples t tests on pre-test and post-test means indicate that all students with a speech/language disorder achieved statistically significant gains across all measures of reading, math, and phonological awareness skills tested except for passage comprehension and applied math problems. Gains were positive but not statistically significant on those tasks.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -ACH for students with speech and language disorder. Age and gender did not emerge as a predictor of gains for any of the tests.

Reading. MR results indicate the overall regression for Test 2, Reading Fluency, was not significant (F (5, 24) = 1.99, p = .12). MR results indicate the overall regression for Test 9, Passage Comprehension, was not significant (F (5, 6) = .2.44, p = .15). Therefore, age and gender were not related to reading measures for this sample of students.

Math. MR results indicate that the overall regression for Test 6, Math Fluency, was not significant (F (5, 219) = 1.38, p = .23). Multiple regression results indicate the overall regression for Test 10, Applied Problems, was not significant (F (5, 11) = .69, p = .63). Multiple regression results indicate the overall regression for Test 18, Quantitative Concepts, was not significant (F (5, 59) = 1.80, p = .12). Therefore, age and gender were not related to gains in math fluency, applied math problems, or quantitative concepts in this sample of students with speech and language disorder.

Phonological Awareness. MR results indicate that the overall regression for percentile gain on Test 13, Word Attack, was not significant (F (5, 551) = 2.01, p = .41). Next, MR results indicate the overall regression for Test 20, Spelling of Sounds, was not significant (F (5, 311) = 1.42, p = .214). MR results also indicate that the overall regression on Test 21, Sound Awareness, was not significant (F (5, 551) = 2.04, p = .07). Therefore, age and gender were not related to gains on tests of phonological awareness with this sample of students.

Results on General Intellectual Ability (GIA) for Students with TBI

WJ III GIA	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
GIA *Age Equiv.*	F	19	9 – 57	14.4	5.6	18.7	6.8	4.3	3.8	2.4 – 6.1	4.87	< .001
	M	24	9 – 60	13.1	4.1	17.4	5.9	4.4	3.4	2.9 – 5.8	6.31	< .001
GIA *Percentile*	F	19	9 – 57	38.6	28.3	60.5	32.9	21.9	15.8	14.3 – 29.5	6.04	< .001
	M	24	9 – 60	30.1	24.3	52.6	29.6	22.5	16.8	15.4 – 29.6	6.57	< .001
GIA *IQ Score*	F	19	9 – 57	93.1	15.	104.4	17.3	11.3	6.1	8.4 – 14.3	8.06	< .001
	M	24	9 – 60	89.4	13.6	101.1	14.8	11.7	7.4	8.6 – 14.8	7.75	< .001

Statistical analysis using paired samples *t* tests of pre-test and post-test means of General Intellectual Ability (GIA) indicate that all students with traumatic brain injury (TBI) realized statistically significant gains in GIA across all three measures of age-equivalency, percentile, and IQ score. Female students with TBI ($n = 19$) achieved a mean 4.3 year gain, 21.9 percentile gain, and 11.3 IQ score points from pre-test to post-test. Male students with TBI ($n = 24$) achieved a mean 4.4 year gain, 22.5 percentile gain, and 11.7 IQ score points gain from pre-test to post-test.

Multiple regression (MR) analyses were performed to determine if age and/or gender were related to gains in GIA for students with TBI. Results indicate that the overall regression for GIA Age Equivalency was not significant ($F(4, 38) = .57$, $p = .68$). Therefore, age did not have a relationship with the gains in IQ Age Equivalency for students with TBI.

MR results indicate that the overall regression for GIA Percentile was not significant ($F(4, 38) = .69$, $p = .60$); and GIA IQ score was not significant ($F(4, 38) = .86$, $p = .49$). Therefore, age and gender do not appear to have a relationship with the gains in GIA Percentile or GIA IQ score for students with TBI.

Results by Cognitive Area for Students with TBI

WJ III Test	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Comp-Knowl *C1 Verbal*	F	24	9 – 57	40.3	25.9	53.2	30.6	13.	18.8	5 – 20.9	3.38	.002
	M	33	9 – 60	37.7	26.7	45.7	33.	8.	16.8	2.1 – 14.	2.74	.009
LTMem *C2 Vis-Aud*	F	32	6 – 87	21.8	26.7	49.6	36.1	27.8	28.	17.7 – 37.9	5.61	< .001
	M	38	9 – 60	16.2	18.6	41.7	33.7	25.6	23.2	18 – 33.2	6.79	< .001
LTMem *C12 Retrieval*	F	4	12 – 18	41.8	22.1	33.2	19.9	-8.5	15.6	n/a	n/a	n/a
	M	6	14 – 51	29.7	21.1	49.	27.8	19.3	13.	5.7 – 33	3.64	.014
Vis Proc *C3 Spatial Rel*	F	32	6 – 87	40.3	24.8	61.6	25.9	21.3	17.3	15. – 27.5	6.94	< .001
	M	38	9 – 60	38.1	23.8	56.4	26.3	18.3	19.4	11.9 – 24.7	5.8	< .001
Aud Proc *C4 Sound Blend*	F	26	9 – 57	54.8	26.3	69.5	25.8	14.6	14.5	8.8 – 20.5	5.14	< .001
	M	33	9 – 60	53.9	30.	69.6	28.7	15.7	18.1	9.3 – 22.2	4.98	< .001
Logic/Reason *C5 Concept Form*	F	32	6 – 87	44.6	30.7	60.3	33.3	15.7	15.6	10.1 – 21.3	5.71	< .001
	M	38	9 – 60	36.9	32.	52.	34.5	15.	15.3	10. – 20.	6.05	< .001
Logic/Reason *C15 Analysis-Syn*	F	5	12 – 18	22.2	12.5	55.6	22.7	33.4	18.4	10.5 – 56.3	4.05	.015
	M	5	10 – 25	25.	13.3	54.8	31.	29.8	24.2	-0.2 – 59.8	2.76	.051
Process Speed *C6 Visual Match*	F	23	9 – 57	28.9	30.1	45.1	32.8	16.1	15.4	9.5 – 22.8	5.02	< .001
	M	31	9 – 60	21.1	26.	35.9	32.	14.7	20.7	7.2 – 22.3	3.98	< .001
Process Speed *C16 Decision*	F	6	12 – 41	44.	21.7	54.	26.5	10.	8.6	1 – 19.	2.86	.035
	M	9	10 – 53	23.	30.6	53.2	32.8	30.2	24.2	11.6 – 48.8	3.74	.005
Exec Process *C20 Pair Cancel*	F	32	6 – 87	27.7	26.6	43.5	32.7	15.8	18.8	9 – 22.5	4.74	< .001
	M	37	9 – 60	25.5	26.9	43.1	32.4	17.6	20.2	10.9 – 24.3	5.3	< .001
WMem *C7 Num Reverse*	F	31	6 – 87	34.5	29.2	49.9	30.7	15.4	20.5	7.9 – 22.9	4.2	< .001
	M	36	9 – 60	34.9	31.6	52.8	34.6	17.9	23.4	10 – 25.8	4.59	< .001
WMem *C9 Auditory*	F	18	9 – 69	36.5	25.6	56.1	29.5	19.6	19.3	10. – 29.2	4.31	< .001
	M	29	9 – 60	36.5	30.7	49.3	32.4	12.9	20.2	5.2 – 20.5	3.43	.002

Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students with TBI achieved statistically significant gains across all measures of cognitive abilities tested.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -COG for students with TBI. Age and gender did not emerge as a predictor in any of the tests. Results by cognitive area are below:

Verbal Comprehension. MR results indicate the overall regression for percentile gains on Test 1, Verbal Comprehension, was not significant (F (4, 52) = 1.03, p = .39). Therefore, age and gender did not predict percentile gains in verbal comprehension for this sample.

Long-Term Memory. MR results indicate that the overall regression for Test 2, Visual -Auditory Learning, was not significant (F (4, 64) = 1.79, p = .12). Therefore, age and gender did were not related to gains in visual-auditory learning. The overall regression for Test 12, Retrieval Fluency, was significant (F (4, 5) = 6.44, p = .03), but the sample size is too small to form conclusions about the relationship between gender, age, and retrieval fluency.

Visual Processing. MR results indicate that the overall regression for Test 3, Spatial Relations, was not significant (F (5, 64) = 1.79, p = .12). Therefore, age and gender were not related to gains in visual processing for this sample of students with TBI.

Auditory Processing. The overall regression for Test 4, Sound Blending, was not significant (F (4, 54) = 1.31, p = .27). Therefore, age and gender did not predict percentile gains in auditory processing.

Logic and Reasoning. MR results indicate the overall regression for percentile gains on Test 5, Concept Formation, was not significant (F (5, 64) = .44, p = .81). MR results indicate the overall regression for percentile gains on Test 15, Analysis-Synthesis, was not significant (F (4, 5) = .70, p = .62). Although the sample size is too small to draw conclusions about Test 15, the results of the MR analysis on Concept Formation indicate that age and gender were not related to percentile gains in logic and reasoning.

Processing Speed. MR results indicate the overall regression for percentile gains on Test 6, Visual Matching, was not significant (F (4, 49) = .151, p = .96). Multiple regression results indicate the overall regression for percentile gains on Test 16, Decision Speed, was not significant (F (4, 10) = 1.48, p = .27). MR results indicate that the overall regression for Test 20, Pair Cancellation, was also not significant (F (5, 63) = 1.08, p = .37). Therefore, age and gender did not predict percentile gains in visual matching, decision speed, or pair cancellation with this sample of students.

Working Memory. MR results indicate that the overall regression for Test 7, Numbers Reversed, was not significant (F (5, 61) = .90, p = .48). MR results indicate the overall regression for Test 9, Auditory Working Memory, was not significant (F (4, 42) = 1.85, p = .13). Therefore, age and gender did not predict percentile gains on tests of working memory for this sample of students with TBI.

Results by Achievement Area for Students with TBI

WJ III Test of Achievement	Gen	*n*	Age range	Pre-test *M*	*SD*	Post-test *M*	*SD*	Gain *M*	*SD*	95% CI	*t*	*p*
Reading *A2 Fluency*	F	2	17 – 41	43	35.4	66.5	16.3	23.5	19.1	n/a	n/a	n/a
	M	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Reading *A9 Pass comp*	F	4	12 – 18	27.2	20.6	37.2	22.3	10.	9.5	n/a	n/a	n/a
	M	2	14 – 25	26.5	19.1	38.	2.8	11.5	21.9	n/a	n/a	n/a
Math *A6 Fluency*	F	8	12 – 41	23.1	15.9	42.4	19.2	19.2	14.9	6.8 – 31.7	3.66	.008
	M	12	9 – 53	17.6	22.5	29.5	26.3	12.	12.6	4. – 20.	3.28	.007
Math *A10 Applied Prob*	F	4	12 – 18	27.2	20.6	37.2	22.3	10.	9.5	n/a	n/a	n/a
	M	2	14 – 25	26.5	19.1	38.	2.8	11.5	21.9	n/a	n/a	n/a
Math *A18 Quantitative*	F	5	12 – 18	36.8	30.7	46.6	26.6	9.8	23.7	-19.6 – 39.2	.93	.406
	M	6	10 – 53	32.3	23.4	46.2	23.5	13.8	13.3	-.2 – 27.8	2.54	.051
Phono Aware *A13 Word Attack*	F	32	6 – 87	41.9	23.4	53.4	26.3	11.5	12.1	7.1 – 15.8	5.39	< .001
	M	37	9 – 60	32.4	24.9	43.9	30.4	11.6	13.8	7 – 16.2	5.11	< .001
Phono Aware *A20 Spell Sounds*	F	12	9 – 52	37.7	24.	47.2	21.9	9.6	24.5	-6. – 25.2	1.35	.203
	M	15	9	24.8	19.7	37.3	23.6	12.5	25.1	-1.4 – 26.3	1.93	.074
Phono Aware *A21 Sound Aware*	F	31	6 – 87	46.	34.7	60.1	34.5	14.1	21.2	6.3 – 21.9	3.7	< .001
	M	38	9 – 60	32.	28.7	47.2	34.6	15.2	18.4	9.1 – 21.2	5.1	< .001

Statistical analysis using paired samples *t* tests on pre-test and post-test means indicate that all students with TBI achieved statistically significant gains across measures of math fluency, word attack, and sound awareness. Not enough data was collected to draw conclusions on the statistical significance of the remaining achievement areas.

Multiple regression (MR) analyses were also performed to determine if age and/or gender were significant predictors of gains on the WJ III -ACH for students with TBI. Age and gender did not emerge as predictors in any of the tests. However, due to small sample sizes of students with TBI, MR analyses could only be conducted on math fluency and phonological awareness test results. Results by achievement area are below:

Math. MR results indicate that the overall regression for Test 6, Math Fluency, was not significant (F (4, 15) = 1.13, p = .37). Therefore, age and gender did not predict gains in math fluency for students with TBI. MR analyses could not be run on applied math problems and quantitative concepts due to small sample sizes.

Phonological Awareness. MR results indicate that the overall regression for Test 13, Word Attack, was not significant (F (5, 63) = .54, p = .74). Next, MR results indicate the overall regression for Test 20, Spelling of Sounds, was not significant (F (4, 22) = .187, p = .94). MR results also indicate that the overall regression for Test 21, Sound Awareness, was not significant (F (5, 63) = .24, p = .94). Therefore, age and gender did not have a relationship with percentile gains on any measures of phonological awareness for this sample of students with TBI.

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