

ANXIETY IN THE CLASSROOM

Academic performance can be hindered by an anxious mind.

Anxiety disorders represent one of the most prevalent manifestations of psychopathology in children and adolescents. Epidemiological reports estimate the prevalence rate of anxiety disorders to be between 10-17% nationwide, with many of these disorders beginning with their onset during late childhood or early adolescence. While once thought that these disorders tended only towards transience in children, new research contends that childhood anxieties are far more likely to be chronic in nature when not addressed properly in children: leaving little ones to struggle with their disorders both at home and in the classroom.

In this issue of the Neuroconnection News, we will be taking a deep dive into childhood anxiety and its influences on learning and academic performance. As rates of diagnosis for anxiety disorders are increasing steadily in today's youth, we seek to understand how anxiety manifests in children of varying developmental stages. We also investigate the degree to which anxiety disorders can impair academic performance, explore new research into the use of neurofeedback for the treatment of anxiety disorders, and describe how anxiety disorders are being treated right here in our office at The Neuroconnection.

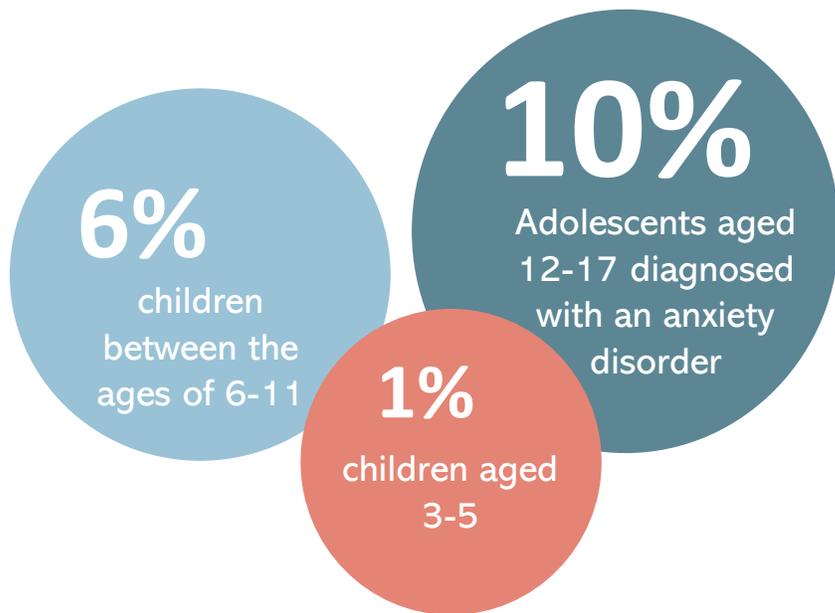


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Special points of interest

- In what ways does childhood anxiety differ from anxiety in adulthood?
- How can anxiety impact a child's abilities at school?
- What role can neurofeedback play in the treatment of anxiety disorders in youth?



Childhood Anxiety: A Unique Constellation of Symptoms

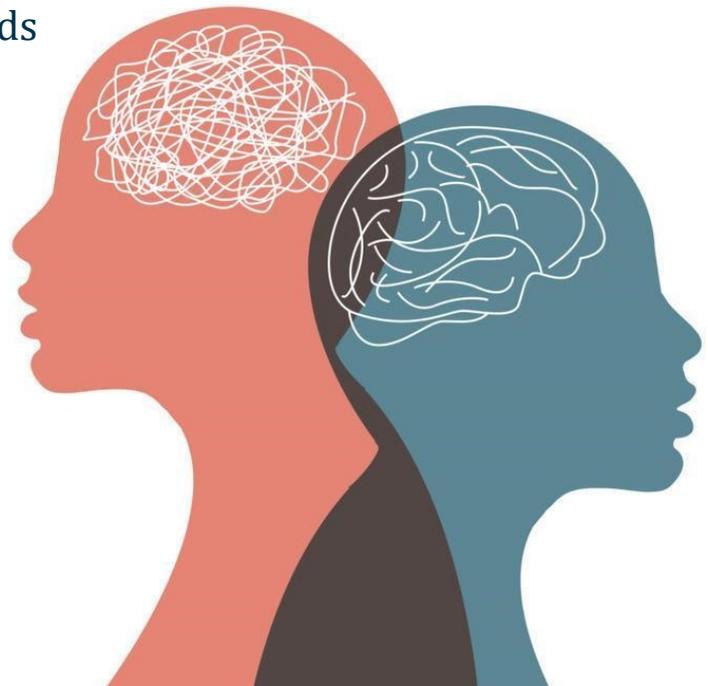
Childhood and adolescence are the core risk phases for the development of anxiety symptoms and anxiety disorders. During these periods, differentiating between normative worry and pathological anxiety is particularly difficult, as some degree of anxiety is expected during certain childhood developmental stages. When the excessive worry begins to interfere with a child’s everyday functioning, however, interventions may be necessary.

Connecting Mind and Body

Unlike adults, who are typically able to clearly express their anxiety symptoms, children and adolescents may not have the vocabulary necessary to fully describe their experiences. Therefore, youth with anxiety frequently present with somatic symptoms as opposed to exclusively manifesting the expected emotional or cognitive symptoms. Children with anxiety are more likely to complain about stomachaches or headaches, having a pounding heart, feeling dizzy, and feeling nauseous. Youths that are restless, easily fatigued, irritable, and have difficulty sleeping or concentrating may also be experiencing symptoms of generalized anxiety.

Anxiety Across Developmental Periods

In a 2014 article exploring the differences in generalized anxiety’s expression in younger and older children, it was found that younger children diagnosed with generalized anxiety tend to have more perfectionistic and harm avoidant behaviors than their older counterparts. Younger children were also found to express less school-specific worries. Older children, on the other hand, were more likely to report that they have “trouble paying attention” and “get upset more easily” than their peers. This type of research highlights the heterogeneity of generalized anxiety disorder’s symptoms across different developmental periods.



Mathematics, Test, and General Anxiety

Anxiety disorders can appear in many different forms. While generalized anxiety refers to an individual's tendency to feel excessive worry in a wide array of everyday situations, mathematics and test anxiety are associated with specific, and oftentimes school-related, triggers. Mathematics anxiety encompasses fearfulness, tension, and discomfort in situations relating to mathematics. Test anxiety refers to intense anxiety felt within evaluative settings. These two anxiety sub-types have been found co-occur in individuals, suggesting that mathematics anxiety and test anxiety may share certain risk factors, including a history of academic difficulty, past teasing about academic success, or a generally anxious personality type. For children and adolescents with generalized anxiety, worries regarding school are not uncommon. Particularly as children get older, they become more likely to report school-related worry as a major symptom of their general anxiety. These worries can be due to multiple circumstances within the classroom, including social issues and academic performance anxieties.

Can Anxiety Limit Academic Success?

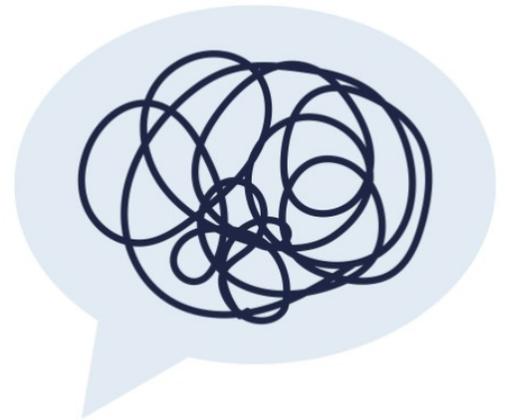
Mathematics, test, and generalized anxiety have each been found to have a negative relationship with academic testing performance, with overall reduced scores in math and reading as compared to non-anxious students. Though each anxiety sub-type negatively effects academic performance, each does so in a unique way.

Each child has an individualized set of experiences, genetic propensities, and environmental factors that encourage or dispel the onset of anxiety disorders. Because of this, multiple theories are put forth that address the negative correlation between anxiety and school achievement.

The **Deficit Theory** suggests that mathematics and test anxieties emerge in children following a prior, unpleasant experience with stressful testing at school. This theory indicates that some children with school-related anxiety already had other factors in their lives that limited their capacity to succeed academically, which then generated the additional anxiety symptoms. Therefore, there is a cyclic and bidirectional relationship between the youth's anxiety and their poor academic performance.

The **Deleterious Anxiety Model** proposes that it is the anxiety itself that limits academic performance. As anxious thoughts have been found to significantly limit working memory, a child with anxiety could struggle to recruit all of the necessary cognitive processes needed to succeed during their examinations.

Depending on a particular child's circumstances, either or both theories could apply to their reduced academic performance. Regardless of cause, anxiety in the classroom may have serious effects on grades across subjects.



Read the articles: Carey, E., Devine, A., Hill, F., & Szűcs, D. (2017). Differentiating anxiety forms and their role in academic performance from primary to secondary school. *PLoS One*, 12(3), e0174418.

Jarrett, M. A., Black, A. K., Rapport, H. F., Grills-Tauchel, A. E., & Ollendick, T. H. (2015). Generalized anxiety disorder in younger and older children: Implications for learning and school functioning. *Journal of Child and Family Studies*, 24(4), 992-1003.

Evidence-Based Research: A Meta-Analysis of Neurofeedback Studies

Preliminary studies have shown that EEG neurofeedback (NFB) has been proven effective in modifying brain function and producing significant improvements in clinical symptoms of anxiety. Through operant conditioning, NFB works to inhibit inappropriate brain wave activity and reinforce healthy activity, thereby limiting abnormal or deficient brain functions. Due to the large body of research available on the abnormal neurological patterns associated with anxiety disorders, NFB training has been able to target specific brain regions and frequencies of neuronal activity that correlate to many different anxiety disorders' symptomology.

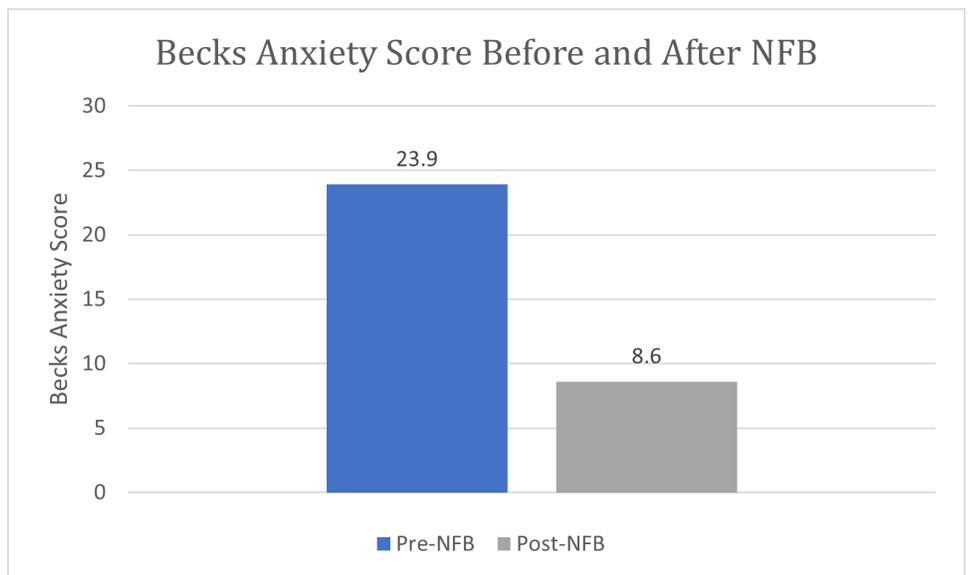
Testaments to this method of treatment have been provided by an abundance of thorough research, a portion of which have been collected, summarized, and reviewed in a recent meta-analysis. This meta-analysis, performed in 2020, looked at five randomized controlled trial designs utilizing EEG neurofeedback in the treatment of anxiety disorders. **Of these five studies, each found that the patients receiving NFB showed marked reductions in their anxiety symptomology as compared to the non-treatment group.** NFB was therefore shown to have substantial efficacy for the treatment of patients with anxiety disorders. Meta-analyses such as the this one are crucial for upholding the scientific rigor of emerging research into neurofeedback as a treatment option for a wide array of mental health issues.

Anxiety Symptom Improvements at The Neuroconnection

Just how effective is NFB in reducing symptoms of anxiety? One way we measure the effectiveness of training is through the Becks Anxiety Inventory. This questionnaire is filled out at the beginning and end of each set of NFB sessions, allowing us to measure an individual's progress and to gauge the overall effectiveness of NFB in clinical practice.

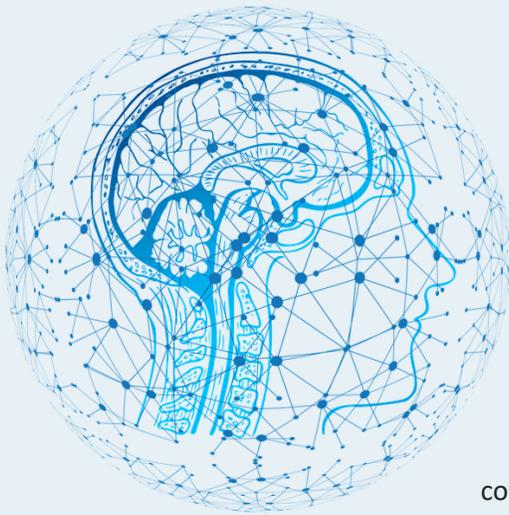
We've compiled and analyzed eight years' worth of data on our clients. While many have experienced the benefits of NFB over the years, we focused on the clients who came to

us with elevated symptoms of anxiety and whose primary goals for training were to reduce their associated symptoms. These 88 individuals consistently participated in at least two NFB sessions per week and completed at least 10 sessions. While the total number of session varies from person to person, the average number of sessions completed was 20. Overall, we saw that the reported anxiety symptoms were reduced by approximately 63% on average.



Read the articles: Tolin, D. F., Davies, C. D., Moskow, D. M., & Hofmann, S. G. (2020). Biofeedback and neurofeedback for anxiety disorders: a quantitative and qualitative systematic review. *Anxiety disorders*, 265-289.

Hammond, D. C. (2005). Neurofeedback with anxiety and affective disorders. *Child and Adolescent Psychiatric Clinics*, 14(1), 105-123.



Landon's Story

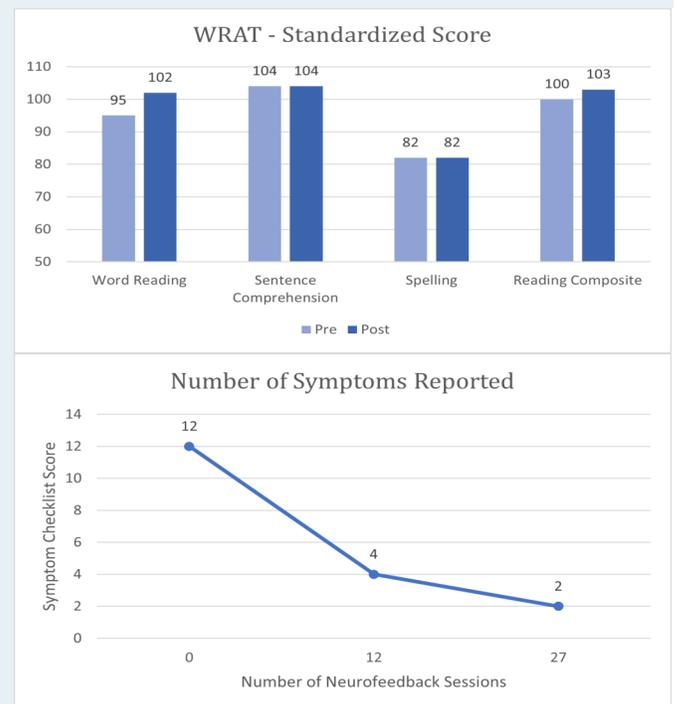
School can be a source of anxiety for many students. Between constant social comparisons and an intense pressure to perform, the classroom can easily transform from a place of learning into a place of mounting stress. This was particularly true for 9-year-old Landon when his parents first brought him into the Neuroconnection in 2016. Landon had been diagnosed with generalized anxiety disorder, ADHD, and dyslexia at a young age, but it wasn't until Landon underwent a series of major life changes that his symptoms began to escalate. Upon starting the fourth grade in a new school, Landon began to experience some of the more common somatic symptoms associated with childhood anxiety, teachers reporting his frequent stomach and headaches. Landon's dyslexia diagnosis made it difficult for him to succeed in reading and writing, which led to Landon's increasing sensitivity to failure. His parents noted his heightened need for reassurance while performing tasks at school and a growing dislike for his classwork and attending school.

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Upon his intake at the Neuroconnection, Landon's parents filled out a Symptom Checklist which recorded Landon's struggles with anxiety and fearfulness at school, low mood, emotional sensitivity, and poor skills with math and reading, among other symptoms. Landon was then administered a Wide Range Achievement Test (WRAT), an academic skills assessment that quantitatively measures skills in word reading, spelling, mathematics, and reading comprehension. The results of his Wide Range Achievement Test scores and his Symptom Checklist scores over time are displayed below.

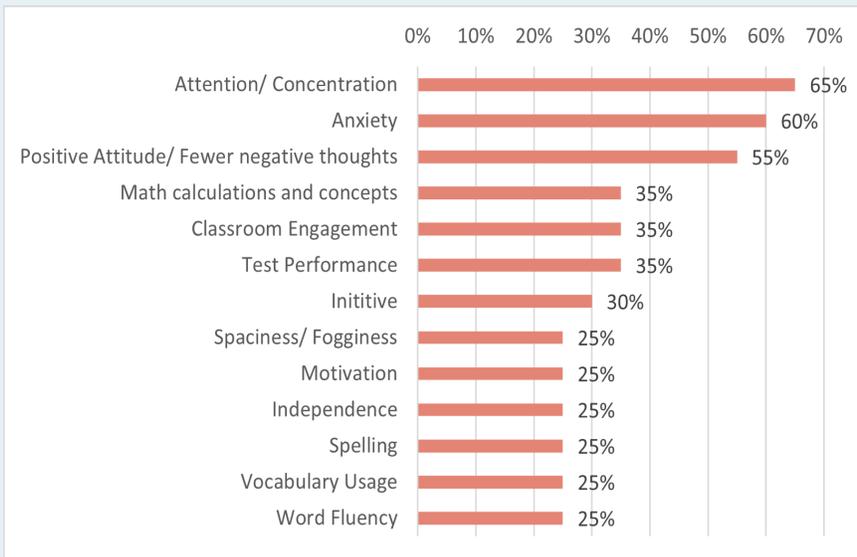
Landon was assigned a training protocol designed to target his school anxiety. Landon would go on to complete a total of 27 neurofeedback sessions. By the end of his training period, teacher reports celebrated the impressive progress Landon had made both academically and socially in the classroom. One teacher noted that "[Landon] is not functioning as the same [Landon] that began with us at the beginning of the year." Parent reflections throughout the protocol also saw tremendous improvements in Landon's anxiety, mood, attention, and organizational skills. He even saw growth in reading and language comprehension on his state-wide testing at school despite academic improvements not being directly targeted by his training protocols. Landon's improvements represent just one example of the many faces who come into the Neuroconnection for the treatment of anxiety issues and for growth in academic performance.



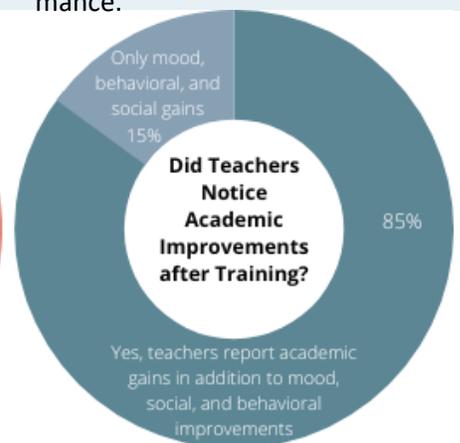
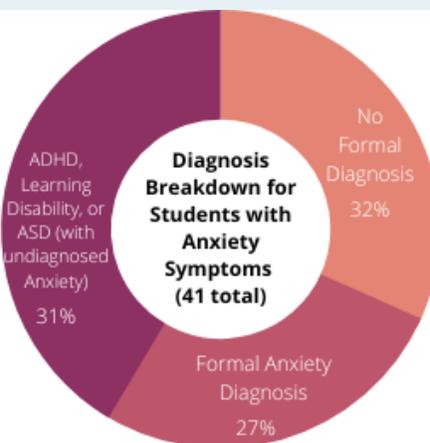
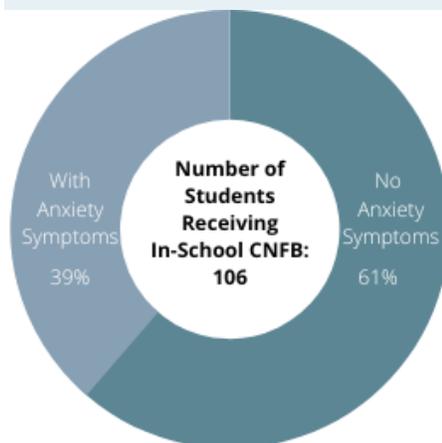
Teacher Feedback for Students at Harvest Christian Academy

Feedback from teachers is a vital component to our In-School Neurofeedback program. We request feedback periodically throughout a child’s training protocol, and we use this input in order to maximize the benefits of each session. Over the past six years, more than 100 students have received In-School neurofeedback training at Harvest Christian Academy (HCA), and in that time teachers have filled out countless feedback forms with helpful observations. We’ve specifically **isolated those students who received In-School training AND whose parents noted that their child**

Summary of Teacher Feedback Reported as Percentage of Teachers who Noted Improvement in this Area



parents noted that their child struggled with symptoms of anxiety at their initial visit (39% of students trained in school.) While some students had previously received a formal diagnosis of anxiety (27%), most had not. **54% of students with parent-reported symptoms of anxiety had previously been diagnosed with a learning disability, attention deficit, or both.** Students completed an average of 20-30 sessions each. At left is a summary of what teachers have reported on their students during and after In-School CNFB, demonstrating a strong correlation between improving anxiety symptoms and improved academic performance.



Teacher Feedback Quotes

“[He] is able to write for longer periods of time... [He] finished reading MAP score on level... able to hold more information in head... Reading and understanding math problems in order to solve.” (6th Grader)

“She is rocking math tests and lessons. She also grew 11 points in her math MAP test this time. Writing has been better too. She works on her own and does good work. (I don’t notice anxiety or irritability in class.) (2nd Grader)

What is Connectivity Neurofeedback?



Connectivity Neurofeedback (CNFB) is an advanced form of Neurofeedback (NFB) that allows the brain to make changes in brain wave patterns across cortical regions in order to develop more functional neuro-pathways. CNFB is more accurate than traditional NFB because it measures the neuronal network activity in three dimensions across regions. This is in contrast to traditional NFB which only trains specific sites. CNFB allows for improved communication within the brain and in turn decreases neurologically rooted symptoms.

Learning disabilities, ADHD, Autism, and other problems impacting school success have specific connectivity patterns. These patterns are identified via a QEEG brain map, and they are found to improve with CNFB training. Typical functional improvements include: improved focus, attention, and cognitive abilities, improved mood and behavior, increased learning capacity and academic performance, and better sleep regulation. Because CNFB creates new neural pathways, changes in the brain are lasting and involve none of the adverse side effects that may be experienced with medications.

“Because CNFB creates new neural pathways, changes in the brain are lasting and involve none of the adverse side effects that may be experienced with medication.”

The professionals at The Neuroconnection understand that neuropsychological conditions, if left untreated, can adversely affect an individual’s quality of life. Our Mission at The Neuroconnection is to provide quality, personalized care using the most up-to-date and researched neurofeedback methods to empower adults and children to reach their optimum potential. We understand the value and importance of coordinating care with other health, educational and mental health providers, and we are committed to integrating neurofeedback with other treatments and services to produce the best outcome for our clients. In basic terms: at the Neuroconnection, it’s always a collaborative process.

Who can benefit?

Improvements in Mental Health

- *Attention Deficit /Hyperactivity Disorder
- *Autism Spectrum Disorders
- *Anxiety
- *Addictions
- *Chronic Fatigue
- *Learning Disabilities
- *Memory
- *Mood Disorders and Depression

- *Obsessive Compulsive Disorders
- *PTSD/C-PTSD
- *Seizure Disorders
- *Traumatic Brain Injuries

Improvements of Symptoms

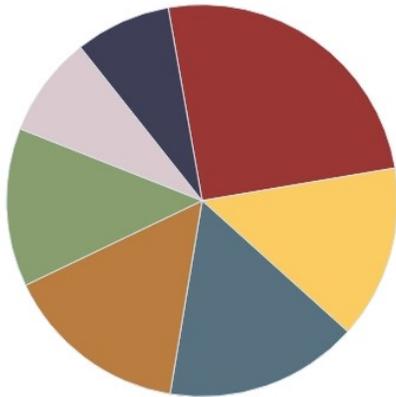
- *Executive Functioning and Processing
- *Attention and Motivation
- *Sensory Sensitivity
- *Mood and Behaviors
- *Obsessive Thoughts
- *Academic Performance
- *Social and Motor Skills
- *Sleep Quality

TNC Results & Symptom Improvements

With Connectivity Neurofeedback

Since 2001, TNC has empowered over 800 children and adults to reach their fullest potential by helping their brains learn how to self-regulate, thereby reducing or eliminating the need for medication and creating lasting improvement for a wide range of neuropsychological symptoms. Below we have provided a breakdown of the common symptoms addressed at our office, along with examples of the long-term benefits experienced by those who completed at least 10 sessions of CNFB training.

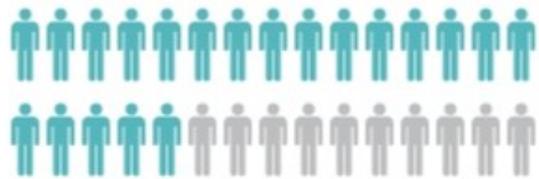
SYMPTOMS TREATED



- ADD/ADHD 25%
- ASD 14%
- ANXIETY/PTSD 16%
- SEIZURE/ PAROXYSMAL EVENTS 15%
- MOOD DISORDER 13%
- LEARNING DISABILITY 8%
- NO FORMAL DX 8%

LONG-TERM BENEFITS

73% of patients reduced or eliminated the need for medication



average decrease in anxiety symptoms — measured via Beck's Anxiety Inventories



average decrease in depression symptoms — measured via Beck's Depression Inventories



average decrease in symptoms associated with Autism — measured via ATEC

OTHER COMMON IMPROVEMENTS

- ✓ Executive functioning
- ✓ Processing speed
- ✓ Attention
- ✓ Organization
- ✓ Sleep
- ✓ Obsessive thinking
- ✓ Planning
- ✓ Motivation
- ✓ Motor skills
- ✓ Social skills
- ✓ Test performance
- ✓ Speech & language use
- ✓ Reading comprehension
- ✓ Math concepts
- ✓ Sensory sensitivities



Upon seeing such excellent results in the past 11 years with Connectivity-Neurofeedback (CNFB), our professionals aimed to extend access to training for those outside of our geographic area or inflexible schedules.

As a result, The Neuroconnection designed an @ Home Training pro-

gram to offer CNFB sessions in the convenience of your home. For eight years, we have been able to provide our expertise and therapeutic treatment to families across the world. The opportunity for daily neurofeedback training at home has brought successful results for clients living as far as Russia and India.

Request more information from The Neuroconnection Website!
www.theneuroconnection.com

Meet Our Director

Ann L. Rigby, MSW, LCSW, BCN has over 30 years of experience in the mental health field. Ms. Rigby has been providing Neurofeedback services since 2001. She founded “The Neuroconnection”, a Brain Mapping and Neurofeedback clinic that provides an advanced, research-based form of Neurofeedback known as Connectivity Neurofeedback.

Ms. Rigby is a past Board Chair for the Autism Society of Illinois. She is a fellow and Board Certified member of The Biofeedback Certification International Alliance. She is also a field placement instructor for graduate students at Benedictine University and holds memberships with the International Society of Neurofeedback and Research (ISNR), the Biofeedback Certification Institute of America (BCIA), and the National Association of Social Workers (NASW). Ms. Rigby is a frequent speaker and exhibitor at many national and regional conferences throughout the year on topics related to the benefits of Connectivity Neurofeedback.

For more info about upcoming speaking engagements, go to our website www.theneuroconnection.com and visit our News and Events tab.



the Neuroconnection
Brain Mapping and Neurofeedback

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