



## April is Autism Awareness Month

Over the past 20 years, the prevalence of Autism has been on the rise. When the CDC began collecting data in 1998 the incidence of Autism in 8-year-olds was 1:150. The most recent report from the CDC indicates that the incidence is now 1:59 children, but a separate study using parent reporting found that this number could be as high as 1:40.<sup>1,2</sup>

In 2008 the United Nations designated April 2 as World Autism Awareness Day, but here at the Neuroconnection we celebrate Autism awareness every day. For almost 20 years we've been privileged to work with adults and children on the Autism spectrum so in this special edition of The Neuroconnection News, we're sharing what we've been up to.

We've compiled 10 years worth of data to demonstrate Connectivity Guided Neurofeedback's (CGNFB) effectiveness in improving the lives of individuals with ASD, and we've chosen to highlight one adult who has experienced the benefits of training at The Neuroconnection in a personal way. We're also sharing some of the latest research that's being done in this rapidly advancing field. Lastly, we've compiled a list of upcoming sensory friendly events and activities in the area that include something for the whole family.

We hope you'll join us during Autism Awareness Month as we tackle the challenges and celebrate the triumphs of those on the Autism spectrum. We are privileged to be a part of so many stories, and we hope you enjoy just a taste here in this newsletter. And perhaps when you're finished, you'll agree with us that the month of April is not nearly enough time to truly celebrate our friends and loved ones with Autism.

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### Special points of interest

- How effective is Neurofeedback in treating symptoms of ASD?
- One adult's experience with CGNFB
- fMRI used to predict Autism diagnosis at 6 months old
- Upcoming sensory friendly activities for the whole family

<sup>1</sup> Baio J, Wiggins L, Christensen DL, et al. Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014. *MMWR Surveill Summ* 2018;67(No. SS-6):1–23.

<sup>2</sup> Kogan MD, Vladutiu CJ, Schieve LA, et al. The Prevalence of Parent-Reported Autism Spectrum Disorder Among US Children. *Pediatrics*. 2018;142(6):e20174161



## What is Connectivity-Guided Neurofeedback?

Connectivity-Guided Neurofeedback (CGNFB) 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 neuropathways. CGNFB 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. CGNFB 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 CGNFB 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 CGNFB 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 CGNFB creates new neural pathways, changes in the brain are lasting and involve none of the adverse side effects that may be experienced with medication”*

### It’s a Collaborative Effort

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.

## Who Can Benefit?

Training the brain with neurofeedback has resulted in dramatic and lasting improvements for the following conditions:

- \*Attention Deficit Disorders
- \*Autism Spectrum Disorders
- \*Learning Disabilities
- \*Mood Disorders
- \*Obsessive Compulsive Disorders
- \*Seizure Disorders
- \*Traumatic Brain Injuries

### Notable Areas of Improvement

- Attention
- Shifting attention
- Processing speed
- Executive functioning
- Following directions
- Organization
- Sensory sensitivity
- Mood
- Anxiety
- Behavior
- Obsessive thinking
- Reading comprehension
- Word fluency
- Speech and language ability
- Grammar and writing ability
- Handwriting
- Spelling
- Math ability
- Test performance
- Sleep
- Social skills
- Motor skills
- Phonetics and semantic language

# Neurofeedback Reduces Symptoms of Autism

Just how effective is neurofeedback in reducing the core symptoms of ASD? One way we measure the effectiveness of training is through symptom checklists that may be filled out before, during, or after training. This is an important clinical tool to measure an individual's progress, but it also allows us to compare the results of this practice with other studies measuring the effectiveness of connectivity guided neurofeedback (CGNFB) in reducing symptoms of ASD.

We compiled and analyzed almost ten years' worth of data on our Autism clients. While many have experienced the benefits of CGNFB over the years, we focused on the 55 clients who met the same selection criteria as other similar studies on this population. These individuals consistently participated in at least two CGNFB sessions per week and completed the recommended number of sessions before discharge. While this number varies from person to person, the average number of sessions completed was 30.

We used the Autism Treatment Evaluation Checklist (ATEC) when comparing the results from our practice with others. (See sidebar for more information on the ATEC.) The graph below compares the average symptom score for each category before and after CGNFB training and shows the percent drop in symptoms by category.

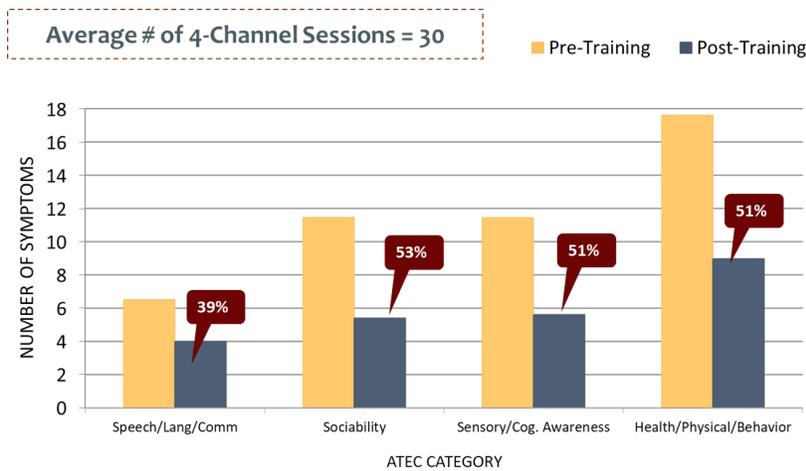


Figure 1—ATEC Category Scores before and After 30 sessions of CGNFB

In addition to comparing the change in individual categories, we also calculate the change in total symptom score before and after training. The average *total* score for our clients before training was 44. After CGNFB, the average total score dropped to 21.6. This 51% decrease in ASD symptoms is consistent with Coben and Padolsky's findings in a similar study.

In addition to these changes, the follow up data we've collected from discharged clients shows that these changes are maintained and even continue to improve a year after training ends. If you'd like to read more about ATEC improvements following CGNFB, please see the articles below.

## Further Reading

Robert Coben PhD & Ilean Padolsky PhD (2007) Assessment-Guided Neurofeedback for Autistic Spectrum Disorder, *Journal of Neurotherapy*, 11:1, 5-23.

Mahapatra, S., Khokhlovich, E., Martinez, S. et al. *J Autism Dev Disord* (2018).

## What is the ATEC?

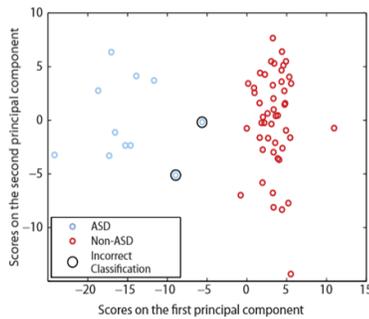
The Autism Treatment Evaluation Checklist (ATEC) is a one page assessment tool designed to be completed by parents. It consists of 77 statements that are divided into four categories: 1) Speech, language, communication; 2) Sociability; 3) Sensory, cognitive awareness; 4) Health, physical, behavior. An individual receives a score for each category as well as a total score.

The total score, which ranges from 1 to 179, can be correlated with the severity of Autism symptoms according to the following scale: mild (20-49), moderate (50-79), severe (>80).

Tracking a person's scores helps to measure changes in symptom severity and can be useful for monitoring behaviors over time. It is also allows us to measure the effectiveness of a given treatment when "pre" and "post" scores are compared.

The ATEC is one of many important assessments in our office. We use this score, along with individual category scores, to measure the effectiveness of neurofeedback training and overall progress.

A free online version is available on the Autism Research Institute's website: [www.autism.com/ind\\_atec](http://www.autism.com/ind_atec)



**Correct classification of 6-month-old infants at high familial risk for ASD using functional connectivity MRI.** The top two principal components of functional connections that show a correlation with at least one of the 24-month ASD behaviors, including social, language, motor development, and repetitive behavior in ASD (blue) and non-ASD (red) 6-month-old infants. The participants that were incorrectly classified in cross-validation analysis are circled; both were diagnosed with ASD but classified as non-ASD. Classification was correct for 96.6% of 6-month-old infants.

## FcMRI of 6 month-old infants predicts a diagnosis of autism at 24 months of age

Autism spectrum disorder, or ASD, is a neurodevelopmental disorder classified by social deficits and repetitive behaviors, typically emerging within the second year of life.

While there is currently no cure, many individuals are able to reduce, and sometimes even eliminate symptoms, with the progression of early interventions.

With the considerable impact of early detection for autism, modern research has begun investigating techniques to better assist the screening and diagnosis processes for children.

In fact, a recent study in 2017 was able to predict autism diagnoses with the use of functional neuroimaging on 6-month-old infants with high familial risk (Emerson et al, 2017).

The cohort study collected functional MRI data from 59 infants at 6-months of age followed by cognitive, behavioral, and diagnostic assessments once they reached 24 months old.

Of these participants, 11 had received a formal diagnosis for ASD upon post-assessment. Evaluating scores of social interactions, communication, motor development, and repetitive behavior against the fMRI data collected at 6-months of age, researchers were able to identify distinct brain-behavior correlations between the ASD and non-ASD groups (see Figure 1).

Such findings have clinical implications for early risk assessment and the feasibility of developing early preventative intervention for ASD.

*“Heal the food, heal the brain, heal the gut... heal the child.”*

### Taking the first steps to raising a healthy child:

- \* Test your child for allergies
- \* Bolster digestive and immune systems naturally with organic foods and supplements
- \* Decipher the truth behind deceptive food labels i.e. “modified corn starch” = monosodium glutamate (MSG)
- \* Replace processed foods and chemicals with healthier, natural options
- \* Curb your child’s sugar cravings with alternatives like calming organic teas
- \* Protect your soil from harmful pesticides and depletion of nutrients

## Using Food, Plants, and Nature to Heal Children from Chronic Illness

In the past decade alone, the prevalence of ASD has risen nearly 50%, with 1 in 45 children now carrying a diagnosis. According the Center for Disease Control and Prevention (CDC, 2018), this number has continued to climb from 1 in 88 children back in 2008.

Despite a resistance to label the escalation as an epidemic, we are fortunate to have some experts in the field who acknowledge an apparent deterioration in societal health and have begun advocating a change in the conversation surrounding our children’s health.

Through an investigation into her son’s sudden asthma flare, integrative pediatric neurologist, Dr. Maya Shetreat-Klien, has been a leading pioneer for a new approach to address the rising prevalence of chronic disease in children.

According to Shetreat-Klien, children in our modern society are far too often isolated from the very elements that are critical to their health and well-being, or as she identifies, “dirt”. In her book, *The Dirt Cure*, Dr. Shetreat-Klien demonstrates how being exposed to germs and microbes, eating fresh food from healthy soil, and getting out into nature can help to heal neurological conditions that, until recently, have been treated only with pharmaceuticals.

While the practice behind the “dirt cure” sounds easy enough, many of its revelations begin to challenge our second nature of over-sanitation and restrictive diets that are contributing to the disturbing rise of chronic illness in children. Through comprehensive research, Dr. Shetreat-Klein, along with other experts, demonstrate how a misguided practice of “health” poses an impactful threat to our children’s health and development:

- ◆ Raw milk reduces allergy, infection, and inflammation in children.
- ◆ Viruses—not just bacteria—plays critical role in protecting children’s but health as part of a “microbiome”.
- ◆ Pesticides, herbicides, and GMOs damage more than just bugs and weeds.
- ◆ High cholesterol levels improve immune and brain function in children.
- ◆ Regular use of bleach is associated with more, not fewer, infections in kids.

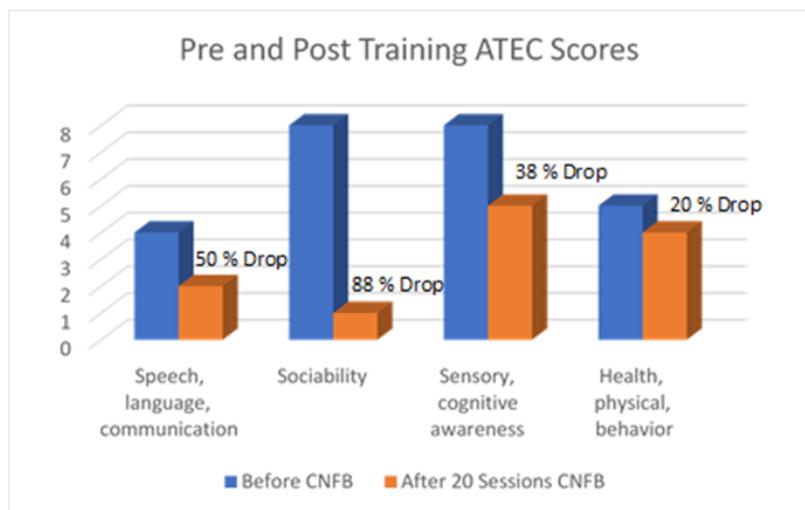
## Case Study: Autism and CGNFB in the Case of a Young Adult

Daniel's development was initially very similar to other children his age. It was not until the age of two that his parents began to suspect that something was wrong. Instead of speaking in 2-4 word sentences, Daniel wasn't even saying "mama". He would pull his parents to the things he wanted rather than ask verbally. He was no longer meeting important developmental milestones. Daniel was eventually given an Autism diagnosis and participated in various interventions to improve his communication and social skills as well as to decrease his sensory difficulties.

When Daniel's parents began exploring Connectivity Guided Neurofeedback (CGNFB) he was 25 years old, worked as a bagger for a local grocery store, and lived with his parents. His parents reported that he had difficulty communicating and conversations were generally limited to those things that interested Daniel. His peers would often lose interest in engaging with him due to the time it took to communicate. He had difficulty interpreting social cues, but he was interested in peers and was painfully aware that they had little interest in engaging with him. Therefore, he remained somewhat isolated and did not venture to communicate much. His eye contact was very limited, he preferred to be alone much of the time, and even at times avoided contact with family members and those he knew well. He was also on a stimulant medication to assist with his lack of attention and focus. He reported some side effects of the medication at the time of intake.

Daniel's initial protocol was tailored to his unique needs and addressed both power and connectivity. After just six sessions of CGNFB Daniel's parents reported that he was making more eye contact and had become more talkative. They also noticed an improvement in his organizational skills. At the end of his first 10 sessions Daniel was more engaged, had better attention, and his communication and social skills had noticeably improved. Because he now needed less medication to obtain the ability to remain focused, his medication was lowered.

After 20 sessions, Daniel's parents reported that he was interacting more with others. He was more willing to share his point of view and they noticed more independent thinking. They've also seen improvements in his reading ability and have noticed that he's less likely to "get stuck" on subjects of interest compared to the beginning of his training. On the occasions that something is very challenging, Daniel is able to ask for help and move on. In addition to the changes noted, Daniel was also able to come off stimulant medication without compromising his ability to focus and attend to tasks.



**Figure 1** – Daniel's ATEC scores before and after 2 protocols of connectivity guided neurofeedback training

such that for the first time he can balance his own checkbook. Daniel's anxiety has decreased substantially, causing him to be more open to new situations without retreating from them.

Daniel's parents are pleased with his progress because as most parents, their main concern was how he would be able to function without them. Although Daniel does not live independently, he is much more skilled at functioning in the world.

Daniel was evaluated using the ATEC before and after CGNFB (For more information on the ATEC, see page 3). His individual category scores are shown in Figure 1. Before he began training his total score was 25. After 20 sessions of neurofeedback, his total score dropped to 12, a 52% decrease in symptoms. An ATEC score of 12 is no longer considered to be on the spectrum.

Relatives have also noted that Daniel is more social now. He engaged in reciprocal conversations during the holidays and did not retreat to be alone. Although they had no idea why, they noted that he was much more likely to share his point of view. His reading improved, and Daniel was eager to discuss what he read. He is now less stuck on things and is able to understand multi-step directions. He is able to problem solve in order to do things without help, and his focus and reasoning skills have also improved. His daily living skills have grown

# Sensory Friendly Events

## Chicago Children's Museum

*Play For All* events invite children and families with disabilities to experience Chicago Children's Museum's inclusive, multisensory exhibits and programs. The museum opens one hour early, at 9 am, for pre-registered guests. The first 250 visitors to register receive free admission.

Next Events: April 13, May 11, June 8

## Field Museum



The Field Museum hosts *Sensory Saturdays* on select Saturdays from 9–10am. This event welcomes families and children with disabilities as well as those with sensory processing needs. (Siblings, family members, and caregivers are also welcome.) It is free with advance registration, but space is limited to 40 guests so that families can enjoy a crowd-free space.

Next Event: May 18

## Sky High Sports

This trampoline park in Naperville hosts a special needs night every Tuesday from 4:00–6:00PM. They turn off the music, dim the lights and dial down the distractions for the comfort of guests. During special jump sessions, each jumper is \$5 with one parent or therapist free. Family members who jump are also just \$5.

## Legoland

*Play Well Days* are intended for families affected by Autism and other sensory processing disorders. Lights and sounds are reduced, more quiet spaces are offered, and admission is limited for this event. Play Well Days are the first Saturday of every month between 8:30-10:00 AM. Reduced ticket prices are available.

## Studio Movie Grill

*Special Needs Screenings* are designed for families raising children with special needs. Movies are shown with the lights up and the volume lowered, and children are free to move around, talk, or even dance in the aisles during the show. The sensory friendly screenings are free for children with special needs and their siblings (parental guidance is always suggested). Adult tickets are available at before-noon price. Special Needs Screenings are shown at 11:00am at all SMG locations except EpiCentre.

## Shedd Aquarium

*Calm Waters* is an exclusive event for guests with disabilities to explore Shedd Aquarium's exhibits and experiences in a comfortable and accepting environment. Modifications include limited capacity and streamlined entry with advance registration. The aquarium also offers a free app to help make Shedd more accessible. The app includes tips and information about specific exhibits as well as a visual schedule and communication tools to help ease anxiety before and during your visit.

Next Event: May 6 (4:30– 7:30 PM)



## AMC Theaters

AMC is proud to partner with the Autism Society to offer unique movie showings where we turn the lights up, and turn the sound down, so you can get up, dance, walk, shout or sing! The *Sensory Friendly Film* program is available on the second and fourth Saturday (family friendly) and Tuesday evenings (mature audiences) of every month. Please check your local theatre listings for specific showtimes

## DuPage Children's Museum

*Third Thursdays* incorporates special resources and programming such as a trained comfort dog, sensory art projects and story time, and specialists to assist with IEP goals involving play. It is a quieter time for family or therapeutic visits, and the museum is open until 8:00 PM.

*Family Night Out* is an opportunity for the whole family to play in a calmer, less crowded environment. Admission is free but registration is required.

Next Events: April 27, May 19, June 22



## Chicago Children's Theater

*Red Kite Project* creates theatrical adventures and dynamic learning experiences for children on the autism spectrum. They offer half day summer arts camp and multi sensory theatrical experiences that incorporate the children into the performance. They aim to foster a shared arts experience that encourages self-expression, social engagement, creative exploration, and above all, FUN!

\*For more information about one of these events, please visit the organization's respective website\*



## More on The Neuroconnection

Upon seeing such excellent results in the past 10 years with Connectivity-Guided Neurofeedback (CGNFB), 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 program to offer CGNFB

sessions in the convenience of your home. For five 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.

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*Request more information from The Neuroconnection Website!*  
[www.theneuroconnection.com](http://www.theneuroconnection.com)

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## 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-Guided 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-Guided Neurofeedback.

For more info about upcoming speaking engagements, go to our website [www.theneuroconnection.com](http://www.theneuroconnection.com) and visit our Resources tab.



**the Neuroconnection**  
Brain Mapping and Neurofeedback

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