

the **Neuroconnection** News

What's so Special about Connectivity Neurofeedback?

The neurofeedback field continues to grow, and we see firsthand how neurofeedback can reduce problematic symptoms, decrease the need for medication, and create lasting changes in the neuronal networking system in a non-invasive manner. It's unlike any other intervention.

As neurofeedback gains popularity, however, so does confusion surrounding how neurofeedback works and what makes different types of neurofeedback more or less efficacious. Though the basic intervention may look similar at first glance, there are several key differences between Connectivity Neurofeedback (what we do at TNC) and other forms of neurofeedback that significantly impact the outcome of the training.

In this edition of The Neuroconnection News, we take a deep dive into how Connectivity Neurofeedback works and what makes it superior to other forms of Neurofeedback.

As always, if you have questions or would like to learn more, please visit our website (www.theneuroconnection.com) or give us a call.



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Special points of interest

- Is a QEEG necessary?
- Are all QEEGs the same?
- What's happening during a CNFB session?
- How effective is CNFB?
- How long do improvements last?

What is a QEEG?

A quantitative electroencephalogram (QEEG), is a representation of the electrical (brain wave) activity of the cerebral cortex. It takes the principles of a traditional EEG one step farther via quantitative analysis to provide a “map” of how a person’s brain functions.

The QEEG gives the clinician information about how well different areas of the brain work, as well as how different regions of the cortex communicate amongst themselves.

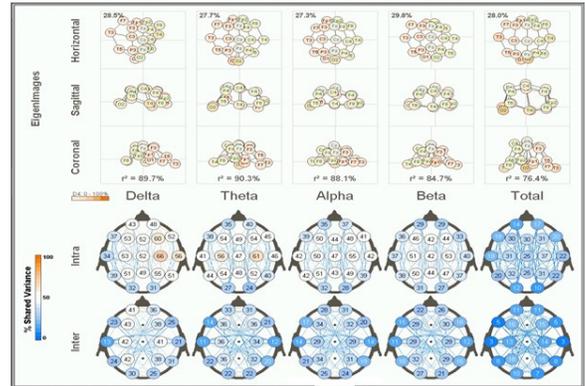


Image: Principle Component Analysis (PCA) to identify connectivity data for CNFB.

Why is a QEEG Necessary?

Everyone’s brain is unique, and symptoms can be correlated with what is seen on a QEEG. It is essential to first see how an individual brain functions and why particular symptoms are present in order to know where and how to train. The QEEG is the roadmap for neurofeedback training.

The data collected during the QEEG is assessed by highly trained specialists, analyzed using digital technology, and is compared to normative databases (data from symptom-free patients of the same age and gender). This information helps the clinician develop individualized training protocols that target the participant’s specific deficits and problematic symptoms.

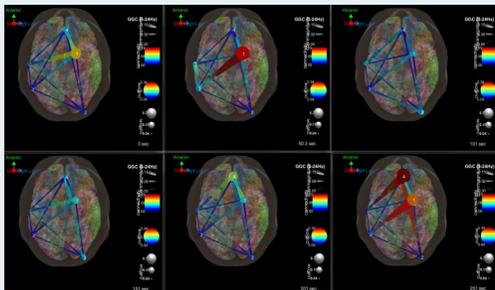


Image: Independent Component Analysis (ICA) to identify connectivity data for CNFB.

Are All QEEGs the Same?

In short: No. The difference lies in the “Q”. Creating a QEEG involves digitally analyzing the raw EEG data and comparing the data to large normative databases. Differences in the recording and analysis software used or in the comparison databases can lead to significant differences in a person’s results. At TNC we use both PCA and ICA to most accurately analyze connectivity.

For some interventions, these differences may not matter, but for Connectivity Neurofeedback, they actually have a significant impact.

The biggest difference between a QEEG at TNC vs. elsewhere involves the inability of most QEEGs to view the brain in 3D. Traditional QEEGs (and thus traditional neurofeedback) are created using calculations that treat the brain as a 2D (flat) object. This allows you to train specific sites, but it does not allow you to address how these sites communicate with other parts of the brain. *In order to accurately address the connectivity between different regions, the analysis must view the brain in 3D.* The ability of TNC’s QEEGs to represent the connectivity within the brain is most like that of fMRI because we use both PCA and ICA. This affords greater precision when locating the source of problem symptoms.

At Note on Direct to Consumer Neurofeedback Devices

There are many devices on the market that claim to train your brain through neurofeedback. While they may fall under the broad umbrella of neurofeedback, if they do not begin with a QEEG they aren’t going to be able to target the nuances and individual differences in a person’s brain. No two QEEGs are the same, even if the two patients appear to have the same symptoms.

If we extend the map metaphor a little further, external symptoms may help you locate the “city” a person is in, but only a QEEG will provide enough details to be a “roadmap” to help get from point A to B. Brain training devices that attempt to address symptoms without knowledge of how the individual’s brain is functioning are simply guessing at how best to train individuals. This simply can’t get to the root of the problem.

How Does Neurofeedback Work?

Neurofeedback uses EEG to give the brain information about itself in real time and asks it to adjust. These adjustments act as “exercise” for the brain and over time teach the brain to function in healthier and more efficient ways.

When neurons fire they produce electrical signals that can be measured using EEG. Neurofeedback software records these signals, *deconstructs* them, and *reconstructs* them in a way that capitalizes on the brain’s plasticity.

The software modulates the auditory and visual feedback in response to how the brain is operating in real time. “Healthy” activity is rewarded while “unhealthy” activity causes an interruption in the movie or game.

Without the participant’s conscious effort, the brain seeks out these sights and sounds learns to produce the “healthy” brain activity. With enough practice, neurofeedback will produce lasting changes in the brain’s default activity, decreasing symptoms and producing desired states of functioning.

What’s Actually Happening in a Session?

The participant can choose to watch a movie or play a simple computer game. During the session, small sensors on the participants head measure their brain activity in real time. The neurofeedback software uses this information to cause the movie to either play clearly or fade in response to the participants brain activity.

Healthy brain waves are rewarded with a clear playing movie, while undesired activity will cause the movie to fade. (See page 2 for more details on how we create individualized training protocols that determine what activity to reward or inhibit).

Participants will notice the screen fading throughout the session, but their brain will make the appropriate adjustments without their conscious effort. During this time the brain is “practicing” healthy behavior. When given enough practice (typically 2 sessions per week for 6-8 weeks) this healthy activity becomes permanent.

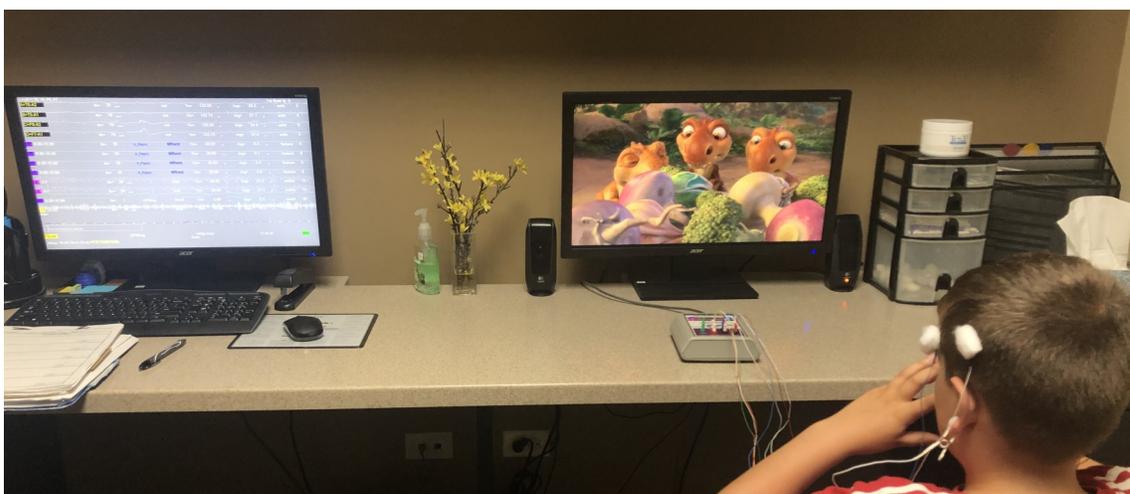


Image: In a typical session, the client watches a movie (right screen) while the technician monitors (left screen). The participant wears small EEG sensors (left side of head above) covered with cotton balls.

What Makes Connectivity Neurofeedback Different?

Connectivity Neurofeedback (or in some research, Multivariate Coherence Neurofeedback) is an advancement over traditional Neurofeedback in many ways. The biggest difference: Traditional NFB uses software and QEEG databases that treat the brain as if it were flat, whereas CNFB views the brain in 3-dimensional space and targets the neuronal networking system accordingly. In certain conditions where the neuronal networking system dysfunction is at the root of the symptom (i.e. ASD, learning disabilities, TBI, mood disorders), it is imperative to accurately evaluate and train those specific areas.

Mapping and training in 3D allows for greater precision and reduces error. Studies have found that fewer sessions are needed to improve power and coherence compared to standard NFB training. There are many different types of neurofeedback. If you have questions about the pros and cons of each, please feel free to call our office to discuss what might be best for you.

Characteristics of Different Types of Neurofeedback Training		Connectivity Neurofeedback	Traditional Neurofeedback	Direct to Consumer Devices
	Able to visualize and train the brain in 3 dimensions	●	●	●
	QEEG Guided More precise, reduced error	●	●	●
	Appropriate Spatial Acuity Tells you what area of the brain is active	●	●	●
	Appropriate temporal resolution Tells you when the activity took place	●	●	●
	Lasting Results after discontinuing training	●	●	●
	Number of Sessions Needed to See Results	Least	More	●

 Research Supports this Claim

 Research Says Otherwise

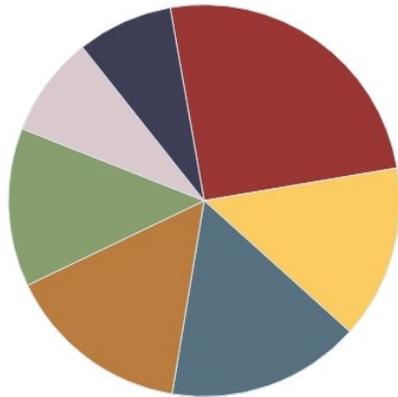
 More Research Needed

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



TNC Offers Home Unit Training

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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