

# *the* **Neuroconnection** **News**

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## **Road to Recovery with The Neuroconnection**

As the spring season begins, we are greeted with a fresh start. Welcoming new growth, this time of the year brings about opportunity for change and inspiration for resolutions. For those suffering from addiction and substance abuse this can present as an ideal chance to take that first step on the road to recovery.

There is often a misconception in assuming addicts simply lack moral values or willpower and can therefore stop abusing drugs or alcohol with a quick resolve to change their behavior. Unfortunately, overcoming addiction is not so straightforward. In actuality, drugs and alcohol alter pathways within our brain that can serve to foster the compulsive substance abuse. This makes quitting exceedingly difficult, even for those who may be determined to do so. According to the Substance Abuse and Mental Health Administration, approximately 22.5 million Americans 12 and older reported needing treatment for illicit drug or alcohol abuse in 2014. While working to prevent substance use disorders among adolescents and young adults may be the critical step to addressing this alarming prevalence, with expanding research into the mechanisms and consequences of drugs and alcohol, luckily there are treatments for those who may already be addicted to help them down a road to recovery.

Here at The Neuroconnection, our professionals understand and seek to confront the challenges that can come along with substance abuse and addiction. Through the use of state-of-the-art Connectivity-Guided Neurofeedback (CGNFB) training, we can successfully address the affected neurological processing that leads to distressful symptoms of addiction. CGNFB serves as a modality not only to correct impaired wiring in the brain initiated by habitual drug and alcohol use, but also to strengthen pathways that can prevent future relapse in addiction. In this month's newsletter we bring to you a descriptive overview of substance abuse and evidence-based research behind Connectivity-Guided Neurofeedback as a viable treatment option towards a path to recovery from addiction. A case study is also provided to demonstrate on how CGNFB helped a specific patient battling substance abuse here at The Neuroconnection. Additional information about our @ Home Training option concludes this issue to relay the accessibility of CGNFB for those outside our area or with scheduling conflicts.

Upon reading this newsletter, if you have any questions or would like to request additional information, please feel free to contact us at (630) 858-5105. We are available to schedule a presentation at your convenience as well, tailored to address your further interests and needs.

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### **Upcoming Events:**

**NAME:** American Academy of Pediatrics 2<sup>nd</sup> Annual Autism, Behavior, and Complex Medical Needs Conference

**Date:** May 20<sup>th</sup>, 2016

**Time:** 7:00am – 4:00pm

**Location:** Regency Conference Center - O'Fallon, IL

## Substance Abuse & Addiction

According to the WHO, substance abuse refers to the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs. After repeated abuse, psychoactive substances are known to lead to dependence syndrome – a phenomenon encompassing behavioral, cognitive, and physiological complications within an individual's life. Individuals engaging in substance abuse typically exhibit:

- A strong desire to take the drug
- Difficulties in controlling its use
- Persisting in its use despite harmful consequences
- A higher priority given to drug use than to other activities and obligations
- Increased tolerance
- A physical withdrawal state

Symptomology of substance abuse and addiction can also resemble mental illness. Individuals may often present signs like psychosis or depression in both the intoxicated and withdrawal states of substance abuse. In those suffering from addiction, these observable alterations in mood, perception, sensation, and level of awareness are likely attributed to the toll abuse of illicit drugs or alcohol takes on their central nervous system (CNS). These changes can be identified in the brain through quantitative electroencephalograph (QEEGs), or brain maps. Depending on the substance of choice, these underlying neurological effects can present as distinct markers:

- ❖ **Alcohol** – QEEG recordings indicate significant decreases in Alpha and Theta brain waves of alcoholics. These individuals experience fast electrical brain activity in their frequent state of hyperarousal and consequently feel unable to relax without a drink.
- ❖ **Marijuana** – Consistent use of marijuana induces elevated Alpha and decreased Beta activity over the frontal cortex. Low Beta activity can simulate the “dumbed down” state of those who are intoxicated since beta is necessary for critical thinking and learning. Demotivation syndrome, obsessive thinking, and depressed mood are also attributed to these effects.
- ❖ **Heroin & Cocaine** – Similar to alcoholism, heroin and cocaine addiction leads to deficiencies in Alpha activity and an excess of fast Beta waves. Alterations within these bands are lasting, presenting even during abstinence from either drug.

*“Addiction is a chronic brain disease, a treatable brain disease - that needs to be understood.”*

- Nora D. Volkow, M.D.,  
director of The National  
Institute on Drug Abuse

Collectively, drug use has been found highest among the late teens and twenties population. In 2013, 22.6% of 18- to 20-year-olds reported using illicit drugs within the past month. With such a high prevalence, research in treatment options is a growing and developing field. One expanding option in particular is Connectivity-Guided Neurofeedback to serve as a modality for substance abuse and addiction. While current studies using neurofeedback for substance abuse may be lacking in quantity, what studies there are have been promising.

For more information pertaining to the findings noted above, please review the references below:

Ross, S. (2013). Neurofeedback: An integrative treatment of substance use disorders. *Holistic Nursing Practice*, 27(4), 246

250. doi:10.1097/HNP.0b013e3182971b7c

World Health Organization. (2016). Substance abuse. Retrieved from [http://www.who.int/topics/substance\\_abuse/en/](http://www.who.int/topics/substance_abuse/en/)

## Neurofeedback as a Modality for Substance Abuse

### **The Peniston Alpha-Theta Protocol:**

The very first protocol to address Alcoholism was done in the late '80s by Eugene Peniston. Peniston conducted a study with alcohol abuses at the VA Hospital to investigate whether or not increasing Theta and Alpha brainwaves would have an effect on improving beta endorphins (an index of stress) and allow subjects to obtain sustained abstinence in an alcohol patient group. 30 male subjects with chronic alcoholism and multiple past failed treatments were divided into two groups: one experimental group to receive alpha-theta neurofeedback and one control group to continue traditional measures of treatment. After completing fifteen 30-minute sessions of alpha-theta neurofeedback, all 15 experimental subjects indicated significant increases in alpha and theta brainwave activity, along with sustained abstinence in a 13-month follow up. In contrast to the control group, those participating in neurofeedback also demonstrated marked reductions in Beck Depression Inventory scores, as well as no increased beta-endorphins.

### **Scott-Kaiser Modifications:**

Hoping to extend the practice of the Peniston Protocol for other substance abuse disorders, a follow-up study by Scott and Kaiser et al 1998 discovered that patients with polysubstance abuse (i.e. cocaine and methamphetamine) showed significant improvement when combining the Peniston alpha-theta protocol with a sensory motor rhythm (SMR) beta enhancement prior to training. After completing 10-20 SMR-beta neurofeedback sessions over the first 10 days followed by 30 alpha-theta sessions, patients indicated improved treatment stay over the Peniston protocol alone. Patients participating in this neurofeedback program also revealed decreased scores on several scales of mood and personality through the Minnesota Multiphasic Personality Inventory II (MMPI-2), increased attention, and greater likelihood of permanent abstinence. Due to its success, this integrative treatment of SMR-beta and alpha-theta protocol later was further researched and practiced within the addiction field. A more recent investigation of the Scott and Kaiser Modifications to the Peniston Protocol was conducted in 2005 (Scott, Kaiser, Othermer, & Sideroff, 2005). With a subject pool of 121 individuals, they found that 77% of those participating in this neurofeedback treatment remained abstinent after 1 year compared to the 44% following traditional treatment. Additional strides were also identified through reduced psychopathology on the MMPI-2 and increased attention and concentration for neurofeedback subjects as well.

Collectively, these studies help to demonstrate the efficacy of neurofeedback treatment for substance abuse populations prone to relapse. The findings point to methods like alpha-theta and SMR-beta neurofeedback training as ideal treatment options for individuals seeking support for their addiction.

For more information pertaining to the findings noted above, please review the references below:

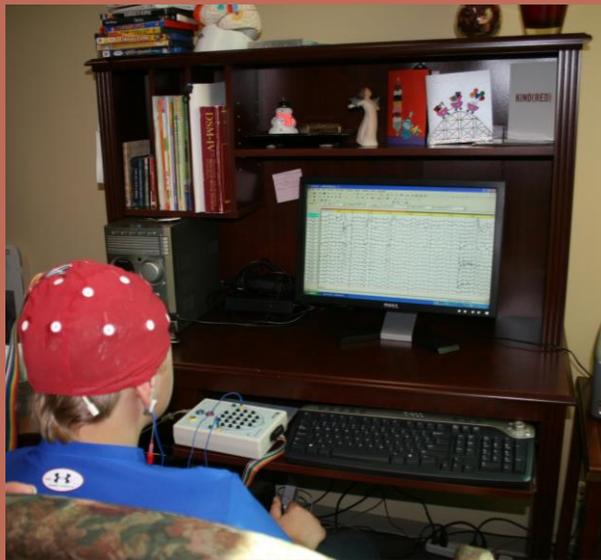
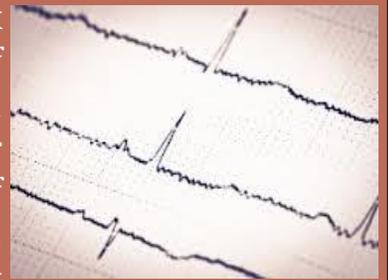
Sokhadze, T. M., Cannon, R. L., & Trudeau, D. L. (2008). EEG Biofeedback as a Treatment for Substance Use

Disorders: Review, Rating of Efficacy, and Recommendations for Further Research. *Applied Psychophysiology & Biofeedback*, 33(1), 1-28. doi:10.1007/s10484-007-9047-5

Debeus, R. J. (2007). Quantitative Electroencephalography-Guided Versus Scott/Peniston Neurofeedback With Substance Use Disorders Outpatients: A Pilot Study. *Biofeedback*, 35(4), 146-151.

## CGNFB at The Neuroconnection

With the use of Connectivity-Guided Neurofeedback (CGNFB), research has demonstrated the power of neuroplasticity to address abnormalities within the brain induced by substance abuse. Here at **The Neuroconnection** our team utilizes quantitative EEG analysis to identify patterns of electrical activity that take into account both power and **connectivity abnormalities** between areas of the brain that may



signify symptoms of substance abuse and addiction. CGNFB training itself functions through operant conditioning, which serves to reinforce desired changes within brain through distinct protocols determined by the QEEG. By training connections within these affected regions with neurofeedback, we are able to exercise and strengthen brain communication, thereby decreasing correlating symptoms. Treatment is non-invasive, with no adverse side effects that one might otherwise experience with medication. Our experts also recognize the significance of individual factors contributing to the impact on

patients' cognitive changes and are determined to developing a comprehensive plan applying CGNFB, while also addressing environmental contributors.

**The Neuroconnection has achieved the following results, with respect to cognitive decline due to substance abuse:**

- ✓ Decrease in cravings
- ✓ Less substance tolerance
- ✓ Better mood regulation
- ✓ Increased focus and concentration
- ✓ Lower anxiety
- ✓ Improved sleep

*“Giving up an addiction means re-programming that part of your brain that makes you restless and unhappy if a desire is not realized.”*

*~ Ken Keyes Jr. ~*

## Neurofeedback Training for Opiate Addiction: Evidence-based Improvement of Mental Health and Craving

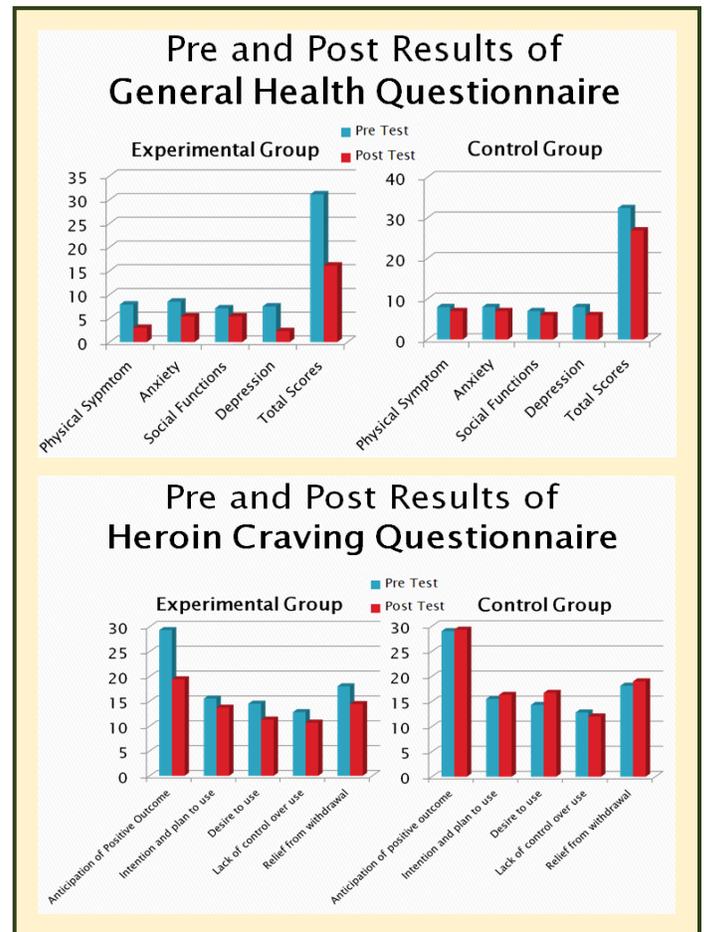
EEG activity of opiate dependent patients is characterized by alterations within the alpha, theta and beta bands, which may be a result of prolonged substance use itself. Despite reported psychological improvements, neurofeedback has not been commonly accepted as a treatment for substance dependence. In a more recent study, and one that was one of the first of its kind, done in 2013, neurofeedback training was done to examine the effectiveness for opiate dependence disorders. The aim of this study was to investigate whether treatment leads to any changes in mental health and substance craving.

This experimental study consisted of a pre-post test design. The participants included 20 men, aged 20-50 years-old, who had opiate dependence disorder according to DSM-IV-R criteria. The main dependent substances were opium, heroin, and/or crack heroin. They had received 3 months of Methadone or Buprenorphine maintenance treatment (MMT/BMT). Prior to receiving treatment, they were examined and matched and randomized into 2 groups, experimental and control. Both groups received their usual maintenance treatment. The experimental group also received 30 sessions of neurofeedback.

Over the course of 2 months the experimental group received thirty 50-minute sessions. Neurofeedback treatment consisted of Sensory Motor Rhythm (SMR) training in the CZ (the central brain cortex) area, followed by alpha-theta training in the PZ (the parietal brain cortex) area. The general health questionnaire and the heroin craving questionnaire were administered before and after treatment to obtain general psychological health and opiate craving information.

The results from the multivariate analysis of covariance showed that the experimental group achieved improvement in somatic symptoms, depression, and total score in general health; and in anticipation of positive outcome, desire to use opioid, and relief from withdrawal craving in comparison with the control group.

Neurofeedback was shown to decrease the craving to use substances and improve general health



in opiate dependence patients. Results obtained from the current study were based on short term neurofeedback training. Continuing therapy could potentially lead to additional positive outcomes, such as improvement in anxiety. Conclusions were that neurofeedback attempts to address the fundamental operational functions of the brain and act as a mechanism for the brain functions and consequently improve psychological abnormalities. Furthermore, research confirms the stability of neurofeedback effects and its prevention of negative side effects. Thus, pharmacology can be used to maintain the initial balance between psychological and physiological health in substance dependent patients, and then neurofeedback could be used to guide the patient towards longer lasting health and balance.

For more information pertaining to the findings noted above, please review the references below:

Dehghani-Arani, F., Rostami, R., & Nadali, H. (2013). Neurofeedback Training for Opiate Addiction: Improvement of Mental

Health and Craving. *Applied Psychophysiology & Biofeedback*, 38(2), 133-141. doi:10.1007/s10484-01392185 *Biofeedback*, 33(1), 1-28. doi:10.1007/s10484-007-9047-5

## The Neuroconnection Provides Success for Patient with Substance Abuse

The Neuroconnection has been successful in treating those with Substance Abuse Disorders with Connectivity – Guided Neurofeedback (CGNFB).

One client in particular was a 21-year-old college student named Jordan. Prior to starting training at The Neuroconnection, Jordan was court ordered into treatment after a DUI conviction when driving intoxicated. Months prior to the accident, Jordan began demonstrating increasingly erratic and unstable behavior at school. Several times per week he would drink until intoxicated while also taking excessive amounts of stimulant medications. Jordan's pattern of drinking and using stimulants was to continue to drink until he passed out. He would not recall the violent and erratic behavior that he exhibited during these episodes due to the blackouts that he experienced. At the time of his court ordered treatment, he was on probation at his university because of a violent outburst when intoxicated on campus.

Jordan was diagnosed with Polysubstance Abuse at the substance abuse treatment center he was attending. He had a history of Attention Deficit Disorder and was prescribed Concerta at the age of eleven. He reported having a head injury from a concussion suffered when playing soccer in high school. Jordan had a family history of alcoholism. Despite his significant attention and behavioral problems, Jordan was a bright student and did well academically throughout high school. He did not begin to abuse substances until he went away to college.

Jordan presented with the following problems at the time of his intake to The Neuroconnection: Polysubstance abuse including alcohol and stimulants, oppositional behavior, inattention, hyperactivity, impulsivity, poor organization and planning, obsessive thoughts, poor judgment, low motivation, low frustration tolerance, mood instability, depressed mood, and problems falling and staying asleep.

A QEEG, or brain map, was administered in order to determine the protocol for Jordan's CGNFB training. The results showed frontal hypo-connection associated with frontal lobe dysfunction including problems with attention, judgement, impulsivity, and hyperactivity. The map also indicated slowing in the delta and theta bands frontally. Jordan then participated in twice weekly neurofeedback sessions to address the problems shown in his first connectivity map.

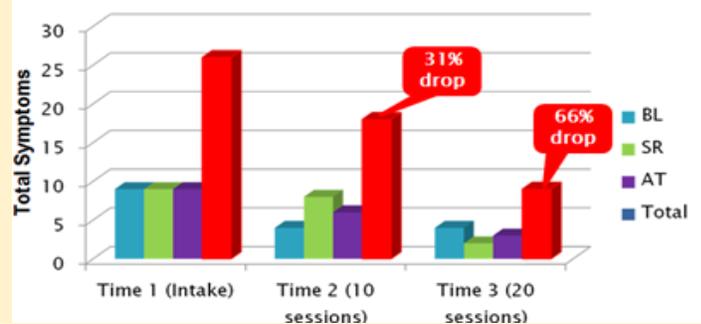
After the first 10 sessions, Jordan reported that he was less anxious and calmer. He also demonstrated less hyperactivity and reported that his concentration had improved. He stated that he was falling asleep more easily and had been less obsessive in his thinking. He had been taken off of all of the stimulant medication since being in rehab so the only intervention had been the neurofeedback training for the improvements noted above. Jordan did admit to drinking a few times during the course of his training but he noted that he was unable to drink as much and was able to stop himself from drinking until he passed out, which was a major problem prior to training.

Jordan reported that he would still like to be less irritable, have more stable moods, and display less anger. As a result, Jordan was remapped to see what changes had occurred. His second map showed improvements in the frontal hyper-connection which accounted for the improved concentration, decrease in obsessive thinking, and better impulse control. There was also a decrease in theta activity which further helped decrease these symptoms.

The second map however, did show left-sided hypo-connection, which correlated with the symptoms that he still presented with, including mood instability, irritability, and depression symptoms. We then started another set of 10 sessions. Following the second set of 10 sessions, Jordan and his parents reported that he was calmer, more emotionally stable, less moody, less irritable, and more motivated. Additionally, his cravings for alcohol subsided. He acknowledged that he did not need stimulants to concentrate any longer so there was no need to restart them when he returned to school. He continued to socialize with his friends who did drink; however, when Jordan would drink he would feel the effects immediately and would not feel well shortly after. As a result, he was no longer able to binge drink like he used to and he reported not drinking until intoxicated for several months.

Jordan's treatment team and parents felt that he was stable enough and had enough supports in place to restart school. After 20 sessions of neurofeedback and completing aftercare, he returned back to college. We followed up with Jordan 8 months later and he reported that he was doing very well. He had not been intoxicated since the beginning of his training at The Neuroconnection and shared that even when he tried to drink with his friends, he could not drink as much. Furthermore, he was getting straight A's since his return to school. His concentration was good without medication. Overall, his mood was good. He was positive about his future and grateful that he had the opportunity to turn his life around.

### Symptom Checklist – upon initial intake



These are the results of Jordan's symptom reports from the initial intake to the end of his training at The Neuroconnection. Symptoms are broken down into categories including those symptoms associated with different training that would be effective. You can see for the blue (depression symptoms), green (attention symptoms) and purple (substance abuse) symptoms that the training helped him in all categories, with an overall decrease of 66%.

*\*Names and dates have been changed to maintain confidentiality\**

## @ Home Training through The Neuroconnection

Upon seeing such excellent results in the past 8 years with Connectivity Guided Neurofeedback (CGNFB), we wanted to find a solution to provide the training to those outside of our area or with schedule inflexibility. As a result, The Neuroconnection provides an @ Home Training program to conduct CGNFB sessions in the convenience of your home. For the past 3 years, we have been providing our expertise and therapeutic treatment to families all around the world. The option of training daily at home has been proven successful with our clients expanding as far as Russia and India.

The @ Home Training program first starts off with an initial intake, along with a QEEG or “brain map” in the office. A custom protocol is then made for the specific needs of the client. At this time, an extended training session is set up within the office to instruct you on how to run a session. We provide you with all the necessary tools and equipment including the neurofeedback system in addition to a laptop which is pre-loaded with all the software and protocols required to conduct training sessions at home. We also provide an Atlantis amplifier, electrodes, head cap to show correct placements, and an @ Home Training manual.

Following the training, we monitor you at home via Skype to verify that you are receiving CGNFB training correctly. Once you feel comfortable training with the software, you may then begin to run sessions on your own with The Neuroconnection monitoring your progress. One protocol consists of 20 sessions, with at least two sessions ran each week until completion of the set protocol. Once finished with the first protocol, you would then return to our office for a QEEG remap to allow for pre and post comparisons.

The  
Neuroconnection  
@ Home Training  
brings Connectivity-  
Guided  
Neurofeedback to  
the convenience of  
your home.

Call (630) 858-5105 now  
to find out more!



## Learn more about The Neuroconnection's director:

Ann L. Rigby, MSW, LCSW, BCN has over 25 years of experience in the mental health field. She has specialized training and extensive experience in the areas of Autism, Attention Deficit Hyperactivity, Anxiety, and Mood Disorders. 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 the 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. Some of her recent speaking engagements included: The 46<sup>th</sup> Autism Society of America National Conference, The 2015 Family Time Magazine Autism and Special Needs Seminar, The Illinois Special Needs Expo, Options Center for Independent Living Annual CIL Empowerment Seminar, and Cornerstone Services Annual Mental Health Seminar.

To learn more about up and coming speaking engagements, go to our website [www.theneuroconnection.com](http://www.theneuroconnection.com) and visit our Resources tab.



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