NEURONOODLE

Neurofeedback

An Efficacious Treatment for Behavioral Health

GET A DOODLE NEURONOODLE OF YOUR NOODLE

NEURONOODLE SERVICES AND FEES

All Packages $4495 What is included?	*ADHD*	*Anxiety*	*Autism*	*Dementia*	*Ala Carte*
**Behavior Management with Parent Education*	x	x	x	x	*$200/hr.
**Psychotherapy, Family or Individual*		x			*$200/hr.
**Neuropsychological Evaluation*	x	x	x	x	*$2500
All Sessions of Neurofeedback	x	x	x	x	$140/hour (discount $1250 packs of 10)
QEEG Brain"Map"	x	x	x	x	$595
Treatment Plan and Scan Interpretation	x	x	x	x	$500
Follow Up Brain Scan	x	x	x	x	$100
Heart Rate Variability (HRV)	x	x			$140/hour (discount: $1250 packs of 10)
Written Clinical Report	x	x	x	x	$700

*Service Billable to BCBS

Behavior Management with Parent Education

Licensed clinician to identify and develop reward-based behavior modification strategies. Focus on behavior change.

Psychotherapy, Family or Individual

Licensed Clinician assisting family with addressing power struggles, family roles, and boundary setting. Individual therapy to work with a Cognitive Behavioral Therapy: restructure self-talk for the purpose of alleviating mood symptoms.

Neuropsychological Evaluation

Board Certified Neuropsychologist and Licensed Clinical Psychologist to identify, diagnose, and make recommendations for developmental (ADHD, Autism Spectrum), academic achievement, Traumatic Brain Injury (TBI), emotional, and neurodegenerative disorders (Alzheimer's Disease, Lewy Body Disease, Parkinson's Disorder). Comprehensive assessment of executive and attention, intellectual, learning and memory, and personality ***functioning.***

Neurofeedback sessions

Placement of electrodes on the scalp, repetitive trainings at the locations of interest, rewarded for healthy brain rhythm via positive changes in audio or visual feedback (watching Netflix movie or listening to music)--after numerous pairings of improved brain rhythm and rewards, the new functioning is learned. The number of sessions vary by condition and severity. At least 20 sessions are typical for initial results.

QEEG Brain "Map"

Scalp electrodes detect brain electrical activity which is then amplified and converted to a graphic map of brain functioning. Maps yield information about how regular or irregular brain activity is in different locations and systems. They also serve for the basis of treatment planning. Before and after maps are used to monitor progress.

Heart Rate Variability (HRV)

HRV is a measure of the variation in time between each heartbeat. This variation is controlled by a primitive part of the nervous system called the autonomic nervous system (ANS). It works regardless of our desire and regulates, among other things, our heart rate, blood pressure, breathing, and digestion. Improving your heart rate variability can have a positive effect on GI functioning, stress, heart function, and overall reduce the physiological manifestations of anxiety. HRV biofeedback not only directly teaches clients to change those physiological reactions to anxiety and stress but also assists clients to enhance self-efficacy and a sense of mastery with direct feedback.

Clinical Report Write Up of Brain Scan and Treatment Plan

Used to document, track, and understand sources of dysregulation that contribute to undesired behavioral symptoms. Often used to communicate with other professionals.

How do I enroll?

- *Complete Intake Paperwork, the forms are available on www.Neuronoodle.com*
- *Phone 847-386-1550, Extension 1 to schedule your intake appointment which will include a brain scan and a meeting with a clinician to discuss your needs, review your paperwork and develop your treatment plan.*

Can we come to you?

If you are a clinical practice and would like to add neurofeedback services, we will send our mobile team to your office for the day (6 client minimum).

More about Neuronoodle

- *NeuroNoodle is owned by Pete Jansons https://www.linkedin.com/in/thepetejansons/*
- *NeuroNoodle exclusively uses the services of Dr. Laura Jansons who is a fellow of the American Board of Neuropsychology https://www.drlaurajansons.com/ She is also Board Certified in Neurofeedback with the Biofeedback Certification International Alliance (BCIA).*
- *Dr. Jansons is in private practice in Buffalo Grove, Illinois. She provides neuropsychological assessment for adults and children and is growing her neuorotherapy and neurofeedback clinic. She has been providing direct therapy, assessment, professional training, and scholarly contributions in her field since 1990.*

Location:

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Suite 110

Buffalo Grove, IL 60089

Phone: 847-386-1550

Listen to our #1 Rated Neurofeedback Podcast!

www.neuronoodle.com

Neurofeedback: An Evidence-Based Treatment for ADHD

With historically high rates of ADHD showing no signs of abating, patients and families are looking for a full range of interventions that work. ADHD treatment, however, is largely deadlocked in a prescription medication-only scenario, with close to 70% of children diagnosed prescribed some form of psychopharmacological medication. For more than forty years, psychostimulant medications have been the most popular and powerful treatment option for ADHD. However, as new research on NFB is published, findings are indicating comparable and even superior outcomes with NFB, in some cases.

Undoubtedly, medication has a successful track record of reducing symptoms of ADHD; yet it does not work for everybody or it brings unpleasant side effects for some people due to the stimulant's mechanism of action in the brain. Additionally, potential long-term risks of taking stimulants are top-of-mind for a number of parents, and studies are limited in this regard. Furthermore, some studies suggest that outcomes from medication treatment may not last longer-term, post-treatment, or without increasing dosage. For those uncomfortable with these considerations, NFB as a non-pharmacological intervention should be a mainstream treatment option for ADHD, or at least a standard complement to medication as an adjunct therapy. Additionally, for many families the ADHD diagnosis process is stressful and inconclusive, often with differing reports from various sources. EEG, used in NFB and described below (see Neurofeedback Explained), offers a more definitive diagnostic tool, and families may prefer medical care that offers this option.

NFB has a long history and thousands of studies, many of which focus on treating behavioral health conditions, validating NFB's efficacy and effectiveness at improving behavioral health and brain fitness. In the past 11 years, for example, at least four major research reviews by leading researchers in the U.S. and internationally have shown NFB to be an efficacious intervention for ADHD.

In several studies, the effects of NFB continue after the treatment has ended, indicating progressive, positive neuroplasticity changes in the brain.

Most notably, research findings show the same rates of remission for ADHD as the leading prescription medications reviewed in the large-scale National Institute of Mental Health Multimodal Treatment Study (NIMH-MTA) for ADHD trial (The MTA Cooperative Group, 1999). Additionally, ADHD-related studies show positive treatment outcomes last longer post-NFB treatments than post-medication treatments (Arns et al., 2020). This means that in several studies, the effects of NFB continue after the treatment has ended, indicating progressive, positive neuroplasticity changes in the brain. Conversely, ADHD medication does not usually have this outcome. Rather, when medication use ends, so does the reduction in symptoms. Moreover, increasing medication dosage may be required to maintain remission.

In the U.S., among children aged 2- to 17-years-old diagnosed with ADHD, 62% take prescription medication. In total, 77% of children diagnosed with ADHD receive some form of treatment: 30% with medication alone, 15% with behavioral treatment alone, and 32% with a combination of behavioral treatment and medication (CDC, 2018b). A full 7% of children and 1.5% of adults in America take medication for ADHD, predominantly methylphenidate, most commonly known as the brand Ritalin (Brennar, 2018.). Many of these children and adults could benefit from NFB as a non-pharmacological standalone or adjunct treatment, from the perspective of both access to treatment and outcomes.

The 2014 National Survey of the Diagnosis and Treatment of ADHD surveyed 2,495 children aged 4- to 17-years-old with ADHD. A recent analysis of the survey's data found a gap in psychosocial and alternative interventions for school-aged children with ADHD (Danielson et al., 2018). According to the research, medication and school supports were the most commonly used treatments, followed by parent training, peer intervention and therapy, and then more distantly by dietary supplements and NFB. The authors stated that increasing access to treatments beyond medication and school support is "important to ensure that the millions of school-aged US children diagnosed with ADHD receive quality treatment."

Current common treatment plans for ADHD vary in approach and can be multimodal because a definitive one-size-fits all solution for ADHD does not exist. Medication and therapy each require a period of trial and adjustment to determine specific effectiveness for an individual.

Similarly, treatment for ADHD with NFB follows this same path: diagnosis, referral, evaluation, treatment plan, trial, feedback, improvement of condition, continuation of treatment, and ongoing patient evaluation and management as needed.

NFB also works very effectively as an adjunct treatment in combination with medication, where it can improve treatment outcomes and increase longer term, positive post-treatment benefits.

As a standalone treatment that is non-invasive and non-pharmacological, NFB may be preferable for some parents who would rather their child(ren) not take stimulants. Even though NFB is powerful and efficacious on its own, NFB is not exclusively a stand-alone or medication-replacement treatment. NFB also works very effectively as an adjunct treatment in combination with medication or other psychosocial interventions, where it can improve treatment outcomes and increase longer term, positive post-treatment benefits.

The fact that NFB proves itself as an efficacious and research-validated treatment modality, should only encourage insurance carriers and doctors to increase access to and application of NFB for ADHD—a formidable medical and social challenge. Having multiple effective tools to address ADHD would be a benefit to children and adults with the diagnosis, as well as to their families, doctors, and therapists.

NFB Treatment for a Broader Range of Mental Health Conditions

While the preponderance of NFB evidence is in the domain of ADHD, a strong evidence base for the use of NFB to treat other behavioral health disorders is also growing. NFB has demonstrated outcomes of effectively reducing symptoms caused by reactions to severe stress and adjustment (such as PTSD, depression, and anxiety) by improving general relaxation and brain regulation, and by reducing symptoms related to anxiety. It has, for example, been used with U.S. military veterans for more than a decade.

Relaxation training, a common treatment for anxiety, is an FDA-cleared use of NFB equipment. Biofeedback, a broader category that includes NFB, and NFB itself, have been used for decades to promote relaxation, as evidence-based, non-pharmacological methods for treating anxiety. A 2008 meta-analysis that reviewed 27 studies found significant efficacy for relaxation training as a treatment to reduce anxiety (Manzoni et al., 2008). More directly, research has shown that various specific NFB treatments have been found to do the same (Kerson et al., 2009; Moradi et al., 2011). In one study, researchers found that NFB is approximately as effective as medication in this regard (Bhat, 2010).

As previously indicated in the CDC data (CDC, 2018a), behavioral health conditions—including mental health issues that cause anxiety—are on the rise, at the same time there exists a lack of accessible and affordable treatments. According to a recent Mental Health America report, the percentage of people in 2020 seeking help with anxiety and depression has increased by 62% since the prior year, with young people ages 11–17 more likely than other age groups to indicate moderate to severe symptoms (Mental Health America, 2020). Adopting effective interventions such as NFB as part of a treatment model not only makes sense but carries lower risks than pharmacological interventions or no interventions. Later, this report will point out that NFB has few and minimal transient side effects, making it a smart choice for reducing anxiety brought on by stress- and adjustment-related disorders. In light of COVID, and with national rates of stress and anxiety in adults and children reaching new highs, now more than ever we need effective, non-pharmacological interventions like NFB to be broadly covered by insurance.

Neurofeedback Explained

What exactly is NFB? Simply put, NFB is a technology that allows patients to perceive their brainwave activity. NFB is non-invasive and non-pharmacological. An NFB device does not add electrical currents to the brain. Rather, surface sensors placed on the head, called electrodes, measure electrical output using electroencephalogram (EEG). The interpreted brainwave data is called quantitative EEG, or qEEG, as it is translated into measurement modes using various quantitative mathematical applications. These subtle qEEQ readings are converted into visible or otherwise perceivable forms such as graphs, charts, amplitude readings, colors, animated images, sounds and so forth. Using these technologies, NFB simultaneously measures, monitors and records brainwaves. The qEEG data is then used to create feedback loops that train the brain towards brainwave states that result in reduction of symptoms and/or improvement in well-being. Normative reference databases can provide trained NFB practitioners with target qEEG measures for age-matched populations as objective starting points for NFB treatment. This practice of determining treatment protocol based on historical evidence is in line with many medical procedures that use established reference databases for guidance during treatment. Further, qEEG is the only FDA-cleared, brain-based diagnostic tool for detecting ADHD, which is essentially a brain-based disorder defined by distinctive, abnormal brainwave patterns.

The brain is modulating its own brainwaves as encouraged by the NFB feedback system.

The feedback loops ultimately enable patients' brains to modulate their own brainwaves towards healthier or target frequency levels by offering rewards to the brain in the form of images, sounds, or other stimuli. NFB participants receive real-time and continuous qEEG data about their own brainwaves, and through conscious intention and reward incentives, are able to modulate brainwaves while witnessing the outcome of their efforts. More specifically, the participant is aware and engaged, but not actively modulating their own brainwaves consciously. Rather, the brain is modulating its own brainwaves as encouraged by the NFB feedback system.

During a typical NFB session, this measure-loop-modulate process continues for approximately 20 to 40 minutes. A trained NFB mental health or medical practitioner monitors the session, sets the protocol, interprets activity, and gets feedback from the patient, which is used to adjust future sessions toward more effective outcomes. Repeated NFB sessions produce lasting changes in brain function and fitness, and consequently lasting improvements indicated by remission or reduction of symptoms in mental and behavioral health disorders.

HOW NFB IS EXPERIENCED

An adult or child patient receiving NFB treatment for ADHD would likely be referred by a physician, psychiatrist or psychologist following diagnosis, but could also be referred by self or a parent. As with other forms of therapeutic treatment, initial intake and evaluation would capture key symptom information about the patient including, in the case of NFB, a qEEG baseline of the patient's brain for reference and for help in determining a treatment plan. At the point of treatment, a typical

session would include the patient sitting in a chair or otherwise in a resting, relaxed pose with four or more sensors connected to their head and ears. Depending on the treatment protocol determined by the practitioner, the patient might use a visual feedback system, like watching a movie or sequence on a screen, or use audio cues such as listening to a song. When the brain is experiencing the intended brainwave, the visual or audio feedback system runs smoothly; and when an unintended brainwave occurs, there may be a visual interruption on the screen or a volume change or skip in the song. These changes give the brain feedback to help it self-correct towards target brainwaves. The treatment would continue for the prescribed amount of time. During treatment the patient is typically awake and aware, but in most cases their conscious participation is limited to a meta-witnessing of the process while the real brainwave work is being done at a faster rate by the brain itself.

The experience tends to be relaxing and non-effortful, and many patients report feeling calm, alert, and at ease, with similar feelings immediately following the session. Bookending the EEG part of the protocol, treatment would also include patient and practitioner feedback about treatment goals and progress, both from the NFB-reported changes in brainwaves as well as how improvements have translated into the patient's life between sessions. Qualitative feedback is often measured using standard tools used to assess human behavior. As with other treatments such as medication or therapy, the practitioner would use this qualitative feedback, along with any quantitative measurements, to adjust the treatment protocol towards optimal effectiveness. Repeated sessions support improvements in brain health and regulation and reduced symptoms and negative outcomes of ADHD. Overtime, improvements become more permanent, typically lasting beyond the end of treatment.

NFB can also be used in other settings, such as classrooms, on more than one student at a time, as demonstrated by a 2014 study that successfully used NFB to treat children with ADHD in grade schools (Steiner et al., 2014). In this setting, children are typically stationed at computers during a specific time period of the school day where they engage in unique, individually responsive, NFB treatment applications as determined by a licensed practitioner.

NFB provides the opportunity to affect positive change in the brain without surgery, electric shock, pharmacological medication, or other outside stimulus.

With repeated NFB sessions, the brain is trained to build more robust neuronal networks that facilitate adaptability related to positive behavioral health outcomes. As such, accessing desired brain states becomes easier and more reliable. The simple and powerful aspect of self-modulating brainwaves through feedback is what makes NFB a unique and potent brain-building treatment or intervention. NFB provides the opportunity to affect positive change in the brain without surgery, electric shock, pharmacological medication, or other outside stimulus, while providing real-time data that signals neuroplasticity changes in the brain.

How NFB Works

As outlined earlier in this report, NFB is the technology of measuring brainwaves, creating feedback loops with the data, and incentivizing modulation towards healthier brain states and brain regulation. To understand the hows and whys of NFB, a closer and more detailed look is required.

On the conceptual level, the reason why NFB works is neuroplasticity—the ability of the brain to change itself, and in the case of NFB, with specific, targeted feedback. To understand the basics of how this happens, we need to consider two key functions: reward mechanisms and operant conditioning. Moving into the application level, understanding how NFB "reads" or measures brainwaves requires an overview of brainwaves (see Appendix A) and of electrode sensors, including where they are mounted on the head, and what they are measuring and why (see Appendix B). A level deeper takes us into the different lobes of the brain and their correlated behaviors and emotions (see Appendix C). To understand how brainwave data is evaluated and used for feedback, a cursory overview of various analysis techniques is needed (see Appendix D). Fundamentally, brainwave data is analyzed quantitatively as measurements of the aspects of the brainwave signal, such as amplitude, the strength of the brainwave, or as derivative of quantitative data that allows other brain modeling and comparisons to normative databases. Some investigation and learning is required to fully understand how NFB measures brainwaves and uses the data.

Once familiarity with the operation of NFB has been established, a broad summary of which treatment protocols are used for different conditions can be considered (see Appendix E). This is part of the complexity of NFB as it is not a one-size-fits all treatment. Much in the same way therapy uses different modalities or medication uses different doses or combinations of medication depending on symptoms and treatment goals, NFB also has different treatment protocols. For example, anxiety-related treatments tend to modulate alpha waves, while ADHD treatments often seek to adjust the relationship between theta and beta waves. Proper protocols for treating ADHD and stress- and adjustment-related symptoms have been derived from research studies that show efficacy.

Equipment is another consideration. Bona fide professional-level equipment must meet certain standards and capabilities and be FDA-cleared; and it requires the practitioner to have a minimum level of training.

In addition to practitioners needing professional-level application skills—including using electrodes and NFB equipment, and interpreting brainwave data—they should also have skilled capacity to solicit and interpret patient feedback and interact with patients in a therapeutic way as part of the treatment. All together, the combination of technical and therapeutic skills provides key feedback that enables the practitioner to adjust protocols with proficiency and towards greater effectiveness, as with other behavioral health treatments.

NFB is similar to therapy, with varying evidence-based modalities, a number of influences in determining treatment, and the requirement of a skilled and trained practitioner.

Each of these variables is important, and a basic overview is essential to understand more specifically how and why NFB works. While at first glance this may seem complex, it is important to remember how, in many ways, NFB is similar to therapy, with varying evidence-based modalities, a number of influences in determining treatment, and the requirement of a skilled and trained practitioner to be

effective. Taking a look at these key pieces, one at a time, will support a fuller picture of the intervention.

NFB FOUNDATIONS: NEUROPLASTICITY AND OPERANT CONDITIONING

Self-neuromodulation is the brain's ability to train itself, in this case through NFB, to reach a desired brain state. Through NFB, a shift in brainwaves and brain regulation occurs, in part as a result of 1) the patient's awareness of the desired brain/brainwave state, and 2) the real-time changes that are happening in the patient's brainwave activity, all through feedback derived from the EEG NFB technology.

NFB is a powerful intervention because it brings to bear self-awareness components that have been found to increase positive outcomes. The patient's awareness of brain states, awareness of optimal goals or at least directional goals, and awareness of what is happening during the process are the foundation of NFB effects on positive neuromodulation. In addition, NFB as a system works through a behavioral change paradigm commonly known as operant conditioning.

Operant conditioning occurs when specific events that create positive or negative rewards are connected to ongoing behaviors such that the frequency of certain targeted behaviors/brainwaves are modified. In the case of NFB, a rewarding event is typically a visual and/or auditory experience, such as a movie, music and/or video game, that serve to help reinforce the occurrence of specific aspects of brainwave activity. As EEG readings from specific brain regions indicate shifts towards target values, the rewarding events are enhanced to encourage the presence of desirable brain function characteristics. In other words, as brainwaves shift towards target frequencies, the brain is rewarded with pleasurable stimuli. Repeated reward stimulus leads to healthier brainwave states that, over time, replace dysregulated brainwave states. The process of providing a stimulus, measuring the effect in terms of targeted brainwave activity, and modifying the reinforcing stimulus to optimize these brainwaves is an example of operant conditioning. The use of operant conditioning has a long and well-documented history of effectiveness in many aspects of influencing and shifting animal and human behavior; and a growing body of literature supports the effective utilization of operant conditioning principles to train neural responses.

As a very simplistic example, imagine trying to housetrain a puppy. When the puppy has undesirable behavior, it gets undesirable consequences—lack of praise and being quickly ushered outside. Conversely, when it sits by the door and waits to go outside, it gets desirable feedback in the form of attention and usually food. Over time, the positive feedback wins out, and the new behavior becomes the norm. Similarly, NFB uses feedback methods for incentivizing brain modulation such as watching a movie. In this example, as brainwaves approach a desired state, the movie gets brighter and set to the right volume; as the brainwaves drift away from the desired state, the movie gets dimmer and quieter. The changes either positively or negatively reward the brain for shifting states/brainwaves, which creates a learning experience for the brain that over time trends toward healthier brainwave states. The patient is not consciously redirecting brainwaves; this is an automatic action in the brain, much in the same way desiring to pick up a cup causes the arm to reach out and clasp it.

Repeated modulation towards the goal produces lasting changes in brain fitness and function, which, in turn, lead to lasting improvements in mental and behavioral states.

EEG is an instant measure of brain activity; there is no time delay for confirmation indicators. Therefore, when participants' brains are successful at modulating brainwaves towards a goal, they promptly get a reward in the form of a visual or auditory stimulus. This "cookie for the brain" gives a hit of dopamine (Sulzer et al., 2013), a win not unlike "winning" a video game or hitting the bull's-eye with a dart. The brain likes this form of reward, and the whole system—the participants, their intentions, the neurological and neurochemical brain activity—is incentivized and trained to repeat the effort in anticipation of another reward. Over time, and with practitioner adjustments based not only on quantitative brainwave data but also qualitative participant self-reports, the brain is conditioned into a new state. Repeated modulation towards the goal produces lasting changes in brain fitness and function, which, in turn, lead to lasting improvements in mental and behavioral states.