

NeurOptimal® Neurofeedback

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1. INTRODUCTION

This document is for those who would like more detailed information about neurofeedback, how it works, and what is involved in the training process. The information has been arranged under various headings so that you access information relevant to your interest without having to read the entire document - if you do not wish to do so. If you have additional questions [contact us](#) or join our neurofeedback [forum](#) for additional discussion.

Neurofeedback has emerged out of significant advances in technology and enables new and innovative approaches to psychological healing and behavioural change and has proven to be very effective. Up until recently though, neurofeedback has been based within the classical scientific approach that views the brain as something to be manipulated in an attempt to bring about predetermined outcomes. This has involved decisions being made about what someone's brain and behaviour should look like and manipulating it toward that outcome, according to more ideas about the best way to do that.

There have however, been considerable advances made within the new dynamical sciences in understanding the transformational potential within the dynamical complexity of the brain. These findings are revolutionising the approach to human behaviour and in particular, brain functioning. It is now recognised the brain does not respond well to imposed structure and processes that are incongruent with its complex dynamical functioning.

Fortunately there has been considerable work in this area and breakthroughs in software development have been able to utilise findings of the new sciences. A neurofeedback system has been developed that recognises the incredible natural potential of the brain and is able to assist it to achieve optimal processing and outcomes without intervention, manipulation, or imposition of beliefs.

This document describes neurofeedback, as the new innovative approach that has emerged from the findings within the new dynamical science. The complex dynamical brain will be explained in some detail, and what this implies in terms of understanding about processing and integration of life experience for optimal healing, learning and transformational development. Also explained will be how NeurOptimal® works within this dynamical context, the benefits of training with it, how they unfold, what the training session looks like, and if there is anything you need to do to improve outcomes. Finally brief information about classically based neurofeedback systems and entrainment technology will be provided to show a contrast and distinctions, to highlight the advances that have been made by the developers of NeurOptimal®.

2. WHAT IS NEUROFEEDBACK?

Neurofeedback is a specialized and advanced form of biofeedback that gives information back to you about your brainwave activity as it is occurring. Neurofeedback can also be called Neurotherapy, EEG Biofeedback or Neurobiofeedback

The electricity generated by Central Nervous System (CNS) processing can be detected by sensors placed on the scalp and displayed on a monitor in real time. This is called the Electroencephalograph or EEG. With specially designed computer software, information about the performance and behaviour of the Brain and the CNS as a whole is then presented back to the individual via visual and auditory perception. The additional information enables the Brain to improve its information processing capacity, efficiency, resiliency, and learning such that long-term outcomes can be achieved.

People using Neurofeedback have experienced relief from a vast array of psychological, emotional & medical conditions along with considerable personal and spiritual growth. Neurofeedback is also widely used by people whom want to increase physical and mental performance, such as athletes, sportspeople, businesspeople, musicians, performers, and students.

3. NEUROOPTIMAL® NEUROFEEDBACK

NeurOptimal® neurofeedback is a unique, leading edge, state-of-the-art, Neurofeedback system that works directly with the psychological healing and transformational capacity of the Brain and the Central Nervous System (CNS).

After many years' experience with multiple Neurofeedback systems and realising the limitations of a classical approach, Dr Valdeane Brown from the ZENGAR institute in Canada utilised his comprehensive knowledge to

generate a remarkable breakthrough in Neurofeedback technology. Most importantly, Dr Brown recognised the CNS as a Nonlinear Dynamical System and understood its complexity, interactivity with other body and environmental systems, its dynamic operation, self-organising ability, and profound transformational capacity. Appreciating the brain could not be understood adequately via existing approaches, he designed a Neurofeedback system from the ground up to engage the incredible natural capacity of the CNS for healing, improved performance, and transformation; so as to bring about profound change with ease and simplicity.

NeuroOptimal® monitors a broad EEG spectrum from both hemispheres of the brain simultaneously, rather than focusing on content or any particular EEG frequency as do other systems. The specially designed computer software and EEG hardware is designed to detect a particular type of turbulence that is characteristic of a transformational system operating less than optimally, this system, namely your brain is unable to utilise its processing and transformational capacity optimally. Such sub-optimal processing is generally caused by stress and lifestyle factors inherent in living in the modern world. This turbulence detection, is unique to NeuroOptimal®, and the information is fed back into the Brain in real time via auditory and visual perception, which enables a natural fluid improvement: Particularly in terms of processing efficiency, stability, adaptability, resiliency, and increased transformational ability. Qualities that are essential for healing, performance and improved behavioural outcomes.

Since the late 1990's, NeuroOptimal® has been utilised internationally in the fields of Psychological Health, Optimal Performance, and Spiritual Growth and Development, with consistently beneficial wide-ranging and highly effective long-lasting outcomes. The rapidly growing international community of NeuroOptimal® trainers support the Zengar Institute in its commitment to ongoing research and development for ever increasing beneficial outcomes and ease of use. Advances in the design of NeuroOptimal® are such that the system is now available outside of the clinical setting for widespread use.

4. THE DYNAMICAL BRAIN

To understand how NeuroOptimal® works it is useful to first understand how complex the brain is and a little about how it functions.

The Brain is part of the Central Nervous System (CNS) and is the core information processing network of the body. It has 100 billion neurons with each connected to as many as 20,000 to 30,000 other neurons, totalling 1 quadrillion connections - about 300 million per cubic millimetre of cortex. If the pathways making these connections were placed end to end, it would total between 150,000 and 180,000 Kilometres: Over six times the distance around the earth. The brain is the most complex dynamical structure known within the universe.

This provides for a very complex and highly dynamic organ that receives information about functioning of the body and the external environment. It simultaneously coordinates all parts and systems of the body, including motor activity, whilst enabling higher cognitive functions such as, memory, emotional processing, language, creativity, and executive functioning - amongst many others. That is, brain is able to process massive amounts of information, develop responses, and learn them for increasing efficiency and mastery.

If we were aware of all the information processing going on, our conscious mind would be catastrophically overloaded. Fortunately consciousness is self-regulated, such that processing not requiring our immediate attention (which is most of the information processing going on) takes place outside of our awareness, within the unconscious. This leaves our conscious mind free to deal with important immediate activity that requires awareness, and focused attention.

In learning behaviour the brain self-organises such that a network of supporting neural interconnectivity is established. With repetition the neural connections are strengthened and more easily activated. Eventually the behaviour can become a primary and unconscious response - such as braking when you see a red light. If a learnt behaviour is discontinued, over time the supporting neural network begins to weaken, is less readily available and

will lose primacy. The brain's on-going ability to create new pathways and interconnections is known as Neuroplasticity and is essential for learning and adaptability.

Another very important feature of brain functioning is conscious and unconscious processing. If we were aware of all the information processing going on, our conscious mind would be catastrophically overloaded. Fortunately consciousness is self-regulated, such that processing not requiring our immediate attention (which is most of the information processing going on) takes place outside of our awareness, within the unconscious. This leaves our conscious mind free to deal with important immediate activity that requires awareness, and focused attention.

With conscious processing we practice selective awareness, work with chunks of information, build logical bridges, make decisions, and determine responses. Consciously generated behaviour, when repeated, becomes largely unconscious. This ensures conscious processing is not overloaded as new situations are encountered that require considered responses.

The Unconscious, in addition to holding patterned behaviour, processes our broader experience beyond selective conscious awareness. To process such massive amounts of information the Unconscious utilises fluid, global, and deep processing from which comes forward insight, wisdom, intuition, dreams, and understanding, alongside emotional and psychological healing.

If we consider these features of the dynamical brain it has profound implications for day to day living. For example:

- **If we repeat behaviour often enough**, it develops a self-organising dynamic that then drives the behaviour. Self-sustaining problematic behaviours are largely unconscious and may be as simple as obsolete coping strategies or as extreme as serious psychological and emotional conditions. Once established they influence the way we perceive the world, our relationship with it, and our sense of self.
- **Behavioural dynamics are like a car rolling down a hill.** If you jump in front just as it starts to move, it is a lot easier to stop than if it has developed momentum. When behaviour has an unconscious component, we are unaware of the activation and the build-up of the dynamical intensity. By the time it reaches awareness the behaviour is usually difficult to control because it is supported by powerful unconscious forces and has gained considerable momentum.
- **When conscious or unconscious processing efficiency becomes compromised** through the stress of modern living, information overload, trauma, or other influences, loss of performance and suffering arises. The body systems it regulates are affected, processing and integration of life experience becomes inefficient, and the additional burden placed on the conscious mind results in loss of awareness and performance in the world. Consequently problematic behaviours, ill health, and dependencies arise. These include, but are not limited to:

Difficulty concentrating

Fatigue

Impaired mind body coordination

Impaired eye hand coordination

Learning difficulty

Difficulty maintaining focus

Poor response times

Difficulty with decision making

Reduced problem solving capacity

Emotional difficulty

Poor coping strategies

Cognitive noise

Cognitive instability

Personality instability

Reduced physical health

Rigid beliefs

Cognitive decline

Impaired immune system

Reduced awareness

Diminished personal power

Loss of sense of self

Poor impulse control

Reactivity

Lack of adaptability

Loss of clarity

Sleep disturbance

Reduced coping strategies

That is, any of the body, emotional, or cognitive processes influenced by the Central Nervous System can be affected. The brain's entire conscious and unconscious ability for optimal complex processing is determined by how efficiently it functions as a self-organising dynamical and transformational system.

Fortunately, Dr Valdeane Brown of the Zengar institute with his vast experience within neurofeedback recognised this some years ago, and realised existing approaches did not directly address the underlying processes that support healthy and optimal existence in the world. Drawing on his experience across several disciplines, including the new dynamical sciences, Dr Brown developed a unique, leading edge, state-of-the-art Neurofeedback system.

Called NeurOptimal®, it was designed from the ground up to work directly with the dynamical self-organising conscious and unconscious processes, to facilitate optimal functioning. The result is dynamical flexibility, adaptability, efficiency, and resiliency of processing with significantly increased resources and awareness. Qualities essential for optimal processing and integration of life experience for improved performance, increased success, better endurance, psychological and physical healing, greater life enjoyment, additional creativity, and enhanced personal growth with fluid transformational outcomes.

Remarkably, these far reaching outcomes are achieved effortlessly and safely when training with NeurOptimal®. There is no intervention, no manipulation, no effortful concentration, no decisions being made about what your brain should be doing, and no need to analyse the past or future. How, because it is recognised the brain is the most complex structure known in the universe with capacity beyond our conscious knowing, and that by providing a mirror of important aspects of its own dynamical functioning, it can use this information for self-correction, self-healing, learning, and optimisation of information processing and the transformational process.

5. HOW NEUROPTIMAL® WORKS

It is very important to understand that NeurOptimal® is not an invasive or directive therapy as other Neurofeedback systems are. There is no diagnosis necessary as no treatment is taking place. Decisions are not being made about what your brain should look like, and it is not being pushed or pulled in any pre-determined direction. Nor is there any stimulus being used for entrainment or any other form of intervention. Rather, NeurOptimal® is peaceful non-directive training assisting the natural capacity of the brain and body for healing, personal growth, learning, performance improvement, and transformational evolution.

NeurOptimal® recognises that the behaviour of the EEG represents the dynamical activity of conscious and unconscious information processing within its entirety. When processing is compromised, with resultant loss of efficiency and impaired functioning, a particular type of turbulence develops within the EEG. NeurOptimal® is designed to detect this emerging turbulence at its earliest preconscious origins and alert the CNS so that it can maintain stability and efficient processing. The on-going return to stability and renormalisation interrupts the dynamic driving the problematic behaviour, before it gains momentum, and trains the CNS to maintain stability and efficiency of processing.

The sensitivity of the software is initially set so that only the peaks of turbulence are detected. Each detection of turbulence triggers a very brief (microseconds) interruption in music you are listening to. It is the interruption in the music that is the feedback and not the music within itself. The CNS very quickly connects these interruptions with the turbulence events that trigger them. Fundamentally NeurOptimal® is saying to your Brain – you just did that, you just did it again, you just did it again, etc. Your brain will use this additional information to reduce the turbulence events and thus begin to stabilise.

Each time the Brain stabilises in a NeurOptimal® training session it is learning how to do that, and gets better and better at returning to stability and developing its capacity to maintain it for increasing periods of time. Whilst the increasing periods of stability are occurring, NeurOptimal® plays an even more profound

role via activation of the orienting response of the CNS. This is a fundamental survival function designed for detection of change in environment, and return to present time for appropriate response. For example, you can be driving your car talking to you passenger about what you will be doing next week. Unusual movement is detected peripherally, your CNS orients to that, and immediately returns your awareness to the present time requiring a release of the previous behaviour.

Utilisation of the dynamical inherent properties of the CNS in this way results in three very important outcomes. Firstly, during the increasing periods of stability, there is no extrinsic compromise of capacity or any dysfunctional processing occurring, meaning that processing efficiency is optimised. Secondly, if maladaptive or inefficient patterns of processing begin to activate, prior to your awareness of them turbulence will appear in the EEG. This results in interruption to the audio stream (feedback) and activation of the orienting response with return to stability and the present. Thirdly, this necessitates a release of old patterns and behaviours that is well known to reduce suffering.

As the Brain, and CNS as a whole, develops stability the full potential of efficient processing and transformational capacity becomes increasingly available. This continues with each session until the Brain and CNS develops the ability to carry the stability and increased processing and transformational capacity across sessions, and then into the future independently of NeuroOptimal® training. That is, the Brain, via neuroplasticity and its transformational capacity, has developed and strengthened the necessary self-organising networks and dynamics to maintain the desirable behaviour.

6. WHO CAN TRAIN WITH NEUROOPTIMAL®?

The youngest has been the unborn child enjoying the benefits from the mothers training session. The oldest so far at NeuroTribe is an 89 year old. In short anyone who can sit reasonably still during the session. For young children a DVD of their choice is used rather than music.

7. BENEFITS OF NEUROOPTIMAL® TRAINING

The brain controls most if not all aspects of our experience, so benefits can be seen in your [Work](#) and [Play](#), as well as in your [Healing](#) and [Growth](#). Benefits can also be seen in [Performance](#), as athletes, musicians and scholars alike can gain the edge.

With optimal functioning of the Central Nervous System being trained, the benefits of NeuroOptimal® can be wide ranging and far reaching. Maintaining stability of processing is very important and fundamental to good health and realisation of potential. Stability enables the CNS to function efficiently bringing about profound healing with improved performance in most aspects of living.

Improved ability to process and integrate life experience brings forward new understanding and releases bound psychological energy for transformation and action.

Improved flexibility and adaptability means a reduction in grasping and the resultant suffering with increased learning and transformation. Increased awareness results in a mindfulness that further enhances healing, learning, improvement and transformation.

Broadly speaking, the benefits of Training with NeuroOptimal® are increased stability, flexibility, adaptability, and greater resilience of Central nervous system functioning. Whilst NeuroOptimal® is not a treatment and does not target any specific issue, because of the innovative way it works, many specific beneficial outcomes emerge that are appropriate for that individual. Below is a collation of individual benefits often reported by People who have trained on NeuroOptimal®.

OPTIMAL PERFORMANCE

Improved eye hand coordination
improved mind body coordination
Faster response times
Improved executive function
Improved focus & attention
Efficient information processing
Accelerated learning
Increased productivity
Better & easier decision making
Increased accuracy
Burnout protection
Increased energy
Improved open & closed focus
Increased presence
Less reactivity
Reduced anxiety & stage fright
Impulse control
Maintain calm and flow
More alert
Better endurance
Faster recovery
Calmer mind
Increased body awareness
Mood stability
Increased self-control

TRANSFORMATIONAL

Calmer mind
Increase mindfulness
Less prone to absorption
Increased awareness
Improved meditation
Mood stability
Greater awareness of energy
Transformational awareness
Awareness of spiritual feeling
Insight & understanding
Awareness of connection
Impulse control
More centred
Increased presence
Greater sense of direction
Understanding flow
Increased control
Ability to let go/release
Creativity
Smoother transition
Fluid emotional processing
Transitional fluidity
Ease of acceptance
Release
Acceptance and integration

PSYCHOLOGICAL HEALING

Effortless resolution of old wounds & issues
Trauma recovery
Grief recovery
Relaxation
Quiet mind
Improved cognitive functioning
Better & easier decision making
More presence
Improved self esteem
Personal stability
Increased self-confidence and assertiveness
Mood stability
Improved mood
Development of emotional intelligence
Improved sleep
Better problem solving
Impulse control
Less reactivity
More control
Increased psychological energy
Resolution of psychological conditions
Improved memory
Improved relationships
Increased immunity to stress
Enhanced wellbeing

8. HOW THE BENEFITS UNFOLD

NeurOptimal® addresses the health and capacity of the Central Nervous System rather than a symptom directed approach from the outside in. As a result, all other systems arising from the CNS, or interactive with it, are able to function with increased health and efficiency.

The recovery, performance, or transformational path with NeurOptimal® varies from person to person. This is because NeurOptimal® is assisting your Brain and CNS to operate according to natural potential rather than forcing any predetermined path toward any predetermined outcome. Considering that everyone is starting from a different position with a unique history this is particularly relevant. Apart from the natural ease and flow, the change process can be talked about globally in five general overlapping and interactive aspects.

1. Stabilising of the Central Nervous System:

During this process people begin to feel deeply relaxed, mind quietening between sessions, sleep improvements, decrease in reactivity, and generally, feeling more settled. For some this can occur with one session for others it may take more.

2. Beginning of deep unconscious processing:

Further improvements in the above benefits and stability, occasional vivid dreaming for some, life begins to feel easier, energy begins to increase, alertness increases, increased endurance, stabilising of mood, noticeable improvements in psychology and response times.

3. Improved processing:

Improved stability and efficiency along with freeing up of psychological energy brings increases in attention, focus, mind body & eye hand coordination, adaptability & flexibility, increased awareness, increased presence, decision making easier and faster, more creative, better response times, increased intuition, improved access to higher resources, coping significantly better, sense of self clearer and more stable, able to reference internally more easily for decision making, clarity in thought, identification of emotions and processing of them without being overwhelmed. Significant shifts can occur seamlessly with increased adaptability and flexibility such that within days you will feel you have always been like it. Increased awareness leads to objective observation of own and others behaviour along with environmental dynamics in general. As a result of developing mindfulness the developmental and transformational processes are receiving uncontaminated feedback for further enhancement of outcomes

4. Smooth travelling:

Carrying the benefits easily from session to session, finding that the old 'you' is getting harder to recall as you settle into the emergence of increased capacity, better functioning, and a stronger positive sense of self. Life experience is now driving the growth and transformational process, and confidence develops as you become familiar with this growing sense of self control.

5. Into the future:

Once your Central Nervous System is functioning according to its inherent design and capacity the gains will continue to unfold independently of NeurOptimal®. Most people are happy with this level of improvement and stop training. Others briefly dip in and out of the NeurOptimal® process over time, for additional benefits or for assistance with periods of unhealthy stress.

9. WHAT HAPPENS IN A TRAINING SESSION?

Session Structure

You are seated in a comfortable reclining chair facing a computer monitor and two sensors are placed on your scalp and another two are placed on your ears. Comfortable headphones are then placed over your ears so that you can easily hear the music. A 30 second recording of EEG activity for use in a pre and post training comparison is conducted. During baseline recordings there is no training occurring and you will not hear any music.

Once the training begins, you will hear the music with very brief and occasional interrupts and will be able to watch a music based visualisation on a monitor if you desire. For children a DVD of their choice can be used. During the training you can have your eyes open or closed as you desire. It is most appropriate that you go with what feels most comfortable and can change between eyes open and closed if you like. Other than this there is nothing else you need to do – no need for concentration, staying perfectly still, trying to control thoughts, images on a screen, or the need to think about anything in particular.

When the training is completed another baseline is conducted and then a comparison is made with the pre training baseline. Then headphones and sensors are removed and the session is completed.

How Many Sessions

One of the features of NeurOptimal® is that it is very safe because the person is able to change at their own rate without any forcing of the process. In addition, everyone is starting from a different place with a different history and they are coming for different reasons. Some achieve their desired outcome in less than ten sessions. Most require between ten and twenty sessions, with some requiring more. Remember, you do not need to do ten or twenty sessions to experience benefits as this will be evident within the first few sessions.

Frequency of Sessions

NeurOptimal® is training and, like any training, it is repetition that gets the skills in place and then establishes resiliency and long lasting outcomes. Thus it becomes important to carry the improvements across from one session to the next. Most people achieve this with one session per week at the beginning, with a decrease in frequency towards the end of training. If you wish for a faster and easier outcome then two sessions per week are optimal. However, it is important to say that we have had many clients who have achieved very good outcomes with fortnightly sessions or less. This includes fly in fly out mining workers who are training once every three weeks or less. In addition, we have clients who are on the move and will do daily or twice daily sessions for a week or so with the benefits flowing on over time post NeurOptimal® training. In short, any frequency of training is better than none and we can work out an individual programme to suit your lifestyle and budget.

10. CAN I IMPROVE RESULTS?

Before The Session:

Avoid stimulants such as caffeine & coffee immediately prior to the session along with alcohol & illicit drugs. Also avoid eating a large meal an hour or so prior otherwise you may be energetically lethargic during the session. Besides this there is nothing else you need to do other than come along to gain the benefits of NeurOptimal® Neurofeedback training.

During The Session:

With NeurOptimal® there is simply no need to control your thoughts, emotions, concentrate, think of anything in particular, or do anything else to make it work better. By the time you have consciously registered the interruption in the music your Brain has already responded to it. So there is nothing you need do or can do during the session that will improve outcomes, other than be as you usually are. You can simply recline and enjoy the peacefulness of the session. This is why training with NeurOptimal® results in such powerful and long lasting outcomes: The whole brain and mind is involved - not just the conscious mind.

After The Session:

After the session it is fine to return to your normal activities where you will notice the improvements. When possible, immediately after the session, avoid inappropriately stressful environments so that you can allow the training benefits to progress and continue to develop.

Client Forum:

All people training with NeurOptimal® providers whom are on our provider directory have access to a [Client Forum](#). This is a forum where you can ask additional questions, explore the potential of training, engage in discussion with other people whom are utilising NeurOptimal®, and have access to the experienced Neurotribe team.

Resource pages:

Neurotribe has dedicated and comprehensive [resource sections](#) for additional strategies and activities that you can do to contribute to health and wellbeing generally.

11. WHY NEUROOPTIMAL®?

Other types of Neurofeedback:

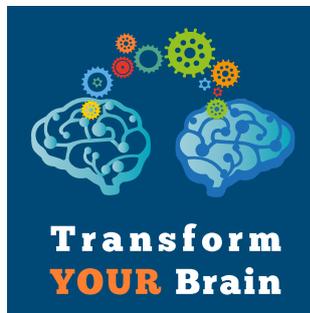
Whilst some of the aspects that separate NeurOptimal® from other types of neurofeedback training are evident from the detail I have provided above, there is additional important information. Most other types of Neurofeedback are involved in direct intervention or manipulation of the frequencies the brain produces. Whilst they can be effective, compared to NeurOptimal® there are inadequacies with these approaches:

- Because the brain is being pushed or pulled in this manner there is an increased likelihood of side effects.
- There is less opportunity for the brain to find its own balanced optimal processing as it is being forced to comply to a preconceived notion of what is right for it.
- There is less opportunity for the brain to develop the flexibility, adaptability and resilience that comes from NeurOptimal® training.
- It is an external intervention that reinforces the thinking the brain cannot do it and needs something else over and beyond its inherent capacity and potential.
- There is very little opportunity for the brain to develop the learning that is necessary for smooth transformation and ongoing development independently of the neurofeedback device.

NeurOptimal® does not utilise any form of frequency manipulation or intervention. It recognises the dynamical complexity of the Central Nervous System as a whole and simply feeds back information to the brain in its own language, moment by moment, about what it has just done. This enables the Central Nervous System to utilise its inherent capacity for healing, self-organisation, learning, and transformation.

Entrainment Technology:

Whilst some manufacturers claim so, they are not neurofeedback devices. There are different types of entrainment and many different types of entrainment devices. Fundamentally, with aural beeps and/or flashing LED lights, it is possible to force the brain to produce any desired frequency or frequency combination. Compared to NeurOptimal®, entrainment devices are powerfully controlling and interventionist, with someone else determining what your brain should look like and defining what states are good for you. In short - Sledgehammer approaches to health, performance, and transformation that mostly do not work with your natural ability to achieve these outcomes. Similar inadequacies as those for interventionist types of neurofeedback apply including increased risk of side effects.



Written by John Thompson, founder of the Neurotribe project.

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