

Neurofeedback and Neuromodulation Basics

The Braincollective

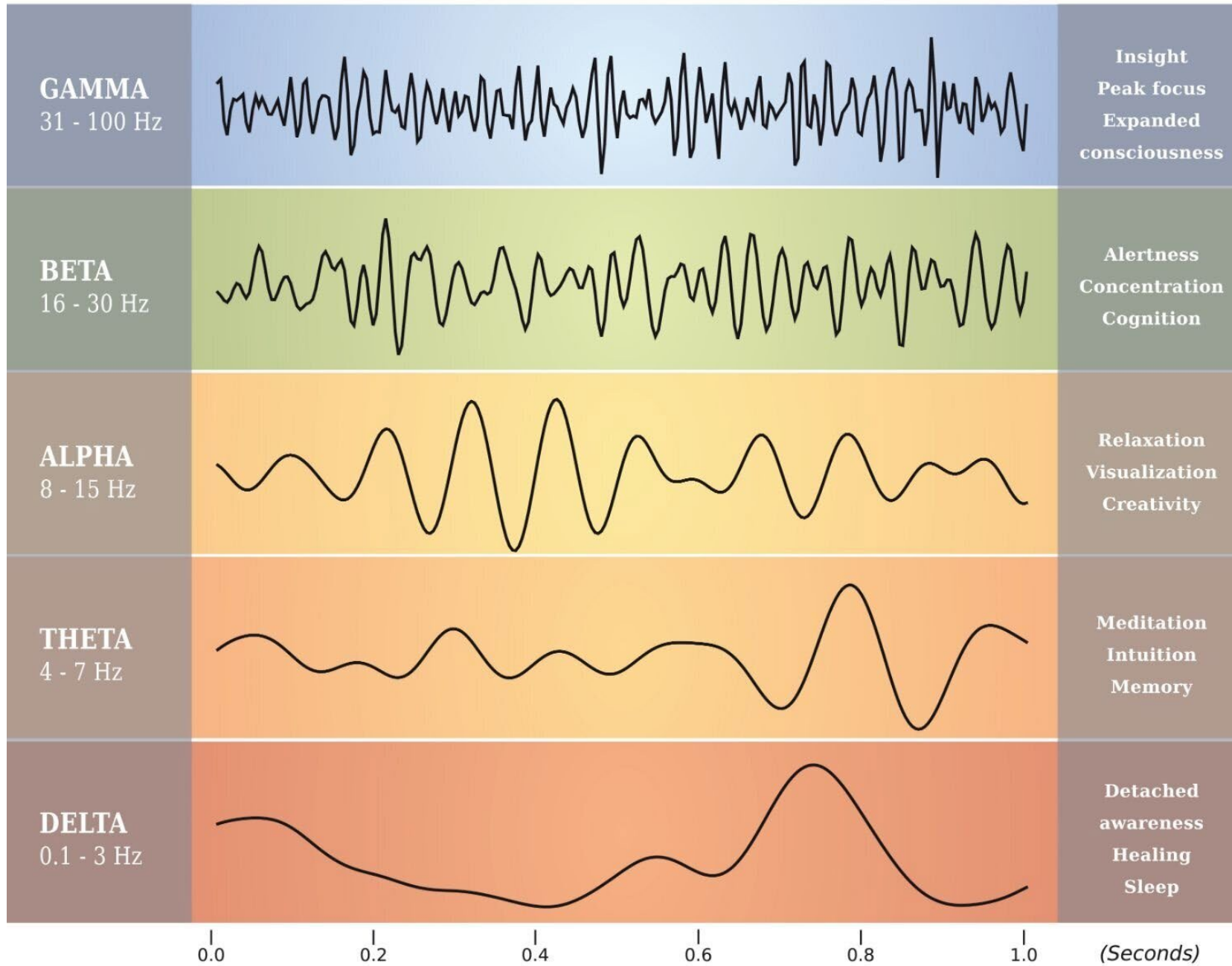
What is Neurofeedback?

- Neurofeedback is a non-invasive treatment that encourages the brain to develop healthier patterns of activity. The goal of treatment is not only to change how you think and feel, but also to change your brain on a biological level for better functioning.
- Recent research has shown that when given the proper support, the brain has the ability to change and adapt, a property known as neuroplasticity. **Neurofeedback can encourage and speed up this process of neuroplasticity.**
- Words alone are often not enough. Simply telling someone to calm down or focus doesn't solve the underlying issues of conditions like anxiety or ADHD. On the other hand, **neurofeedback allows us to speak to the brain with its own language: brain waves.**

What is a Brain Wave?

- **Our brain cells communicate through electrical impulses known as brain waves.** Each brain wave has two properties:
 - Frequency, which is how fast the wave travels.
 - Amplitude, which is how tall the wave gets when it goes up and down.
- **In general, faster brain waves are associated with focus, thinking, and awareness, while slower brain waves are associated with relaxation, meditation, and deep sleep.**

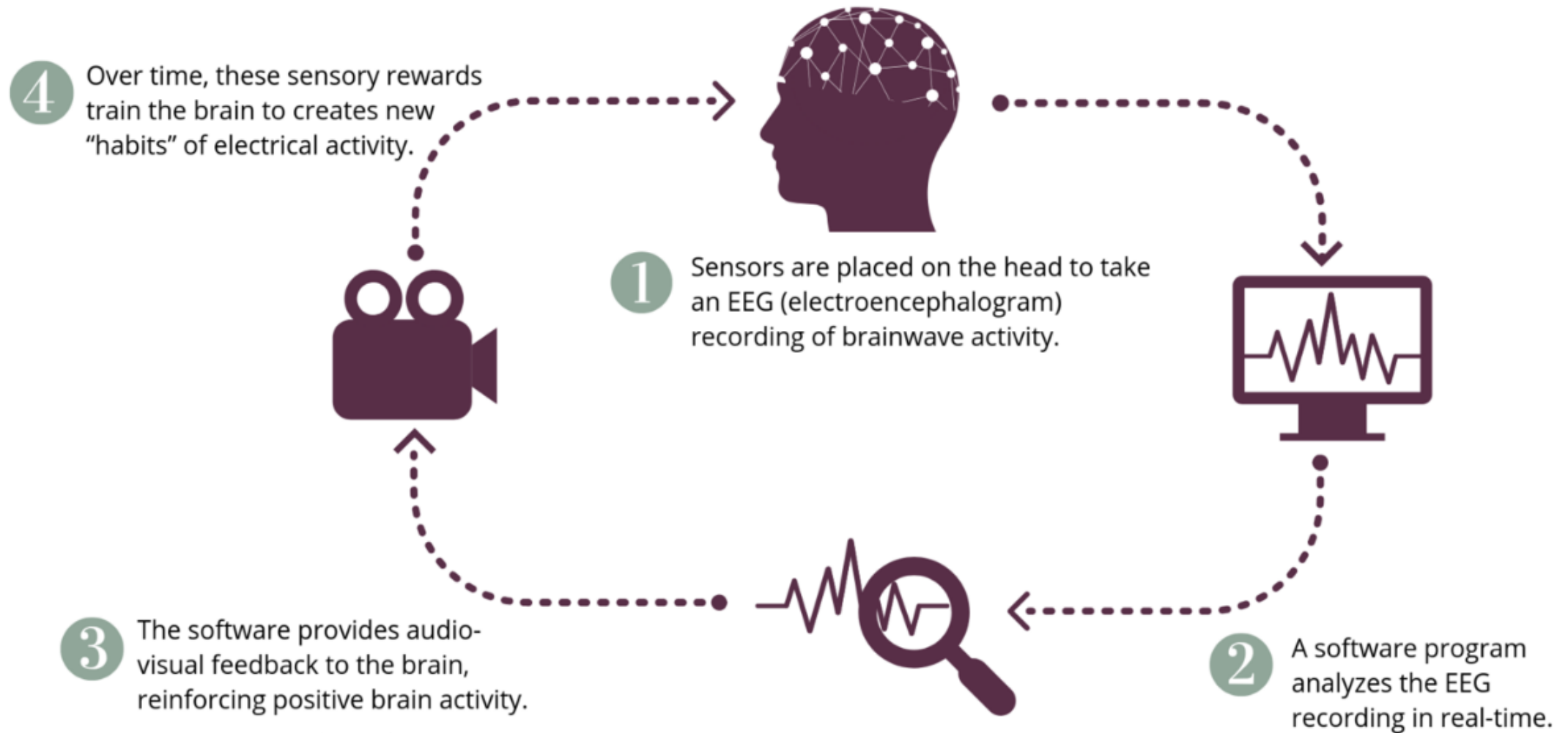
HUMAN BRAIN WAVES



Mental Health Disorders

- **In mental health disorders, brain wave patterns can become disrupted, leading to unhealthy biological activity and behaviour.** For example, people with anxiety disorders often have too much fast brain wave activity, which leaves them feeling on edge, hyper-aroused, and panicky. On the other hand, those with ADHD can have an excess of slower brain wave activity, resulting in symptoms like brain fog, daydreaming, and trouble focusing.
- **The goal of neurofeedback therapy is to help modulate these dysregulated brain wave patterns.**

How does neurofeedback work?



How does Neurofeedback work?

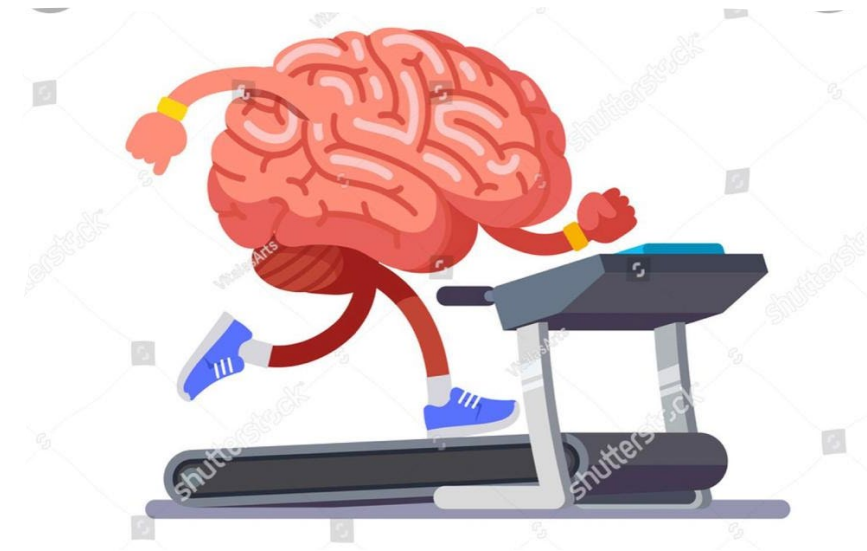
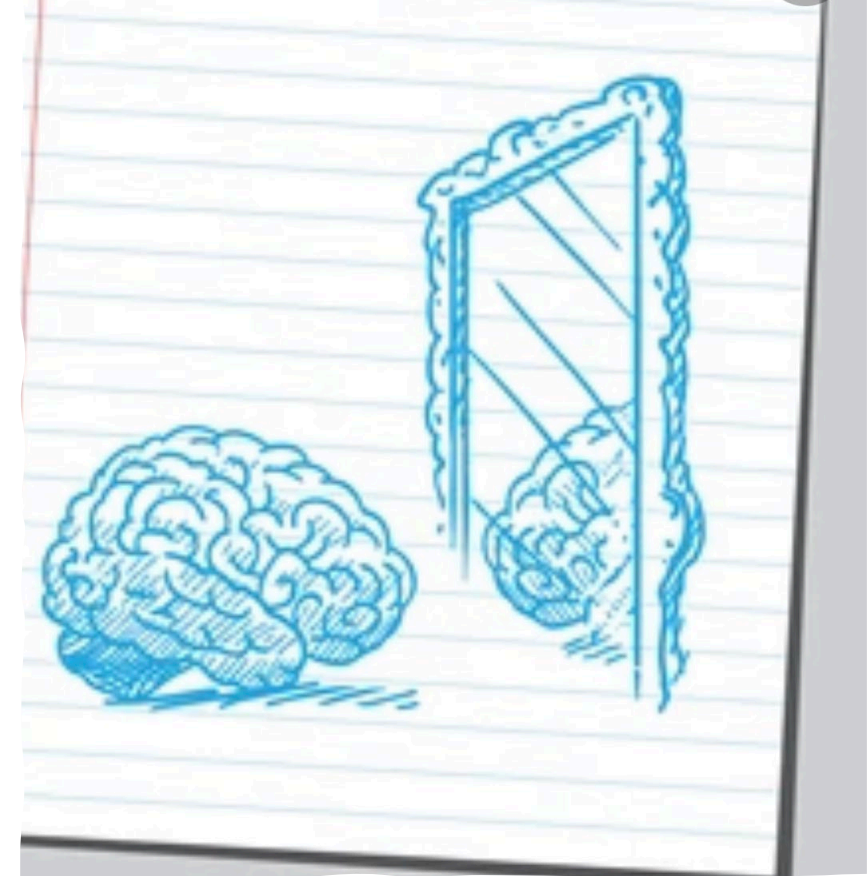
A typical Neurofeedback session follows these basic steps

- 1. Set goals for treatment.** Goals are based on a patient's condition and the type of neurofeedback system.
- 2. Measure brain wave activity.** A clinician starts by placing electrodes on a patient's scalp to obtain a real-time measurement of their brain waves (i.e. electroencephalography, or EEG). After set-up, the patient may watch a movie, play a video game, or listen to music as neurofeedback training begins.
- 3. Train the brain with positive feedback.** When the EEG detects that a patient's brain wave activity has met the goals of treatment, the brain is rewarded with positive feedback.
- 4. Repeat training.** The EEG continues to monitor the patient's brain waves and give positive feedback when goals of treatment are met. This training loop gives the brain thousands of opportunities to self-correct and be rewarded in one session.

Training the brain with positive feedback is based on the principles of learning theory, or operant conditioning, and is similar to how we train a dog to sit by rewarding it with a treat. Our brains, like animals, are constantly seeking rewards.

Neurofeedback

- NOT about forcing the brain to go somewhere.
- Rather, a mirror to the brain of its own activity.
- Improves self-perception
- Promotes self-organised auto-correction processes
- Results in better regulation, flexibility and stability.
- Through repetitive training, the brain can learn to regulate itself better in the long term by establishing new neural connections.



In a nutshell.

- **In a nutshell:** Our brains use brain waves to communicate and function properly. These brain waves may become dysregulated, which can lead to psychiatric or neurological symptoms. Neurofeedback is a non-invasive treatment that addresses imbalances in brain wave activity to help patients achieve deeper healing and better functioning.
- Brain waves are involved in all brain activity and functions so this intervention can be used for a wide range of brain-based conditions:
 - Peak Performance
 - Neurological issues and brain injuries
 - Mental health issues
 - Developmental delays and behaviour disorders