



Neurofeedback for Developmental Trauma

What is it? How does it work?

How does it help those with DTD?

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Neurofeedback. What is it?

- AKA : “Brainwave training”, EEG Neurofeedback/Biofeedback, Brainwave Biofeedback Neurotherapy, Neurobiofeedback”
- Definition: Use of instruments to mirror brain/body processes that one is usually unaware of, which may be brought under voluntary control (taken in part from Thompson and Thompson, 2015)

Processes we are Unaware of i.e.: our body learning to balance



Processes we are Unaware of

i.e.: heart rate and finger temperature



Processes we are unaware of
i.e.: neurons firing in our brains

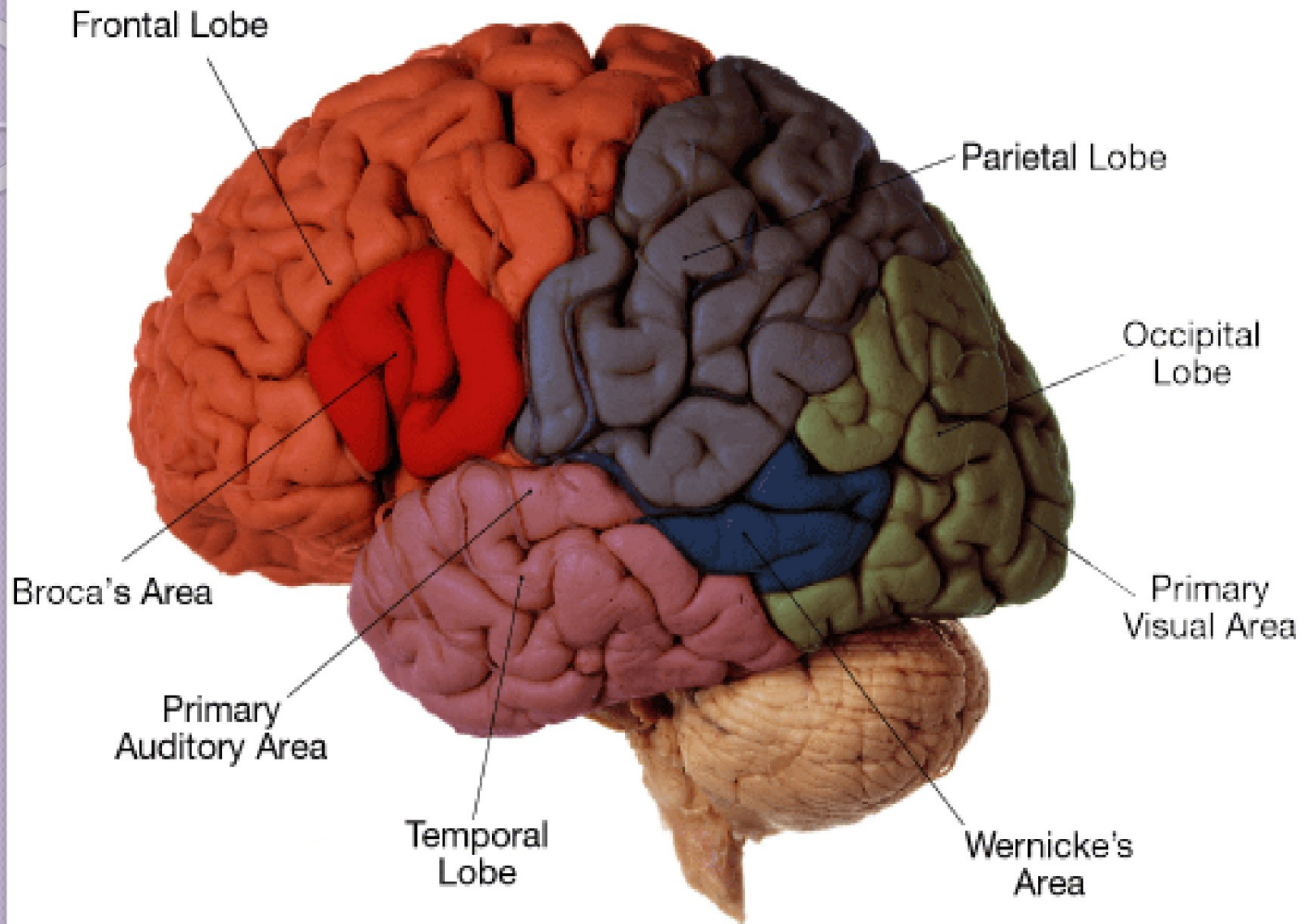


Brain Factoids

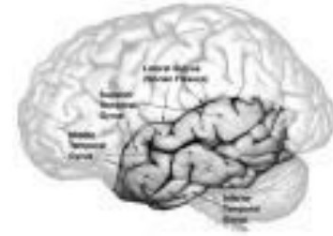
- The brain is the best organized 3 lbs of matter in the universe!
- It is 2% of the body mass using 20% of the oxygen you breathe.
- **100 Billion** Brain Cells with...
- 10,000,000,000,000 Connections (10^{13} SYNAPSES!)
- 1000 types of cells
- Over 100 chemicals



The Lobes of the Brain



Temporal Lobes



- Understanding/ processing language
- Auditory and Visual learning
- Word retrieval
- Intermediate/ long term memory
- Complex memory
- Emotional stability
- Recognition of facial expression
- Decoding vocal intonations
- Rhythm

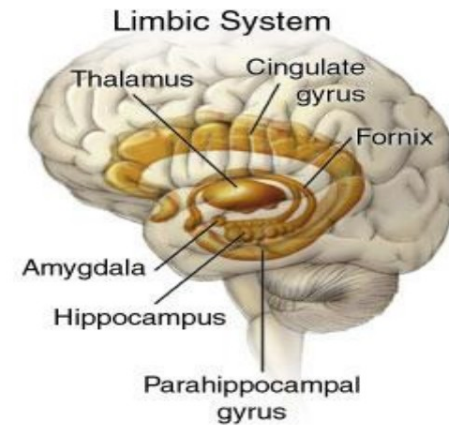
Limbic System

Functions

- Set emotional tone
- Assign emotional coloring to external events
- Tag events as important
- Modulate motivation
- Control appetite and sleep cycles
- Promote bonding
- Process smell
- Modulate libido

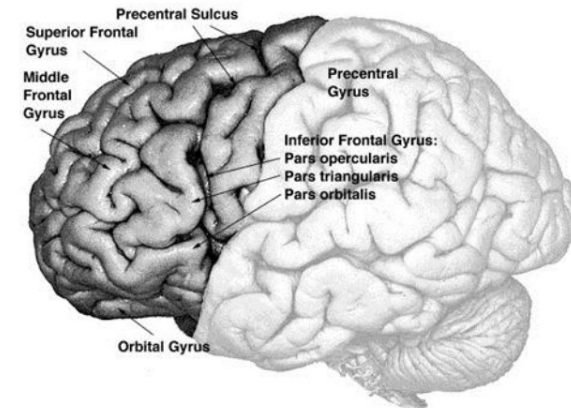
Problems

- Moodiness, irritability, depression
- Increased negative thinking and perception, and emotions
- Decreased motivation
- Appetite and sleep problems
- Increase or decrease sexual responsiveness
- Social isolation



Prefrontal Cortex

the executive center



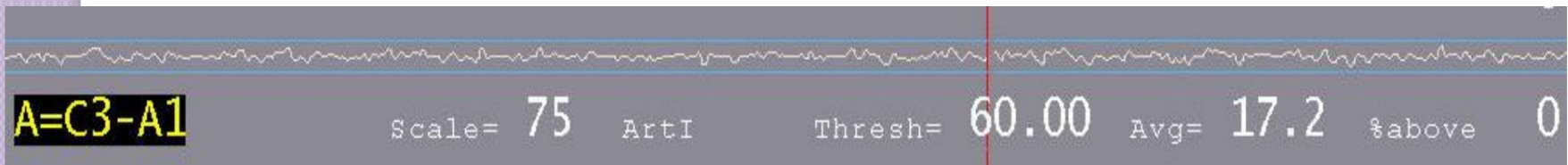
- Judgment/ Attention span
- Perseverance
- Impulse control
- Organization
- Self monitoring and supervision
- Problem solving
- Critical thinking
- Forward thinking
- Learning from experience
- Ability to feel and express emotions
- Interaction with limbic system
- Empathy

How it Works

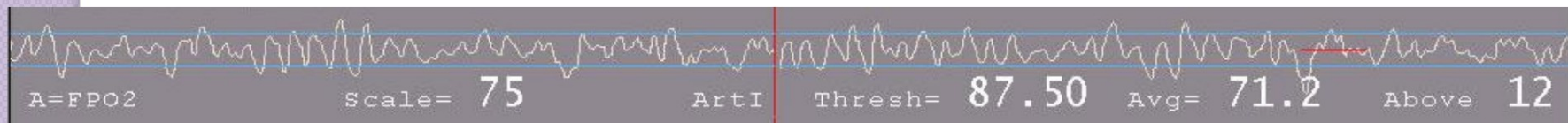
“Small” activated EEG is more normal.

“Taller” EEG has excessively slow or fast activity. Goal – reduce this activity.

Normal EEG :your brain is more “in tune” - more alert, focused, calm, efficient

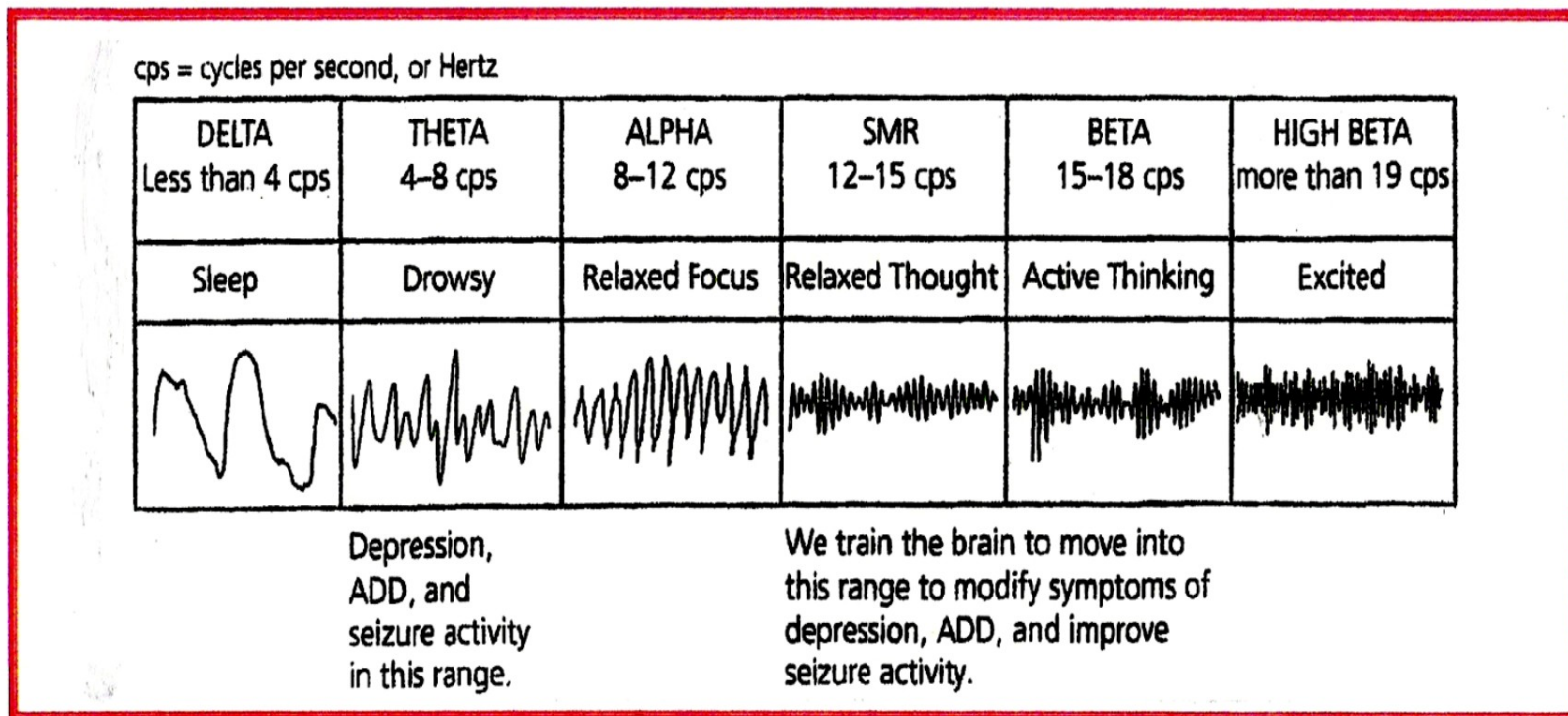


Excessive slow or fast EEG : Causes you to work harder. Brain is less efficient; harder to control and regulate emotion, behavior



Arousal Level and Brain Waves

The **RATE** of **BRAINWAVE FIRING** is related to our state of arousal.



Key Points

- Changing the EEG in targeted ways improves how the brain regulates itself
- When the brain waves are well regulated, the individual functions better

Beginning Neurofeedback...

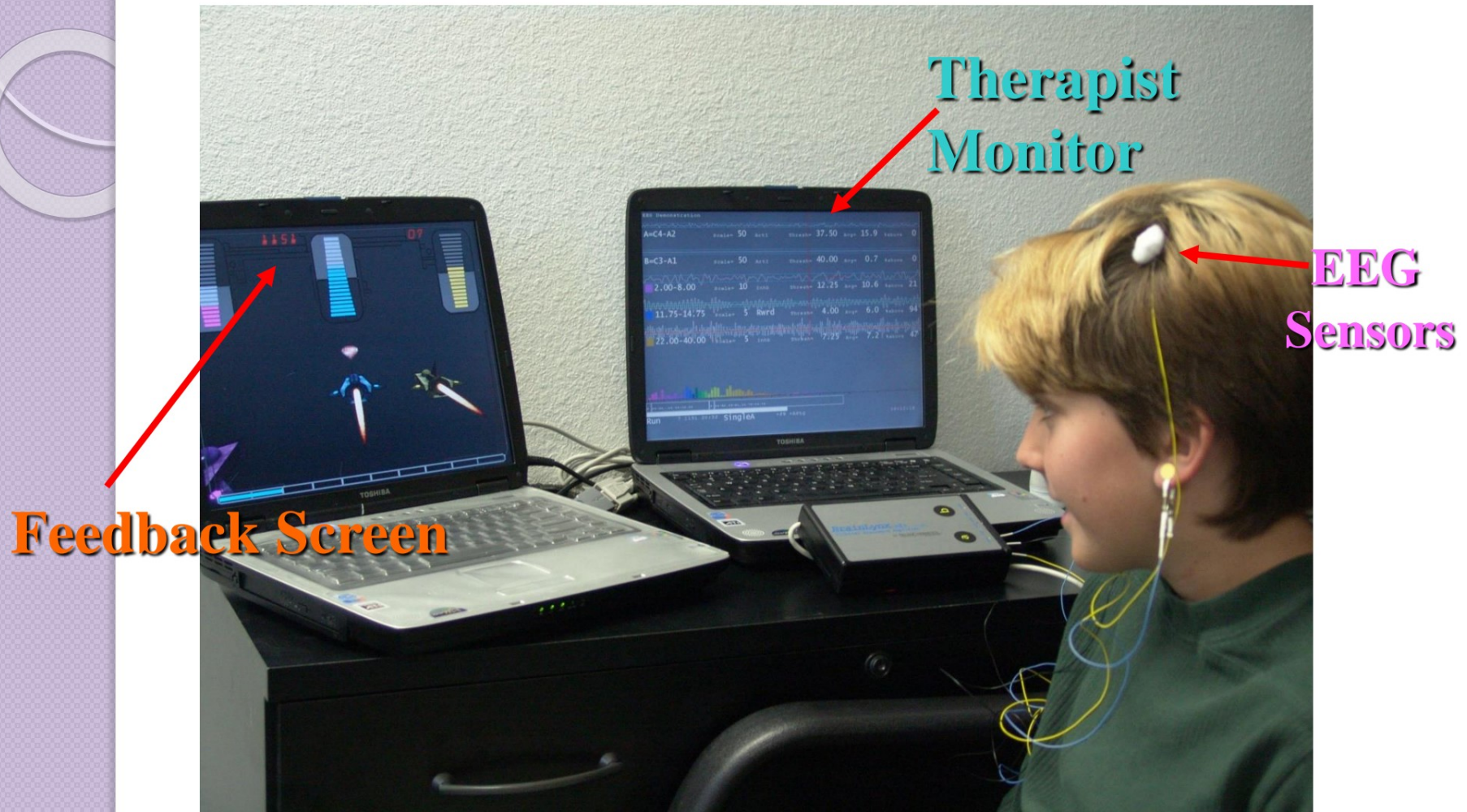
what to expect

1. Intake – expect it to be comprehensive
2. Brain Map or qEEG for baseline measures.
3. Agreement about monitoring, goal setting and being prepared for training.
4. Training days: sleep well, eat well, do not change medication regime unless directed, arrive with clean and dry hair.

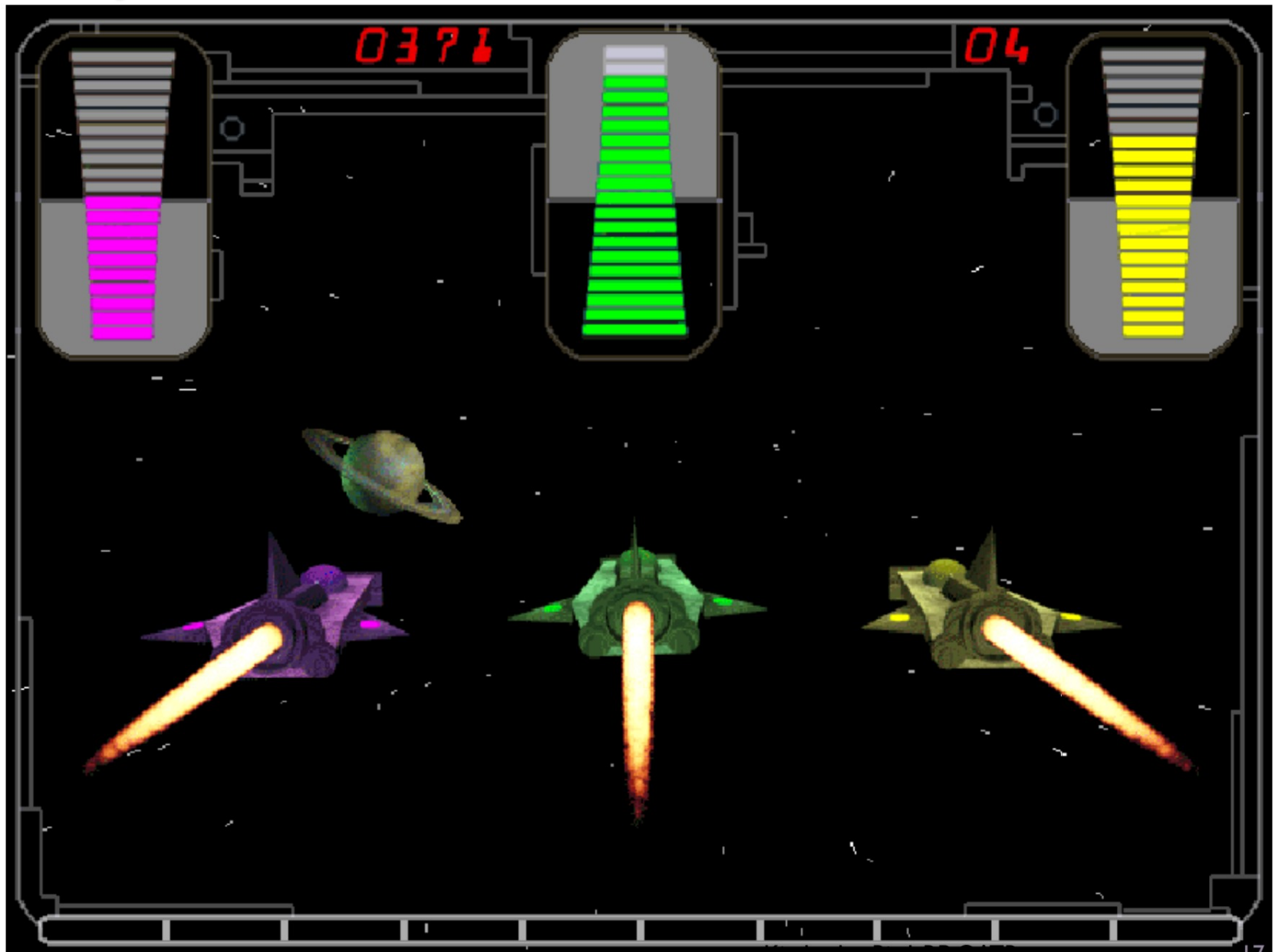
What to expect cont'd

5. You will be asked to report on changes you have noticed. Use of rating scales is common
6. Training is usually 1-3 times per week.
7. Each training session is usually 45-60 minutes in length. Training is usually combined with therapy.
8. Review progress every 10-20 sessions.
9. Clients with DTD may require 50 or more sessions and slow weaning off.

Therapist and client/game screen

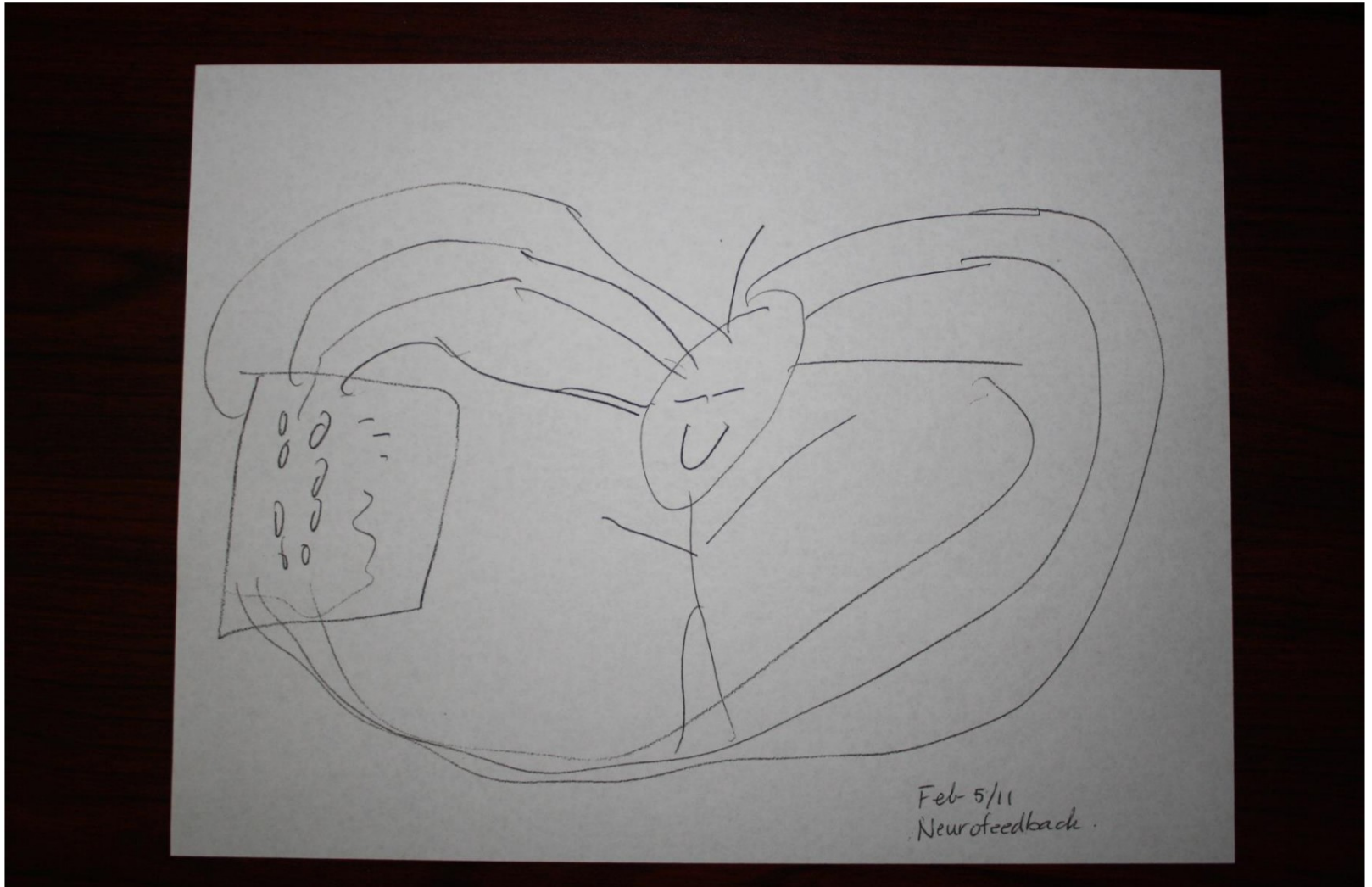


Space Race



How does it help those with DTD?

My Experience



How does it help those with DTD?

- Regulates the firing pattern of the brain in affected areas: right temporal and parietal lobes especially
- Affective changes: warming up and calming down, less reactive, less fear, increased capacity for empathy, more spontaneous, more cohesive sense of self, assertiveness that is well tolerated by others.
- Lower reactivity makes client more accessible in therapy

Caution...

- Neurofeedback is Not Regulated in Canada, though there are voluntary certification programs (BCIA).
- Find a reputable Neurofeedback Clinician through BCIA, EEG Spectrum, and through Member lists from recognized training programs.
- For DTD, the Neurofeedback Clinician should be a Psychotherapist or other licensed mental health professional trained to work with this population.

Studies re Effectiveness

- Duffy FH (2000). The state of EEG biofeedback therapy (EEG operant conditioning) in 2000: an editor's opinion *Clinical Electroencephalography*, 31, v-vii.
- Egner T, & Gruzelier JH (2004). The temporal dynamics of electroencephalographic responses to alpha/theta neurofeedback training in healthy subjects. *Journal of Neurotherapy*, 8, 43-57.
- Fernández T et al (2003). EEG and behavioral changes following neurofeedback treatment in learning disabled children *Clinical Electroencephalography*, 34, 145-52
- Hirshberg LM (2005). Emerging brain-based interventions for children and adolescents: overview and clinical perspective. *Child and Adolescent Psychiatric Clinics of North America*, 14, 1-19
- Lubar JF & Lubar JO (1999). Neurofeedback assessment and treatment for attention deficit/hyperactivity disorders (pp. 103-143). In JR Evans & A Abarbanel (Eds), *Introduction to quantitative EEG and neurofeedback*. San Diego: Academic Press.
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- Serman, M.B. (1996). Physiological origins and functional correlates of EEG rhythmic activities: Implications for self-regulation. *Biofeedback and Self-Regulation*, 21, 3-33.
- Trudeau DL (2005). Applicability of brain wave biofeedback to substance use disorder in adolescents. *Child and Adolescent Psychiatric Clinics of North America*, 14, 125-36

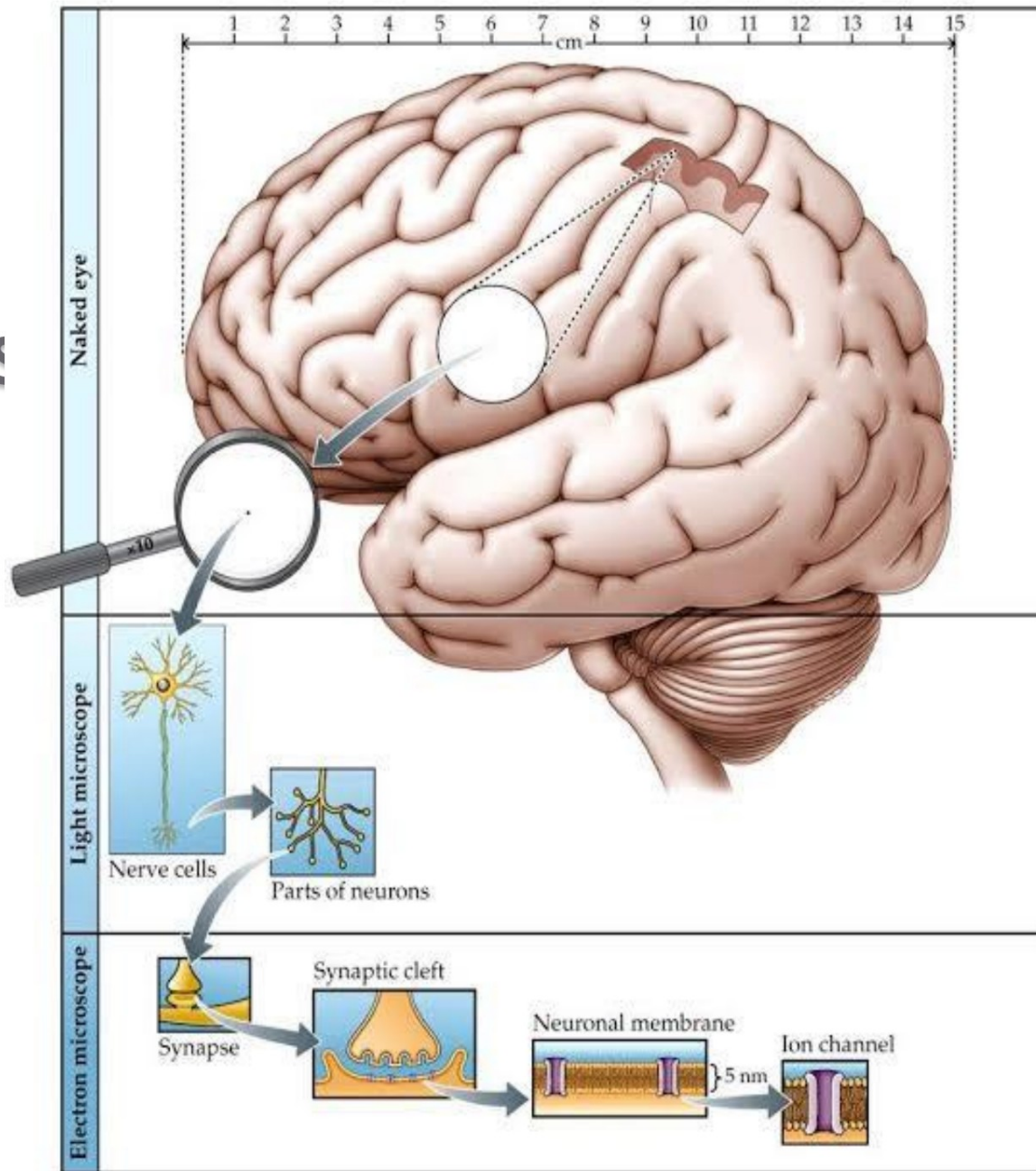
Therapeutic Applications that have Evidence to Support Use

- Addiction
- Anxiety
- Attachment Disorder
- Attention Deficit Disorder
- Autoimmune Dysfunctions
- Chronic Fatigue Syndrome (CFS)
- Chronic Pain
- Conduct Disorder
- Depression
- Epilepsy
- Sleep Disorders
- Stroke/TBI
- Tourettes Syndrome

Additional Links and Reading

- **NeuroFeedback Research 2015 at Boston's Trauma Center (You tube)**
- www.bcia.org
- www.isnr.org
- Neurofeedback in the Treatment of Developmental Trauma, Calming the Fear Driven Brain by Sebern Fisher, 2014
- Google: Michael Cohen, Ed Hamlin Ruth Lanius (Canadian at UWO)

The brain is both electrical and chemical



How did it begin?

- Space ships and cats
- One's **Arousal** level is affected by electrical activity in the brain.
- Neurofeedback is training of the electrical activity

- Based on ***Operant Conditioning*** and **Classical Conditioning**
- Training brain waves to be calm and attentive, rather than sleepy or scared.
- Nothing goes “In” !! The sensors pick up your brain activity and shows it to you on the computer screen.
- The feedback process informs the client about their success in making changes.
- Computer games that “go” when your brain is in the right state

Understanding the Basics: Arousal Level

- Arousal level is reflected in our thinking, feeling and behaviour.
- Examples of difficulties with arousal level: ADHD, Attachment Disorders, Depression, Anxiety, PMS, seizures
- Attachment disorder is a result of Severe Over Arousal. It is a fear based disorder (survival response)

Sebern Fisher's thoughts:

- *Optimal mental health is characterized by*
Regulation of Affect,
Lack of fearfulness,
Lack of reactivity,
Flexibility/resiliency,
Open heartedness,
Relaxed attention.
- *These capacities are impaired after significant trauma or Relational Trauma*