Neurofeedback and Neuromodulation in the Treatment of Childhood Psychiatric Disorders- special emphasis on adoption

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Our Backgrounds

- Larisa
- Dan

What is neurofeedback?

- It is the interaction of the person with neurophysiological information from the brain that allows the individual to either consciously or unconsciously control what is happening internally, and by doing so increase the capacity of the brain to do work in the real world.

Two paradigm shifts

- Paradigm shift from thought processes to brain dynamics
- Paradigm shift from a neurotransmitter understanding of brain dynamics to a Hemodynamic and Bioelectric understanding of brain dynamics.

What kinds of problems do we see with adopted children who come to our clinic?

- Problems with attention and learning (getting things done, lack of synchrony in the classroom)
- Problems with self regulation- (short fuse)
- Problems with empathic attachment (rigidity and ego-centrism)
- Instabilities- migraines, panic attacks etc., Bipolar disorder
- Acute stress and family relationship problems
- Developmental trauma

Additional Problems

- Dealing with a non-adopted sibling with serious mental illness problems
- The same problems we see everyday with children who are not adopted (anxiety, depression, conduct problems, OCD, etc.),
- Pediatric autoimmune neuropsychiatric disorders (PANDAS)

Hypoperfusion of the Frontal Cortex

HEGTALK1-AConceptual

file:///C:/Users/Ddins/Dropbox/HEG/HEG/HEGTALK1-AConceptualIntroductiontoHEG.pdf

peacefully with her mother.

Literature study examines brain areas involved in ADD/ADHD, Schizophrenia, and Autism.

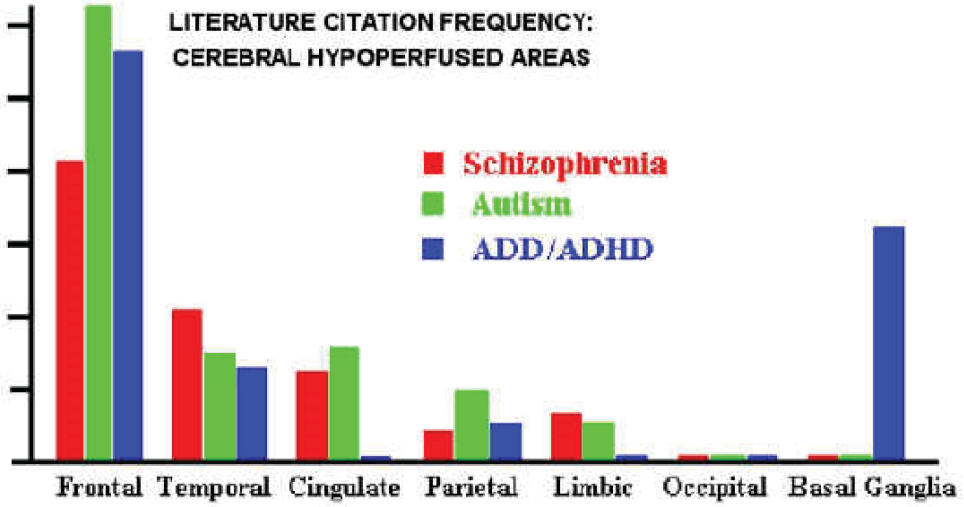
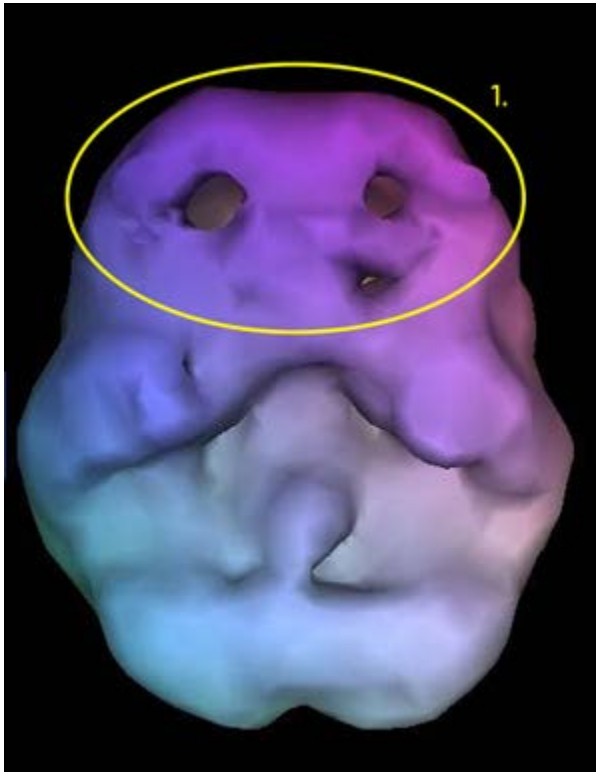


Fig. 5

Fig. 5
The National Library of Medicine search turned up many imaging studies of Autism, Schizophrenia and ADD/ ADHD disorders (Andreason et al.). The citation frequency for hypoperfused brain modules is illustrated here.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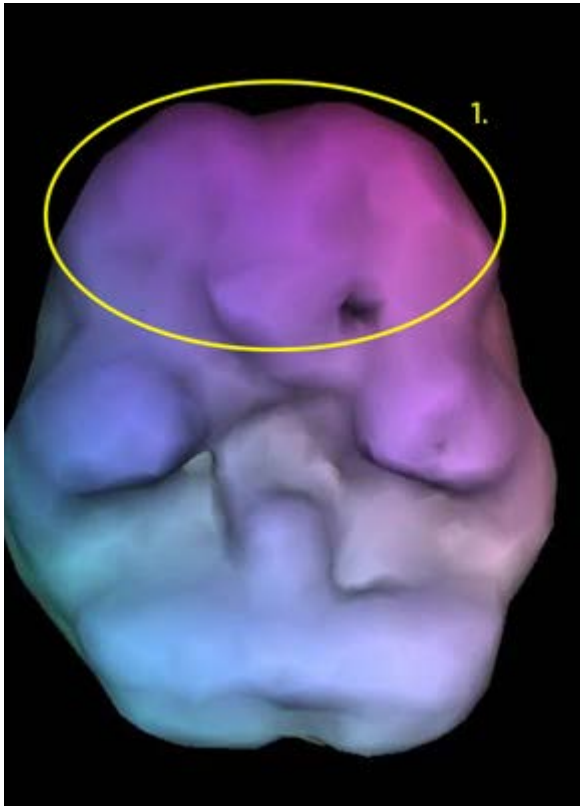
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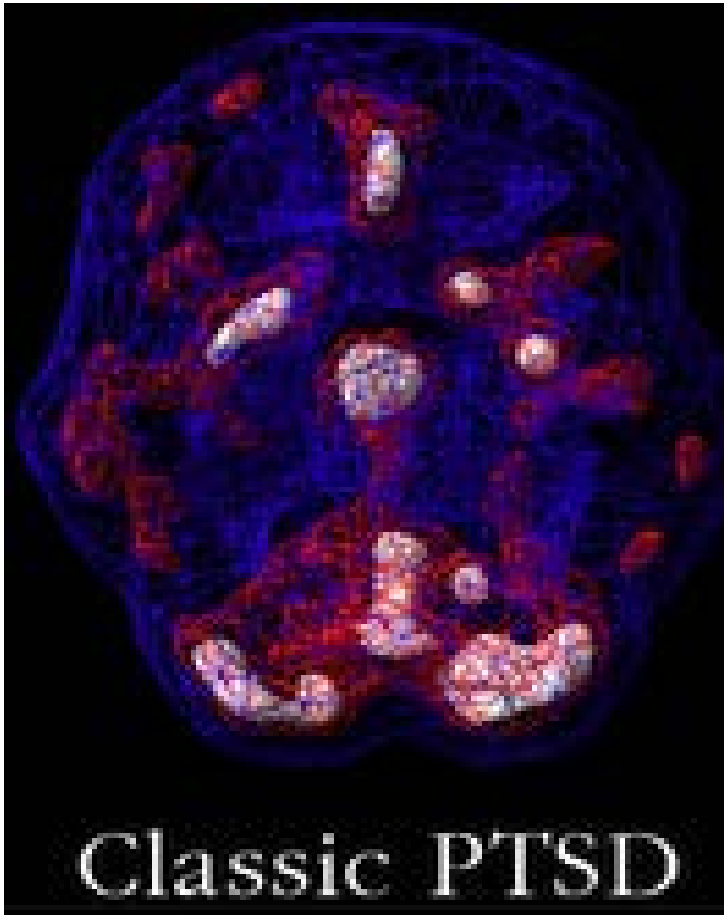
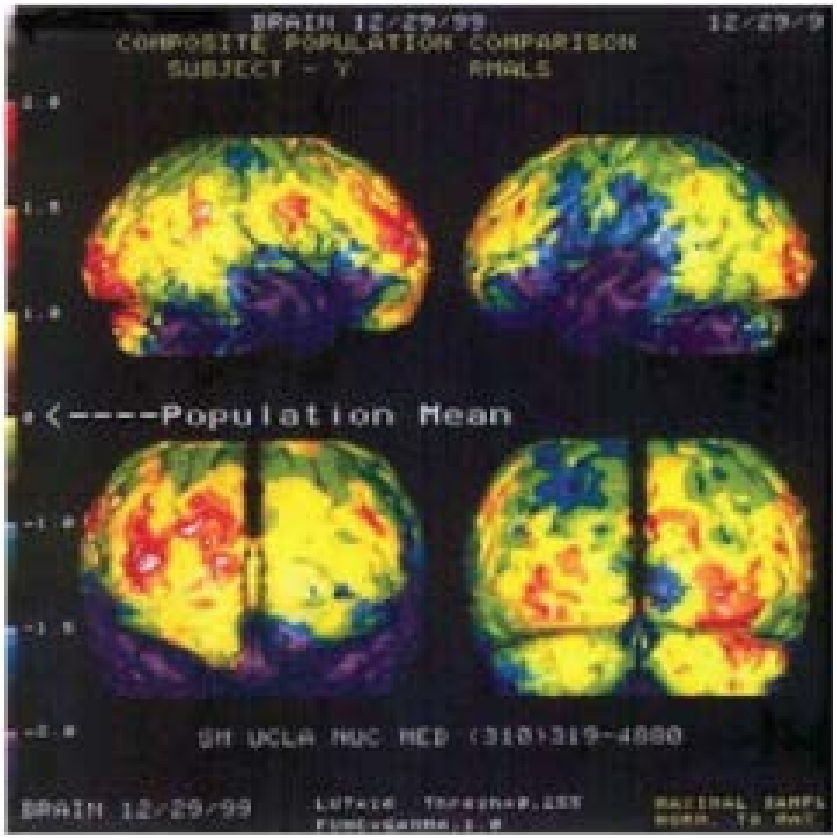
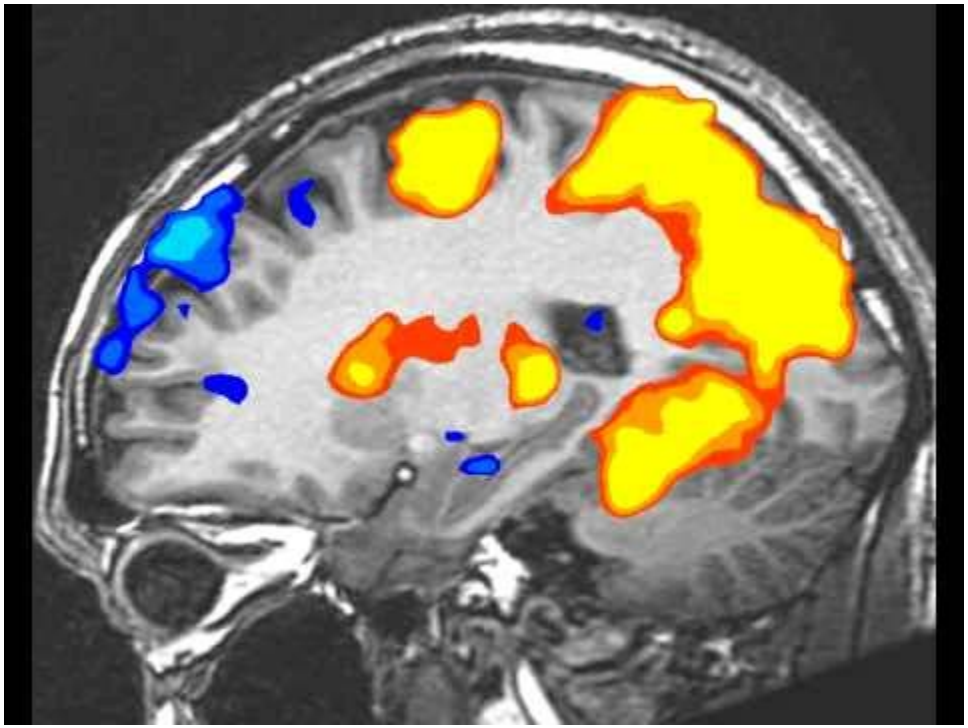
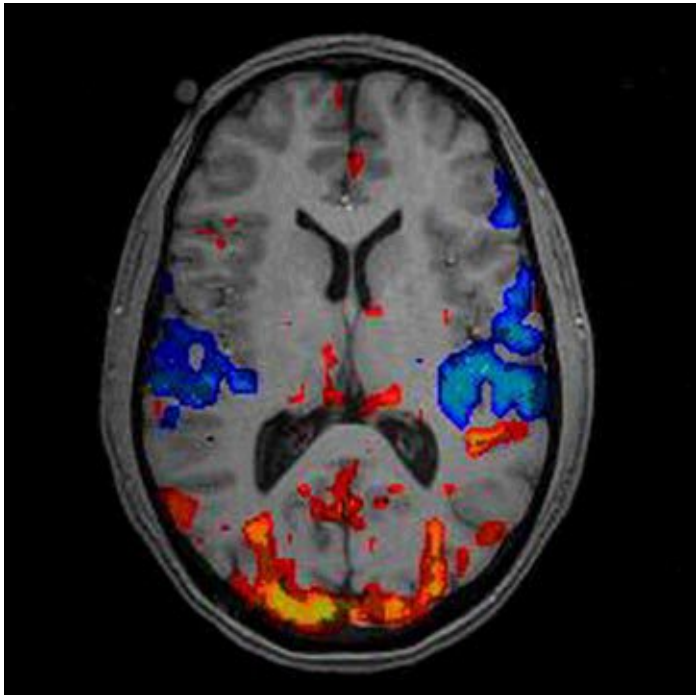
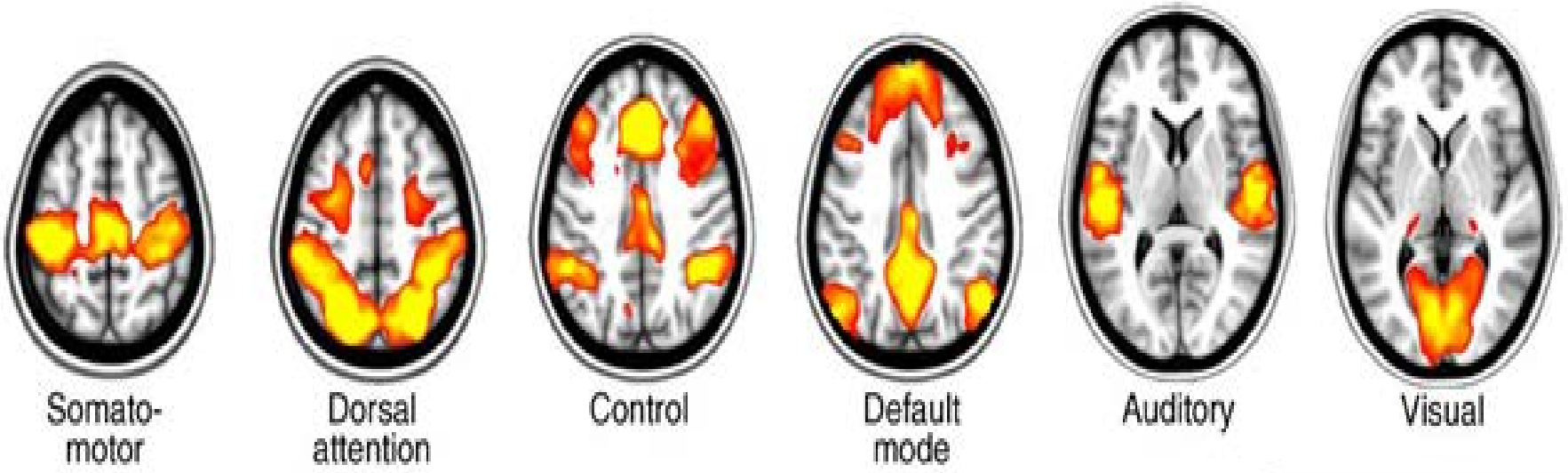

Classic PTSD

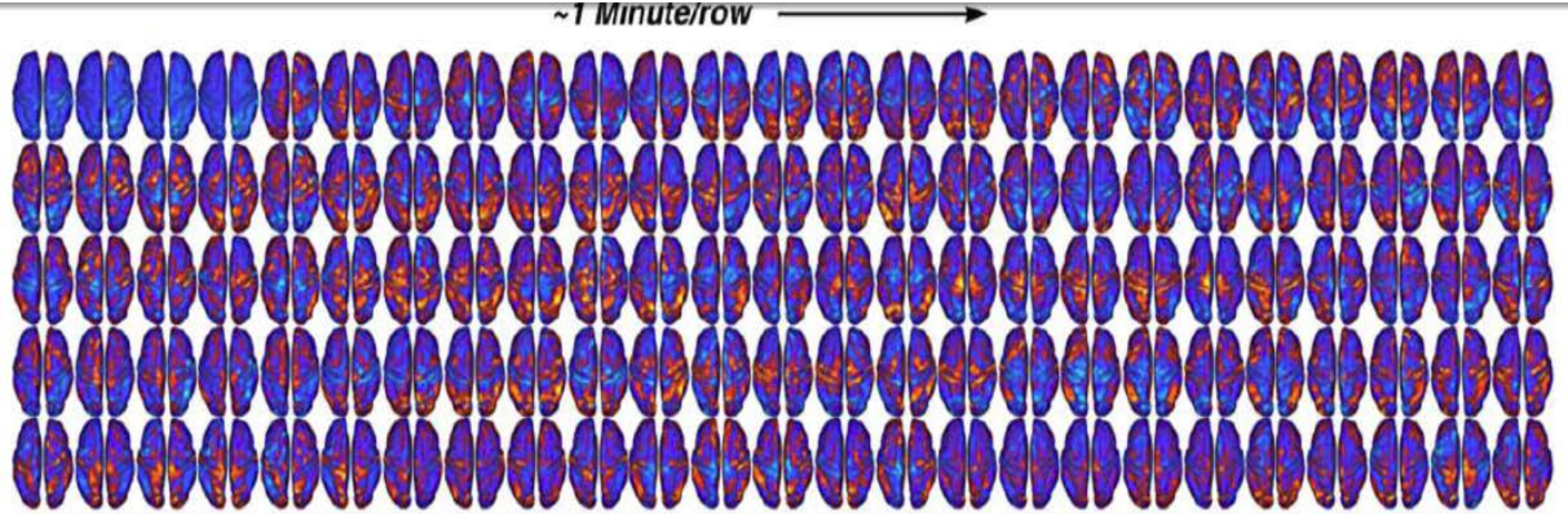

BRAIN 12/29/99
COMPOSITE POPULATION COMPARISON
SUBJECT - Y
RMALS
<-----Population Mean
UH UCLA NUC MED (310)319-4880
BRAIN 12/29/99



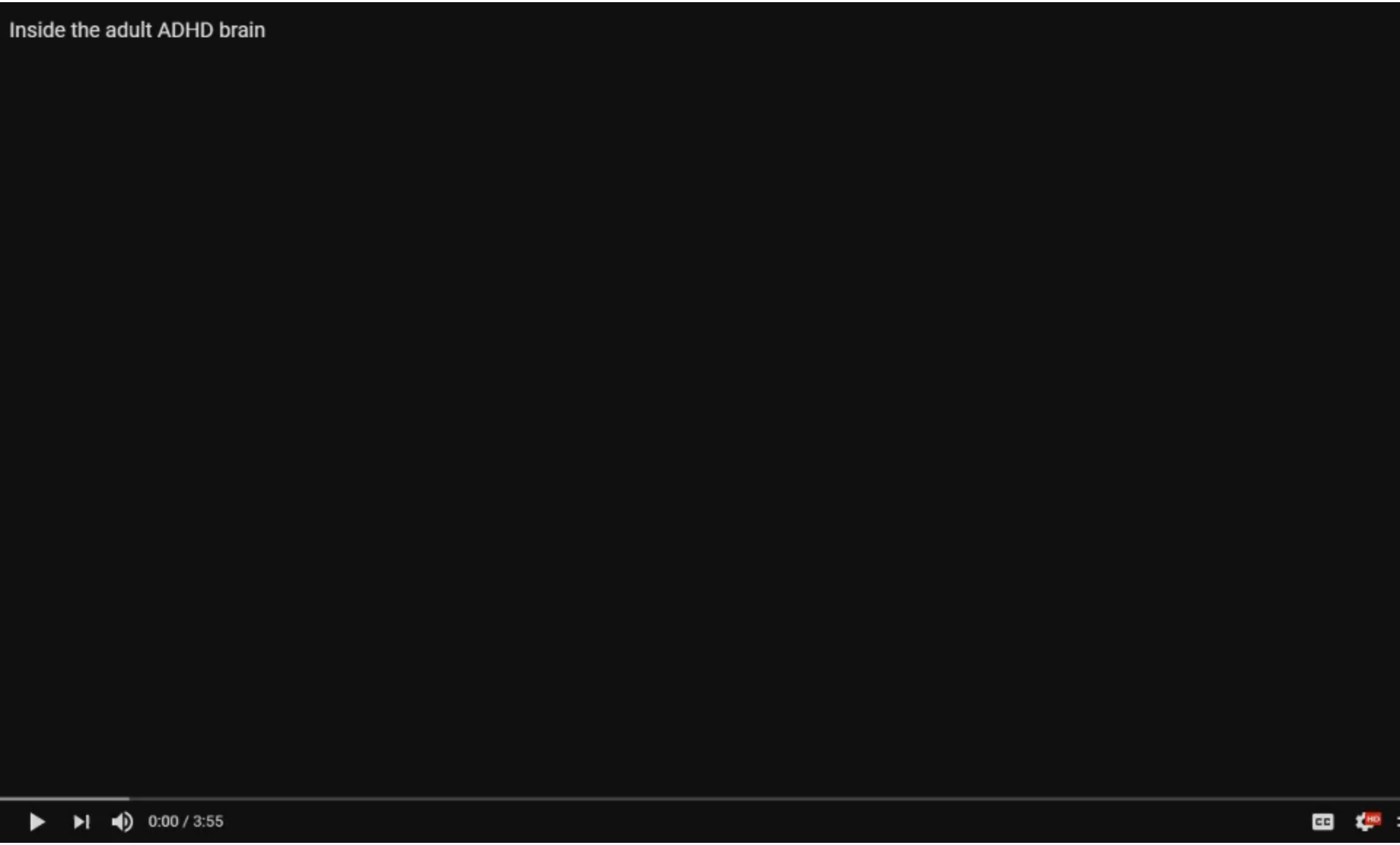




TRENDS in Cognitive Sciences


~1 Minute/row

McGovern Center Video

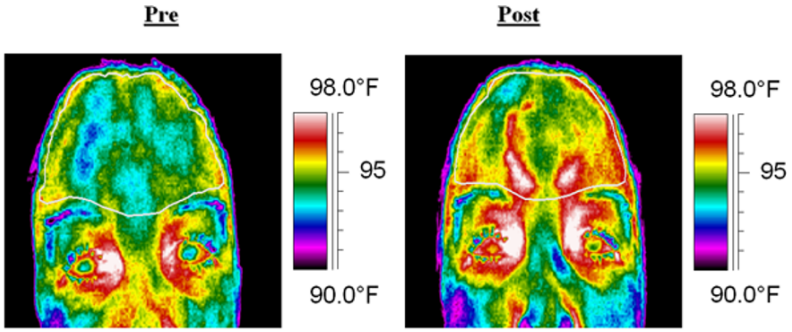


Why is this important?

- Because we can visualize these same processes in a simpler way to provide treatment.
- We can see not only how important brain areas are operating, but also brain networks, and how brain networks interact with each other.
- This gives us clues as to how to proceed with treatment, and confidence that we are proceeding in a useful way.

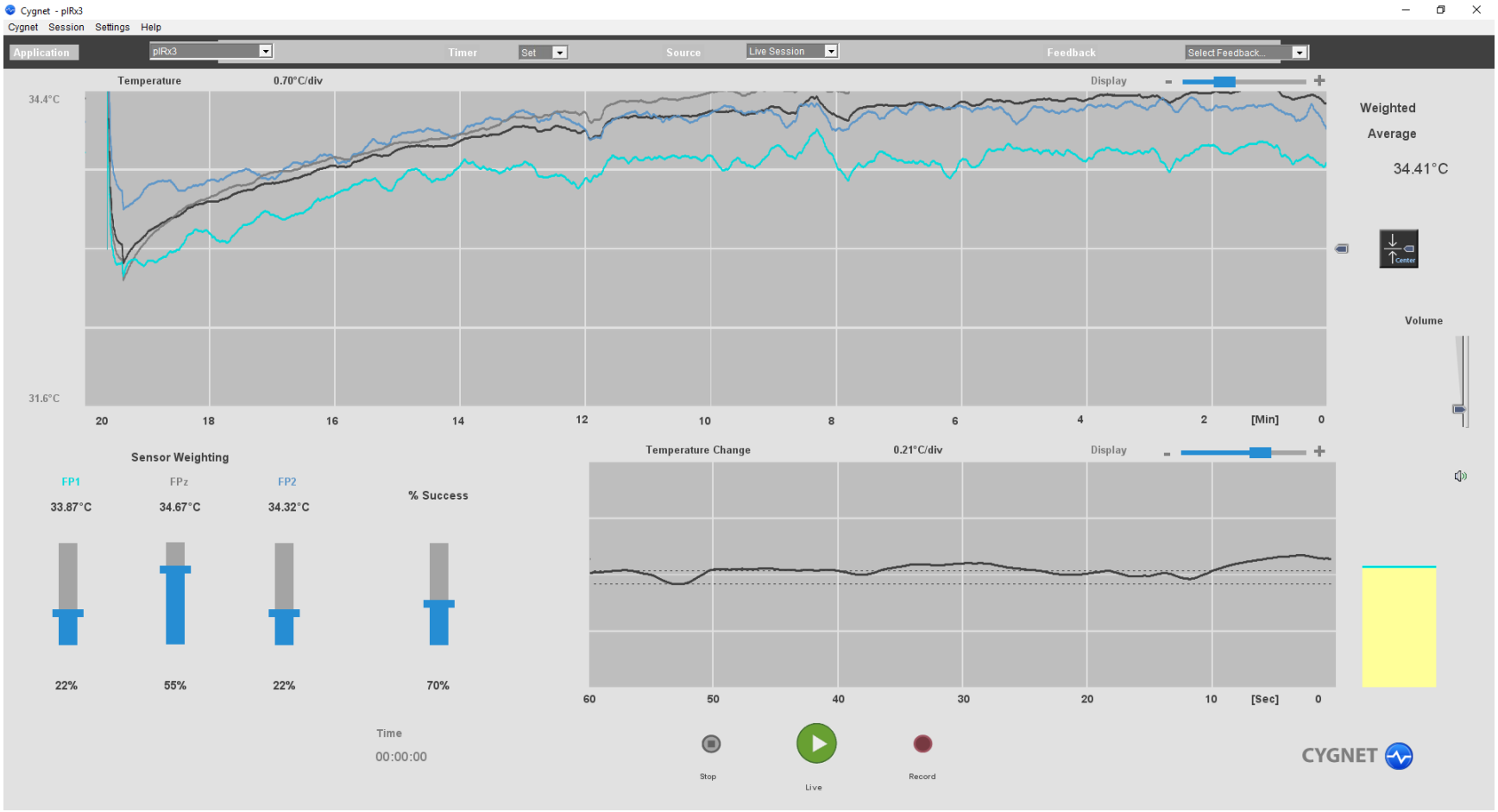
PFC temp data as seen by an infrared camera

FIGURE 3. Pre- and postinfrared images for pir HEG protocol for a patient diagnosed with traumatic brain injury.



vascular return. The addition of threshold... in range of thermal readings were observed

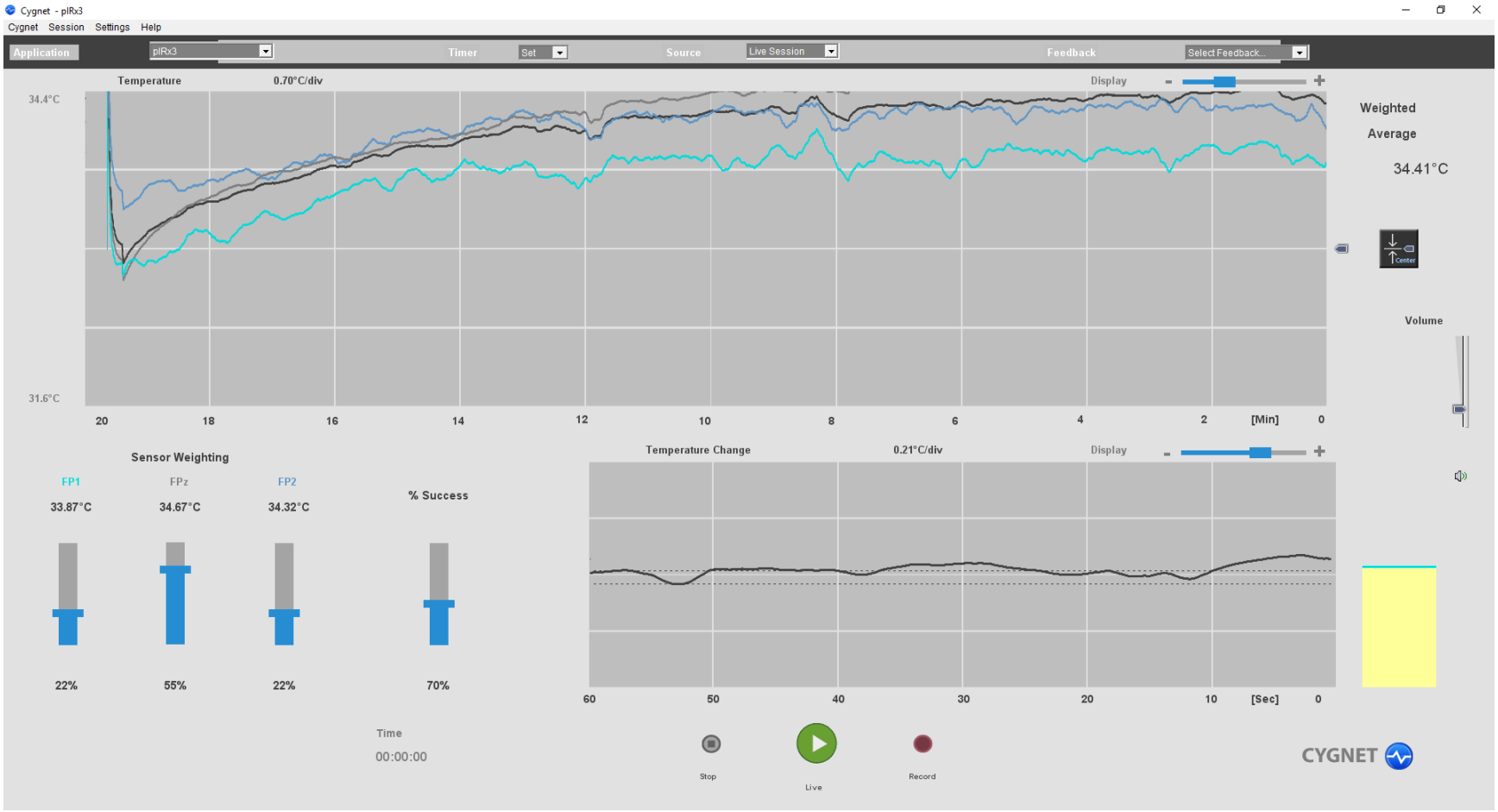
PFC temp data in a line graph



Dual Drive
Lap 1 / 2
2nd Place (2/4)
Inhibit
Reward

LAST
RABBIT

PFC temp data in a line graph



(permanent) changes in blood flow after treatment for a manic-depressive patient.

Single Photon Emission Computerized Tomography (SPECT), demonstrating blood flow pre- and post-treatment

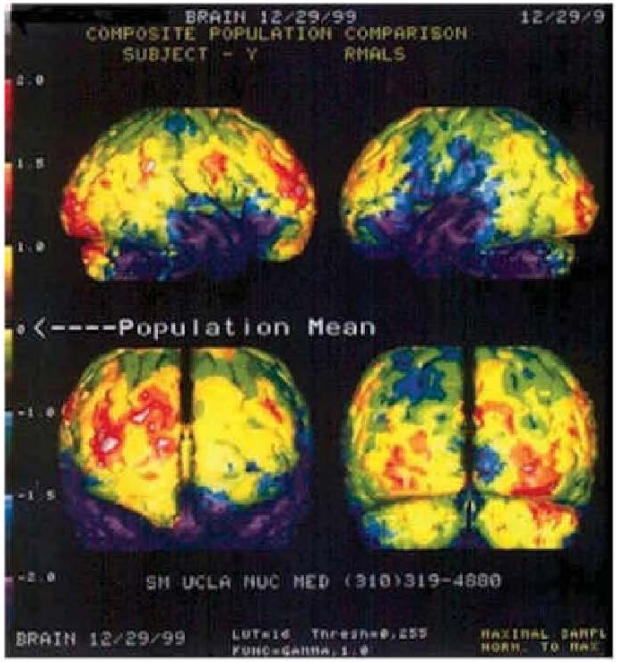


Fig. 3: SPECT study of manic depressed

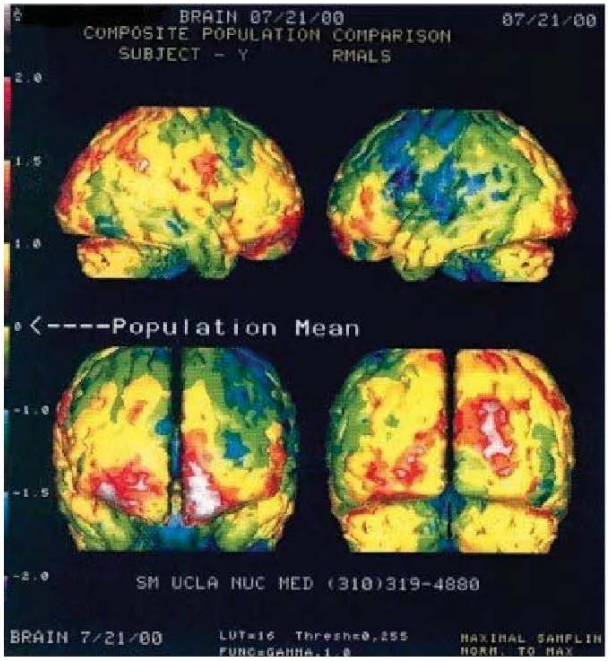
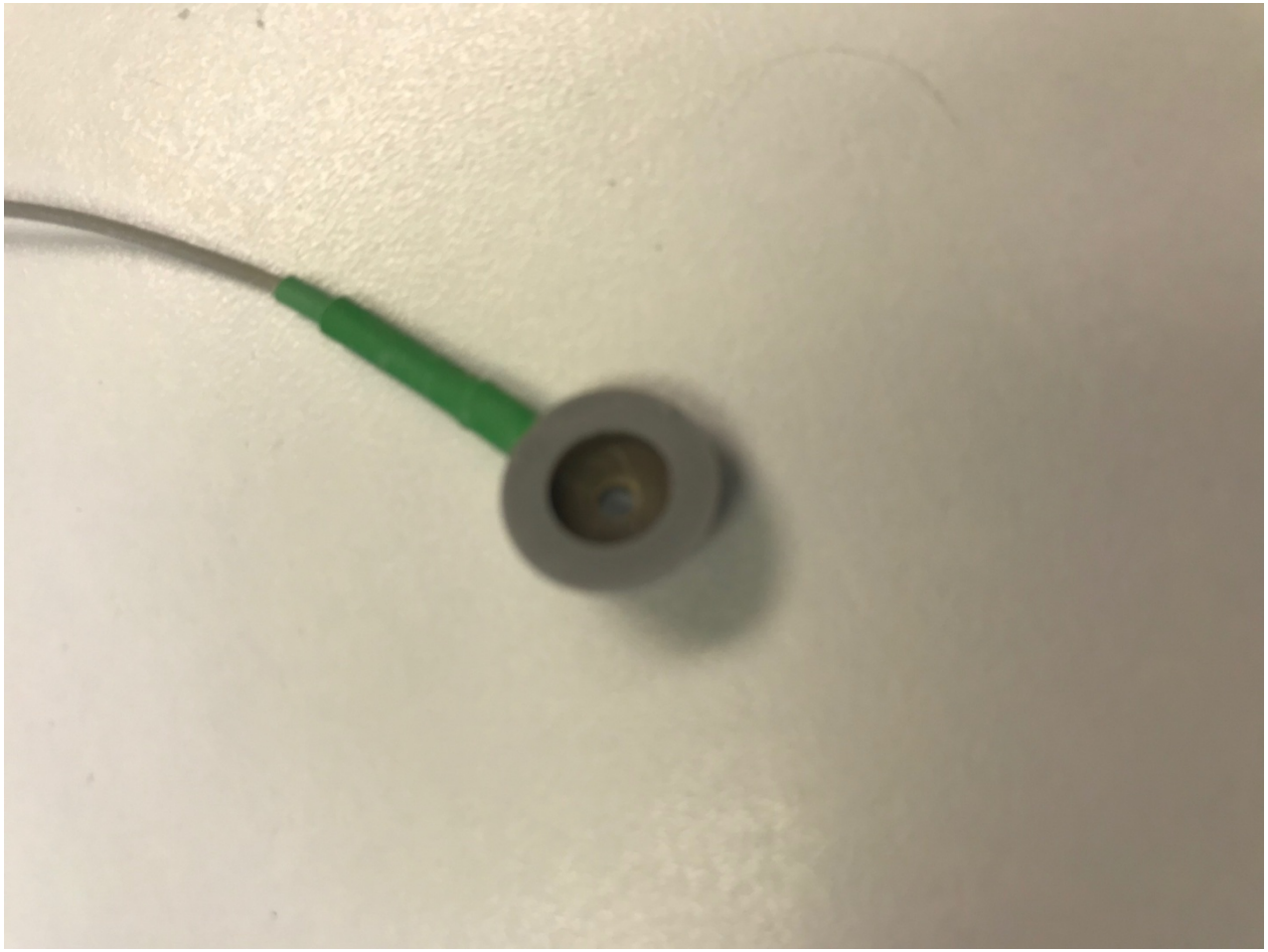


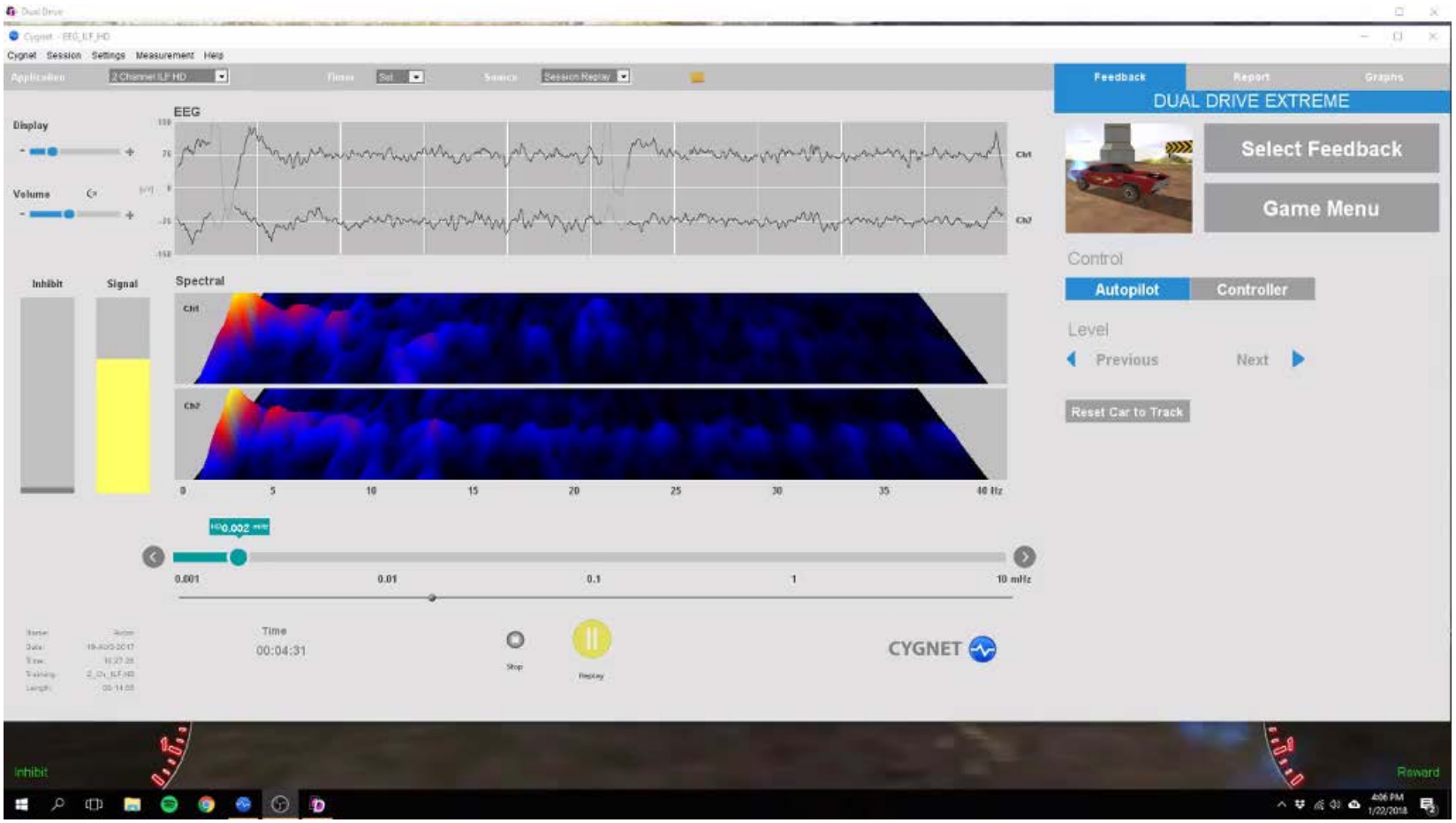
Fig. 4: SPECT study of manic depressed

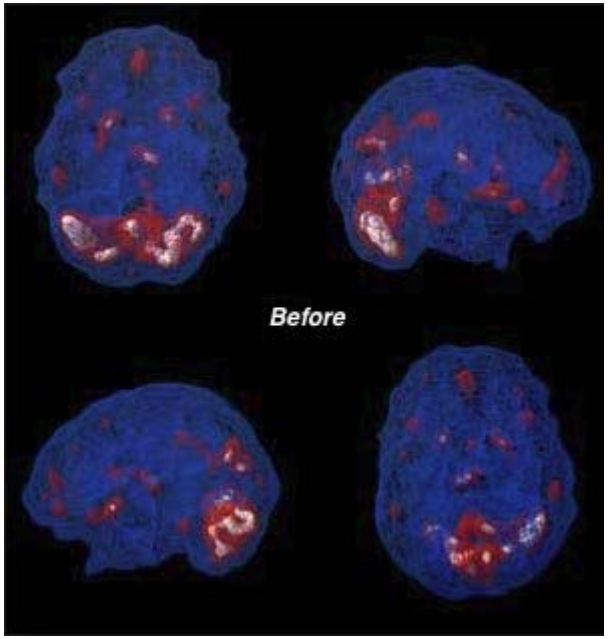
What are Infra-Slow Frequencies?

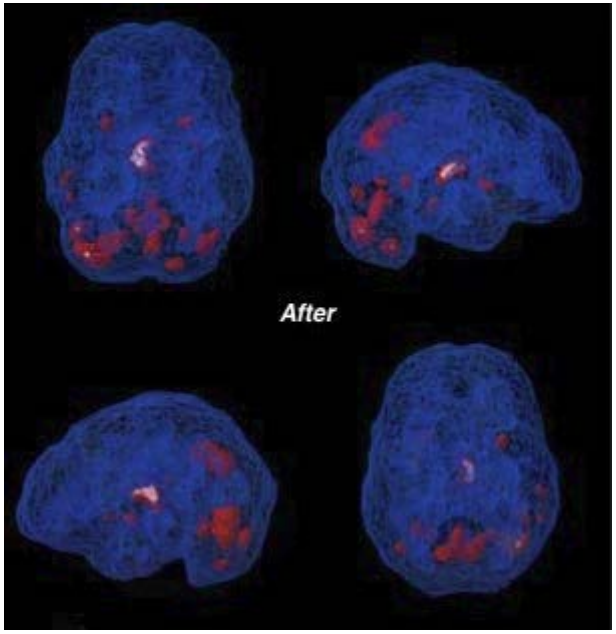
- Infraslow Oscilations- what are they?
- Correlated changes in electrical activity on the same time scale
- Palva and Palva on the significance of ISO's andISF"s
- Mark Smith's description in terms of the ans, attention, etc.



LAST
RABBIT


Cygnet Session Settings Measurement Help
Application
2 Channel ILF HD
Timer
Source
Session Replay
Feedback
Report
Graphs
DUAL DRIVE EXTREME
Select Feedback
Game Menu
Control
Autopilot
Controller
Level
Previous
Next
Reset Car to Track
Display
Volume
EEG
Ch1
Ch2
Inhibit
Signal
Spectral
0 5 10 15 20 25 30 35 40 Hz
0.002
0.001 0.01 0.1 1 10 mHz
Time
00:04:31
Stop
Replay
CYGNET
Inhibit
Reward


Before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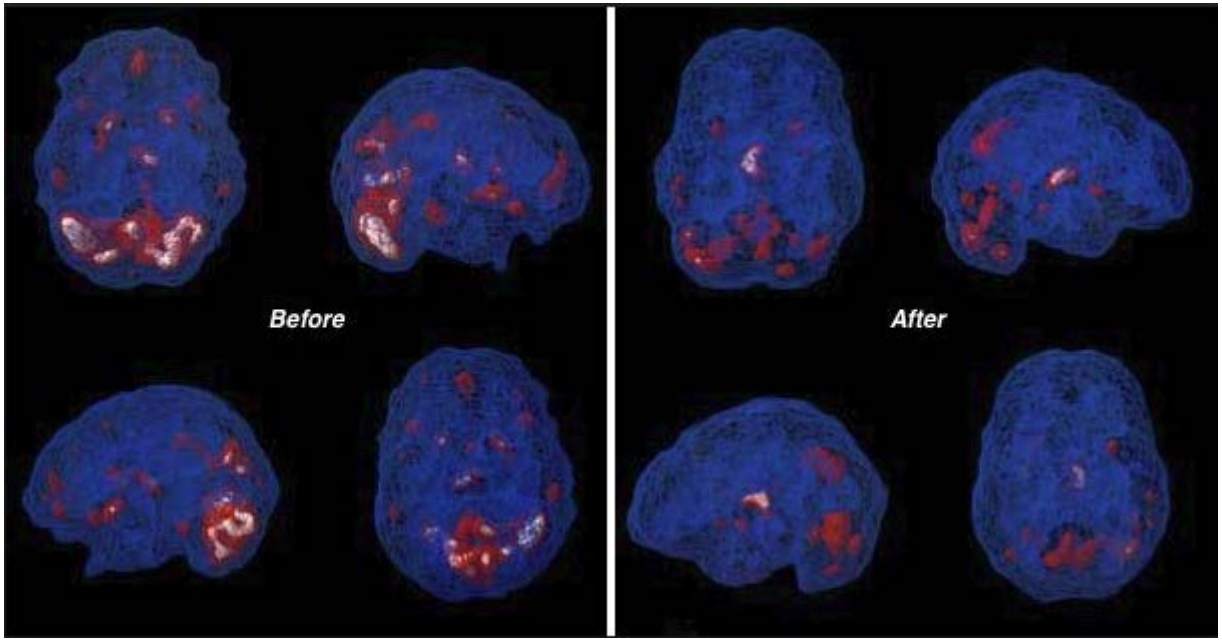

Before
After

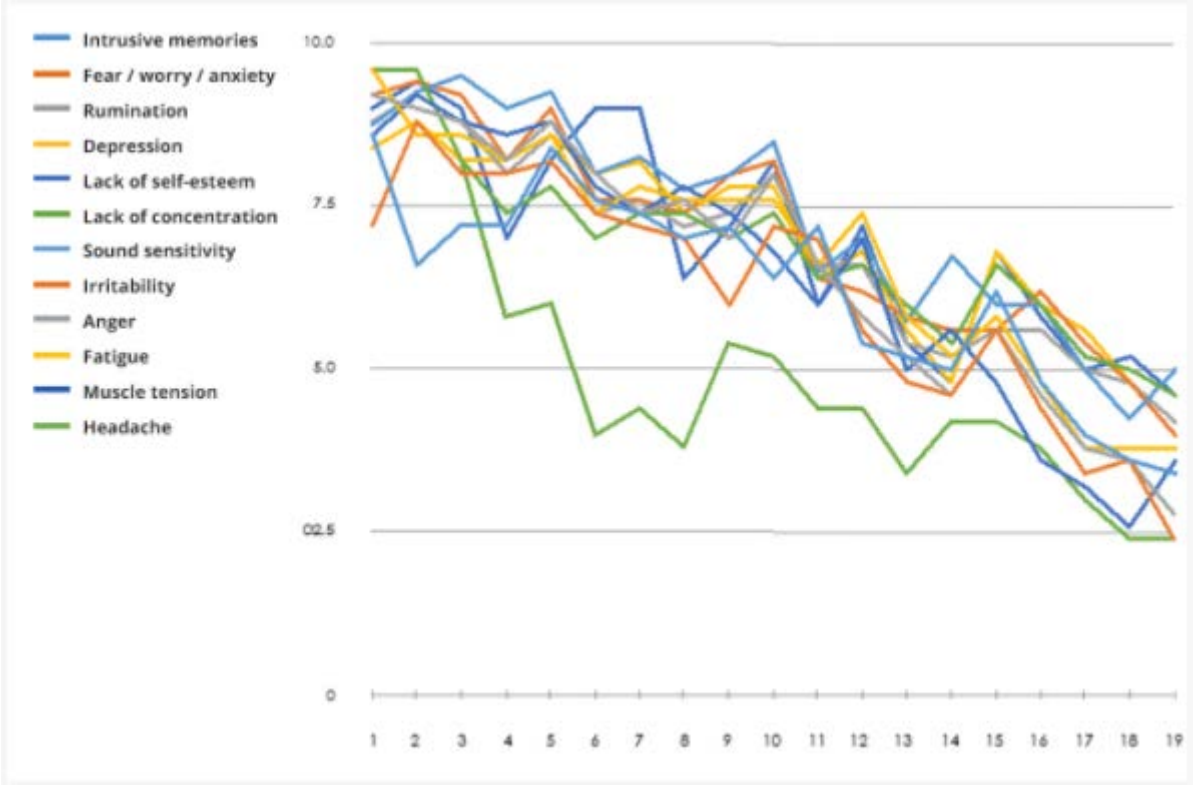
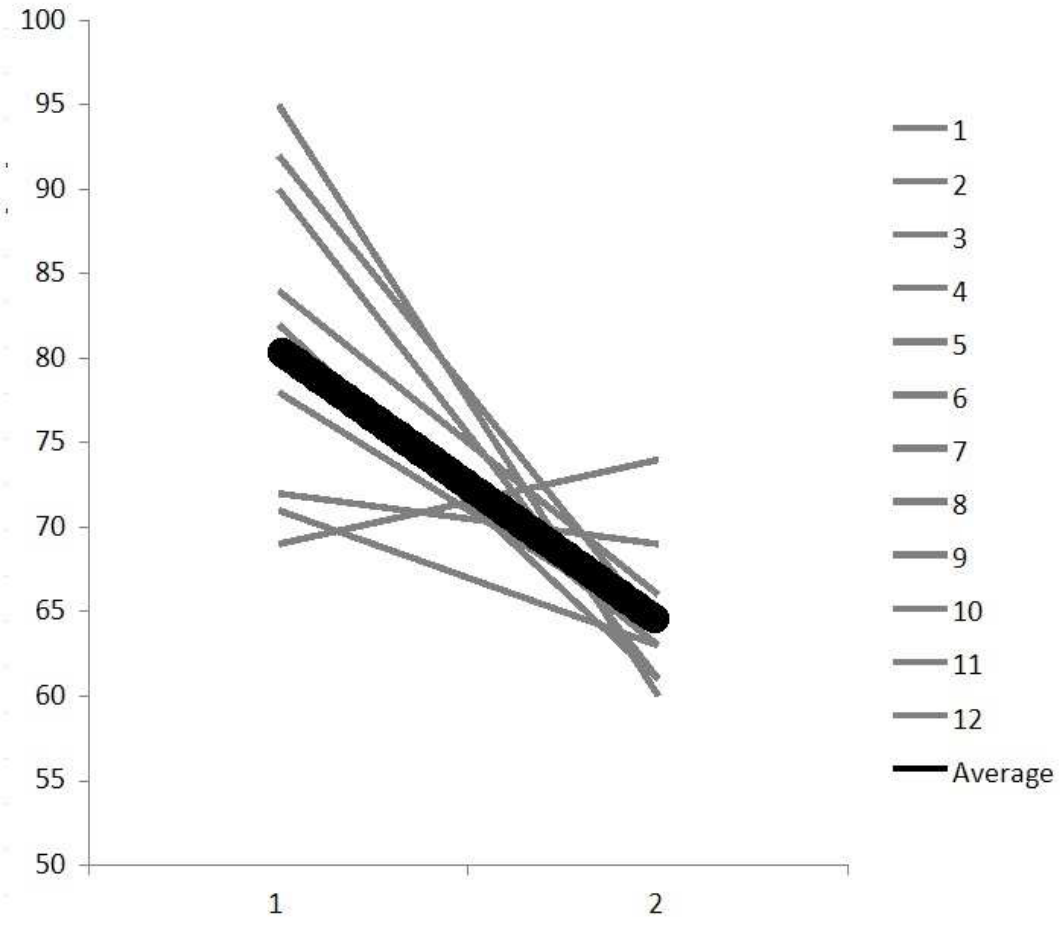

Intrusive memories
Fear / worry / anxiety
Rumination
Depression
Lack of self-esteem
Lack of concentration
Sound sensitivity
Irritability
Anger
Fatigue
Muscle tension
Headache
10.0
7.5
5.0
02.5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Figure 1: Average recovery curves for the five participants are indicated in the Figure for eighteen of the twenty sessions, for the symptoms listed in the legend. The first symptom appraisal took place only after the first session, and the last assessment took place at the twentieth session, and therefore does not reflect the gains attributable to the first and last sessions. Substantial remediation of their critical complaints is indicated.

Figure V. CBCL Results, Change on Marker of Primary Concern. CBCL results were available for 12 of the 17 students. The graph above plots the CBCL scaled score for each student's primary area of concern. There was an Average improvement of 16 scaled score points, or 1.6 standard deviations of improvement



Case Studies

Case #1- 5 y.o. boy with problems in self regulation

Presenting Problems

- Anxious
- Aggressive
- Fidgety
- Hyperactive
- Loss of emotional control
- Mood swings
- Irritable

Symptom Checklist

HOW TO

Symptom Checklist

ITALLIS Communication

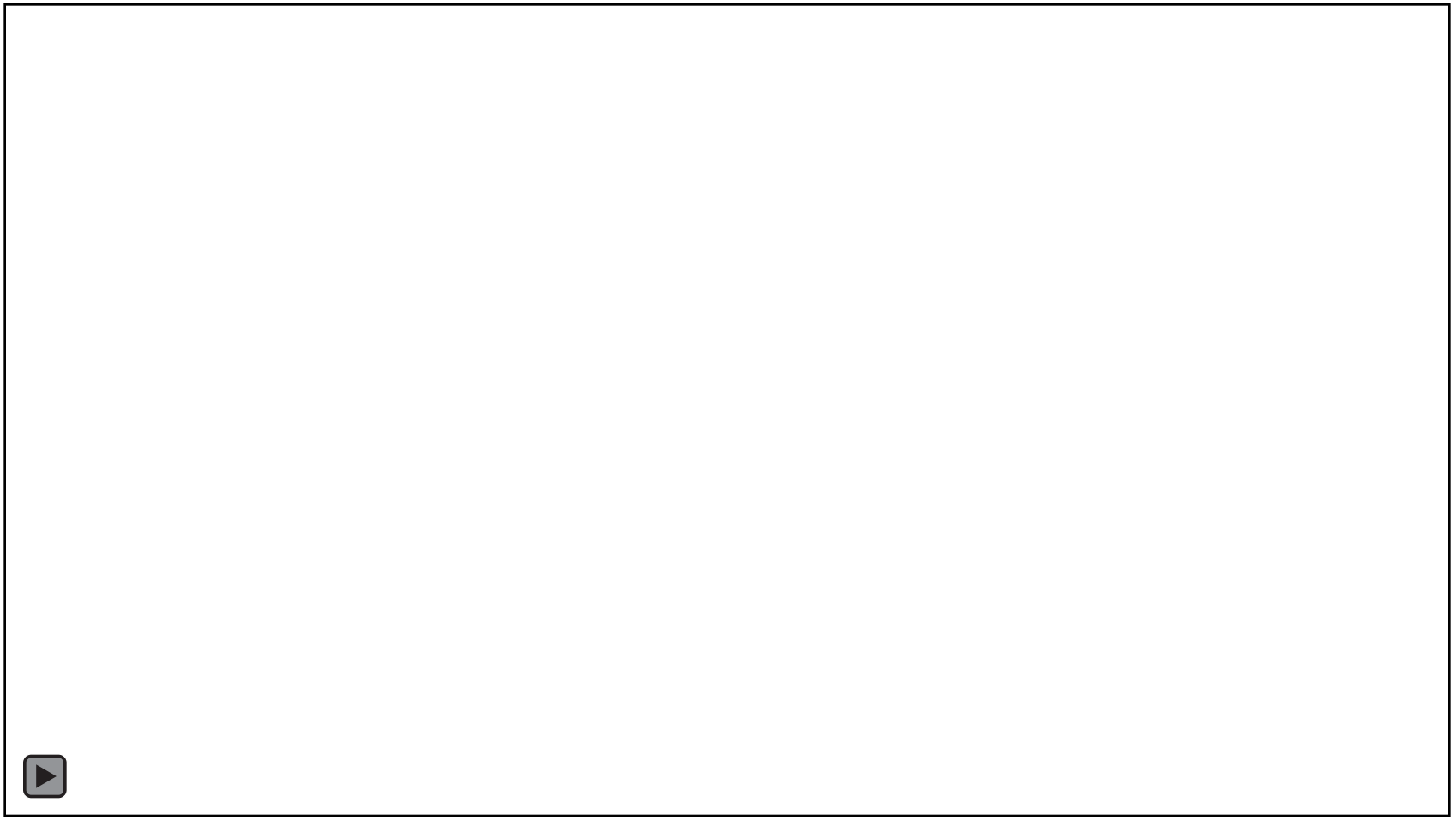
Name:

Date:

Symptom	Score	8-May-17	15-May	18-May	1-Jun	5-Jun	8-Jun	12-Jun	15-Jun	25-Jun	22-Jun	29-Jun	1-Jul	6-Jul	8-Jul	11-Jul	13-Jul	18-Jul	20-Jul	25-Jul	27-Jul	1-Aug	15-Aug	17-Aug	7-Sep	14-Sep	21-Sep	5-Oct	19-Oct
		0=None/Never, 1=Mildest/Rarely, 2, 3, 4=Moderate/Half the time, 5, 6, 7=Most Severe/Continuous																											
Anxious	5	5	4	3	4	3.5	3	3	3	3	3	2	2	2	2	2	2	2	2	1.5	1.5	1.5	1	1	1	0.5	0.5	0.5
Fidgety	5	5	4	3	3	3.5	3	3	2	3	2	2	2	1	1	1	1	1	1	1	2	1.5	1	0.5	0.5	0.5	0.5	0
Fighting/aggressive	5	5	5	3	3	4	3	3	3	3	3	2	2	2	2	2	2.5	1.5	1.5	1.5	1	1	1	0.5	0.5	0.5	0.5	0.5
Hyperactive	5	4	4	3	2	3.5	3	3	2	3	2	2	2	1	1	1	1	1	1	1	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0
Loss of emotional control	5	4	4	3	4	3	3	3	3	3	3	2	2	2	2	2	3	2	2	1.5	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5
Rapid mood changes	5	5	4	3	3	3	3	3	3	3	2.5	2	2	2	1.5	1.5	2.5	1.5	1.5	1.5	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5
Irritable	5	4	4	3	3	3.5	3	3	3	3	2.5	2	2	1.5	1.5	1.5	2	1.5	1.5	1	1	1	1	0.5	0.5	0.5	0.5	0.5
Hiding	5	5																										
Talkative	5	5																										
Impatient	5	4																										
Feelings easily hurt	4																											
Agitated	4																											
Angry	4																											
Feeling jumpy	4																											
Impulsive	4																											
Low self-esteem	4																											
Negative thoughts	4																											
Sad/blue	4																											
Sensitive to touch	4																											
Wake during sleep	4																											
Cry easily	3																											
Difficulty falling asleep	3																											
Inattentive	3																											
Lack empathy	3																											
Difficulty waking/not rested	2																											
Obsessive thoughts	2																											
Racing thoughts	2																											
Difficulty with memory	1																											
Apathetic/indifferent	0																											
Compulsive behavior	0																											
Confused thinking	0																											
Disorganized	0																											
Dull, slow	0																											
Fearful	0																											
Headaches	0																											
Lack motivation	0																											
Lethargic	0																											
Low energy	0																											

LAST
RABBIT

Video #4



Second Session

Session Number: 1 **Session Date:** Monday May 08, 2017 01:03 PM

Session Type: 2 Channel ILF HD **Clinician Name:** Clinician

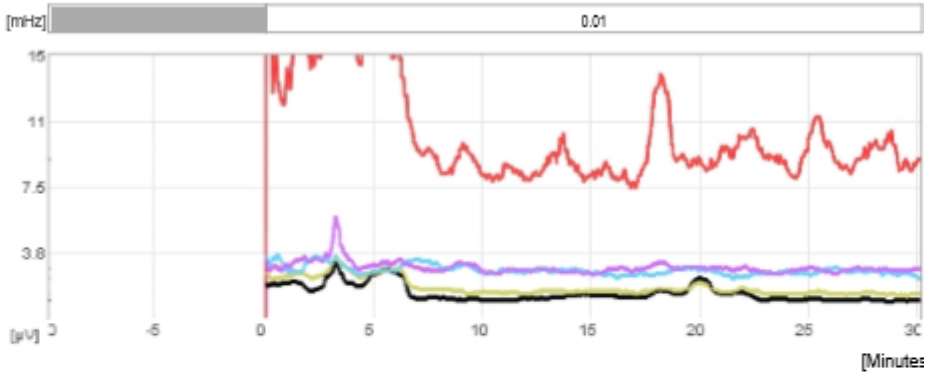
Preferred Feedback

Trends

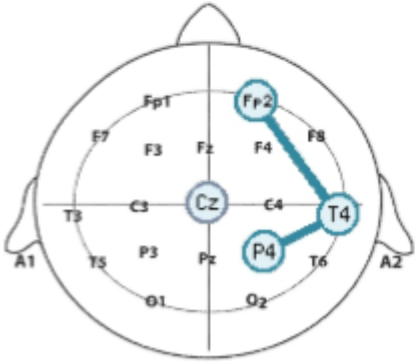
5

Preferred Feedback

Trends



Legend: ILF/10 - Delta - Theta - Alpha - Beta - HiBeta



Time	1. Site	-	2. Site	Reward
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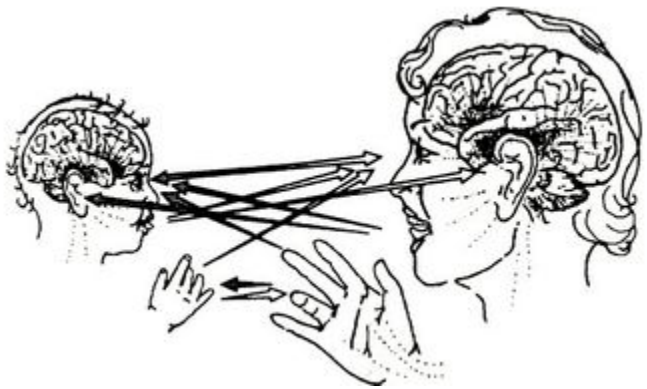
25	T4 - Cz	-	P4 - Cz	0.01 mHz



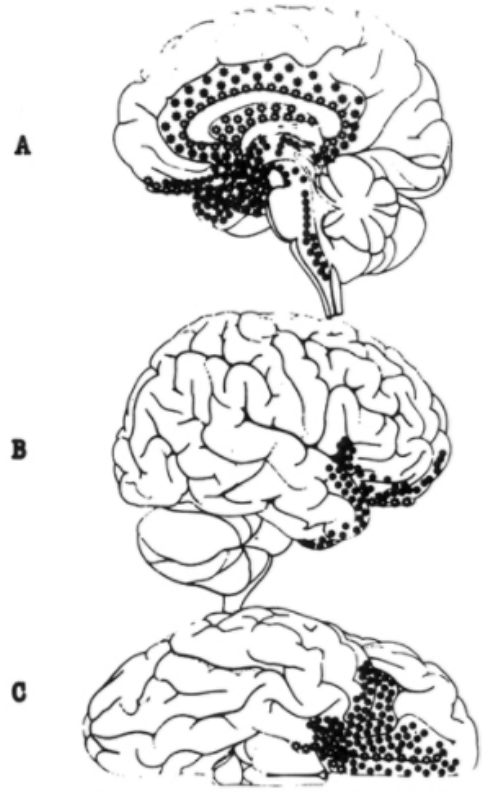
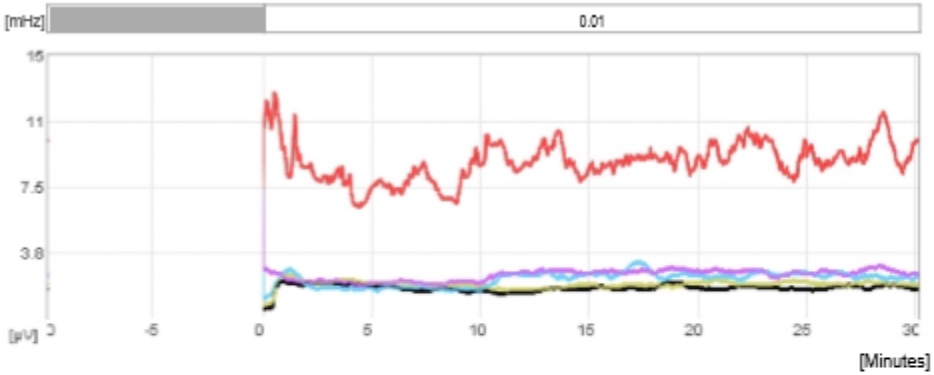


FIGURE 3. Limbic areas of the right brain (from Brothers, 1997). (Top) Medial view. Front of the brain at left. (Middle) Lateral view. Front of the brain is to the right. (Bottom) Ventral view. Front of the brain is to the right. Reprinted from Macchi, G. (1999). Anatomical substance of emotional reactions. In F. Boller & J. Grafman (Eds.), Handbook of Neuropsychology (vol. 3). New York: Elsevier. All possible efforts were made to contact the author by press time.

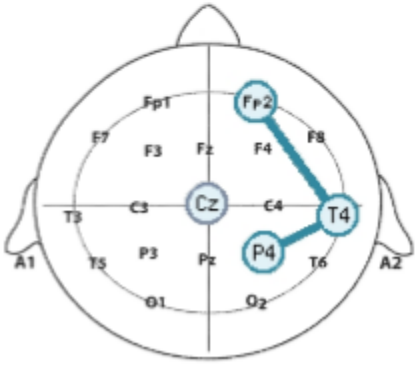
7

Preferred Feedback

Trends



Legend: ILF/10 - Delta - Theta - Alpha - Beta - HiBeta



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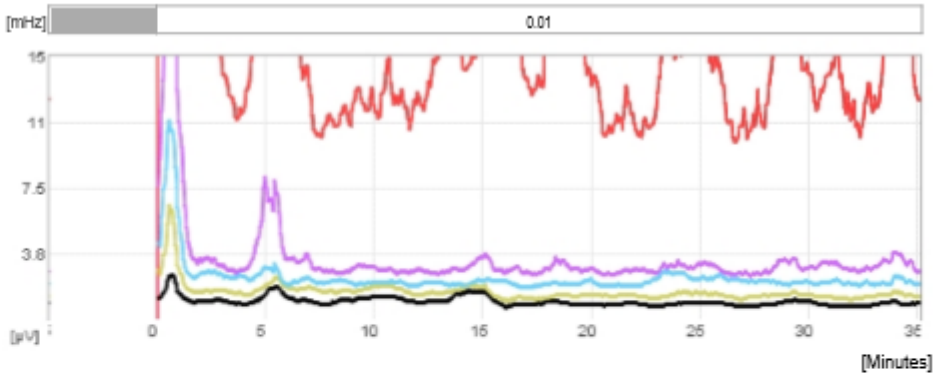
20	T4 - Cz	-	P4 - Cz	0.01 mHz

9

Preferred Feedback

Trends



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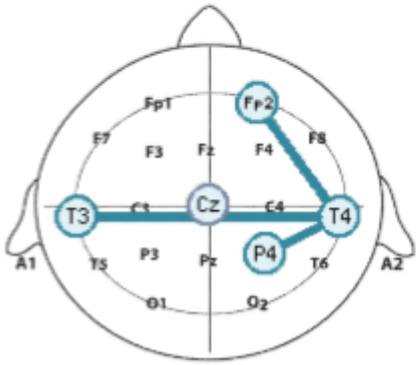
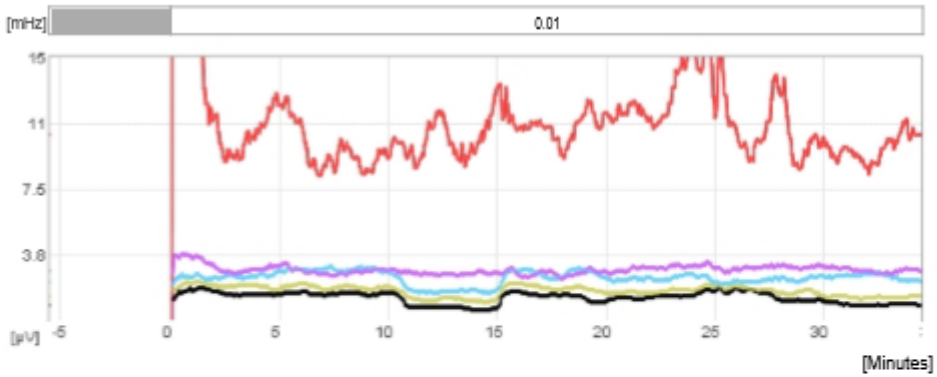


Time	1. Site	-	2. Site	Reward
5	T3 - Cz	-	T4 - Cz	0.01 mHz
10	T4 - Cz	-	Fp2 - Cz	0.01 mHz
20	T4 - Cz	-	P4 - Cz	0.01 mHz

12

Preferred Feedback

Trends



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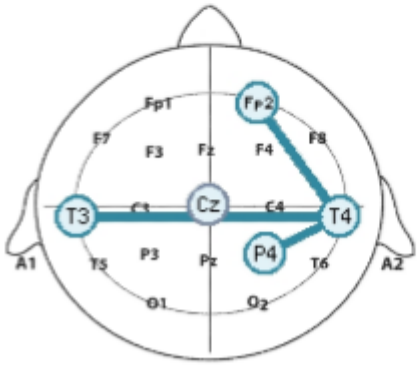
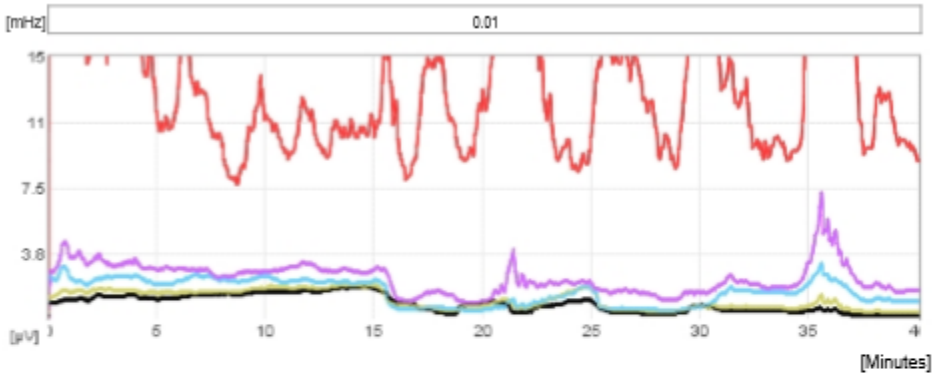


Time	1. Site	-	2. Site	Reward
10	T3 - Cz	-	T4 - Cz	0.01 mHz
15	T4 - Cz	-	Fp2 - Cz	0.01 mHz
10	T4 - Cz	-	P4 - Cz	0.01 mHz

14

Preferred Feedback

Trends



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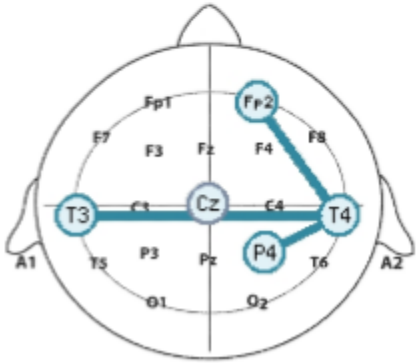
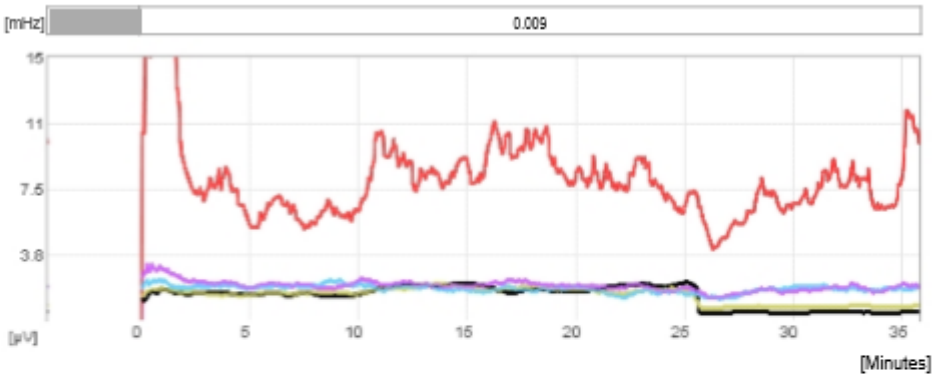


Time	1. Site	-	2. Site	Reward
10	T3 - Cz	-	T4 - Cz	0.01 mHz
15	T4 - Cz	-	Fp2 - Cz	0.01 mHz
10	T4 - Cz	-	P4 - Cz	0.01 mHz

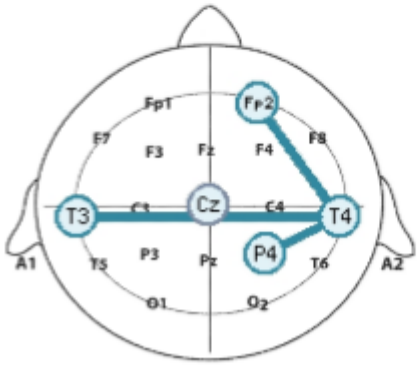
21

Preferred Feedback

Trends



Legend: ILF/10 - Delta - Theta - Alpha - Beta - HiBeta



Time	1. Site	-	2. Site	Reward
10	T3 - Cz	-	T4 - Cz	0.009 mHz
15	T4 - Cz	-	Fp2 - Cz	0.009 mHz
10	T4 - Cz	-	P4 - Cz	0.009 mHz

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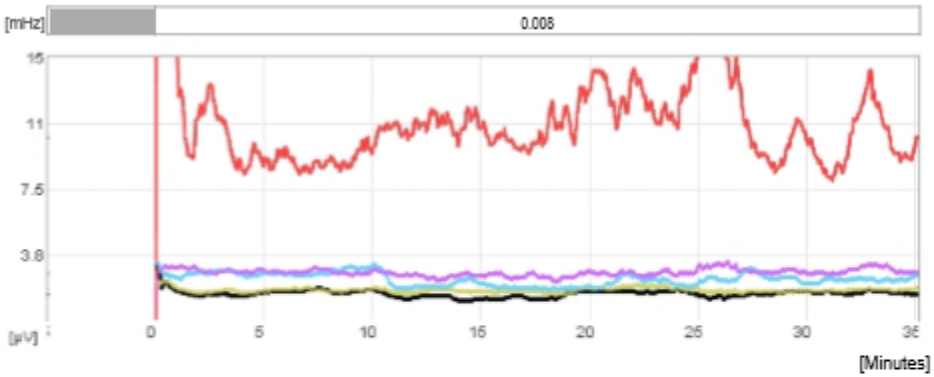
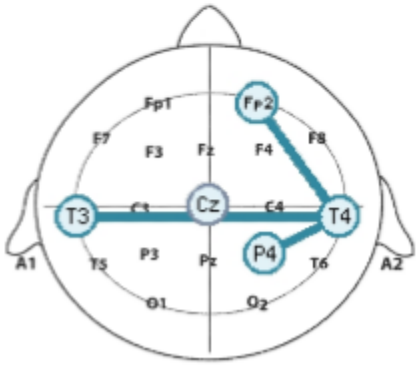
Preferred Feedback

Trends



Legend: ILF/10 - Delta - Theta - Alpha - Beta - HiBeta



Time	1. Site	-	2. Site	Reward
10	T3 - Cz	-	T4 - Cz	0.008 mHz
15	T4 - Cz	-	Fp2 - Cz	0.008 mHz
10	T4 - Cz	-	P4 - Cz	0.008 mHz

Results

HOW TO

Symptom Checklist

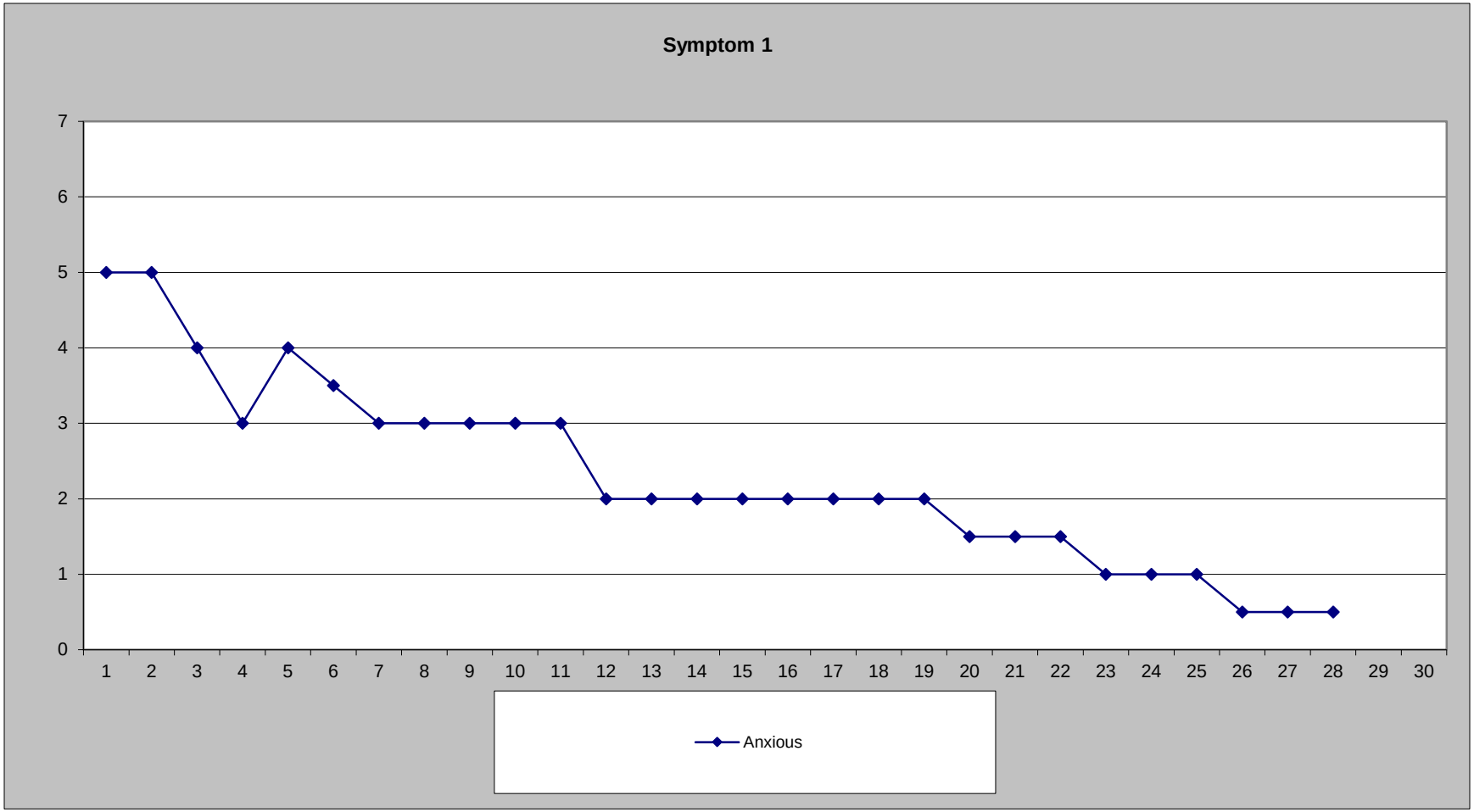
ITALLIS Communication

Name:

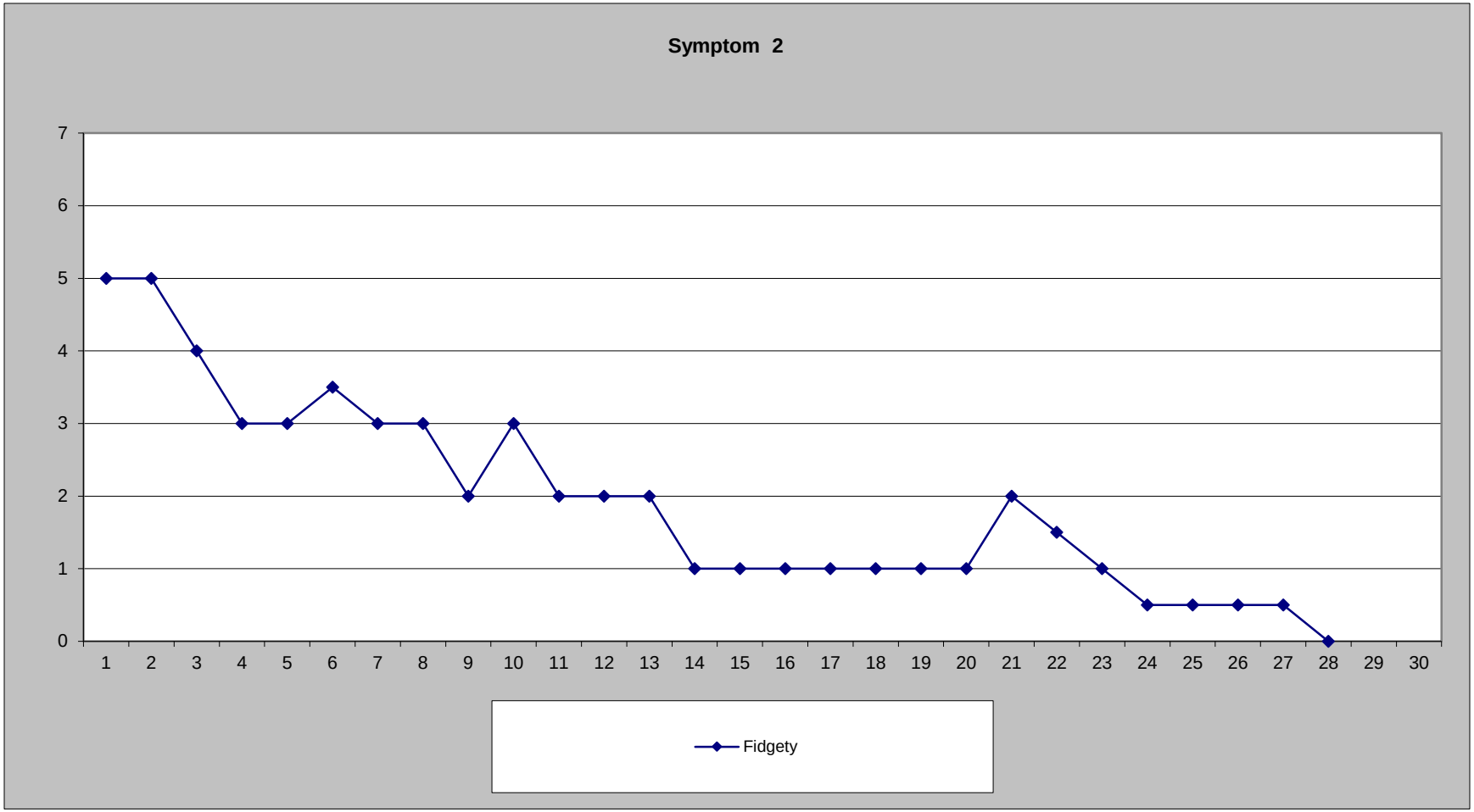
Date:

Symptom	Score	8-May-17	15-May	18-May	1-Jun	5-Jun	8-Jun	12-Jun	15-Jun	25-Jun	22-Jun	29-Jun	1-Jul	6-Jul	8-Jul	11-Jul	13-Jul	18-Jul	20-Jul	25-Jul	27-Jul	1-Aug	15-Aug	17-Aug	7-Sep	14-Sep	21-Sep	5-Oct	19-Oct
		0=None/Never, 1=Mildest/Rarely, 2, 3, 4=Moderate/Half the time, 5, 6, 7=Most Severe/Continuous																											
Anxious	5	5	4	3	4	3.5	3	3	3	3	3	2	2	2	2	2	2	2	2	1.5	1.5	1.5	1	1	1	0.5	0.5	0.5
Fidgety	5	5	4	3	3	3.5	3	3	2	3	2	2	2	1	1	1	1	1	1	1	2	1.5	1	0.5	0.5	0.5	0.5	0
Fighting/aggressive	5	5	5	3	3	4	3	3	3	3	3	2	2	2	2	2	2.5	1.5	1.5	1.5	1	1	1	0.5	0.5	0.5	0.5	0.5
Hyperactive	5	4	4	3	2	3.5	3	3	2	3	2	2	2	1	1	1	1	1	1	1	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0
Loss of emotional control	5	4	4	3	4	3	3	3	3	3	3	2	2	2	2	2	3	2	2	1.5	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5
Rapid mood changes	5	5	4	3	3	3	3	3	3	3	2.5	2	2	2	1.5	1.5	2.5	1.5	1.5	1.5	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5
Irritable	5	4	4	3	3	3.5	3	3	3	3	2.5	2	2	1.5	1.5	1.5	2	1.5	1.5	1	1	1	1	0.5	0.5	0.5	0.5	0.5
Hiding	5	5																										
Talkative	5	5																										
Impatient	5	4																										
Feelings easily hurt	4																											
Agitated	4																											
Angry	4																											
Feeling jumpy	4																											
Impulsive	4																											
Low self-esteem	4																											
Negative thoughts	4																											
Sad/blue	4																											
Sensitive to touch	4																											
Wake during sleep	4																											
Cry easily	3																											
Difficulty falling asleep	3																											
Inattentive	3																											
Lack empathy	3																											
Difficulty waking/not rested	2																											
Obsessive thoughts	2																											
Racing thoughts	2																											
Difficulty with memory	1																											
Apathetic/indifferent	0																											
Compulsive behavior	0																											
Confused thinking	0																											
Disorganized	0																											
Dull, slow	0																											
Fearful	0																											
Headaches	0																											
Lack motivation	0																											
Lethargic	0																											
Low energy	0																											

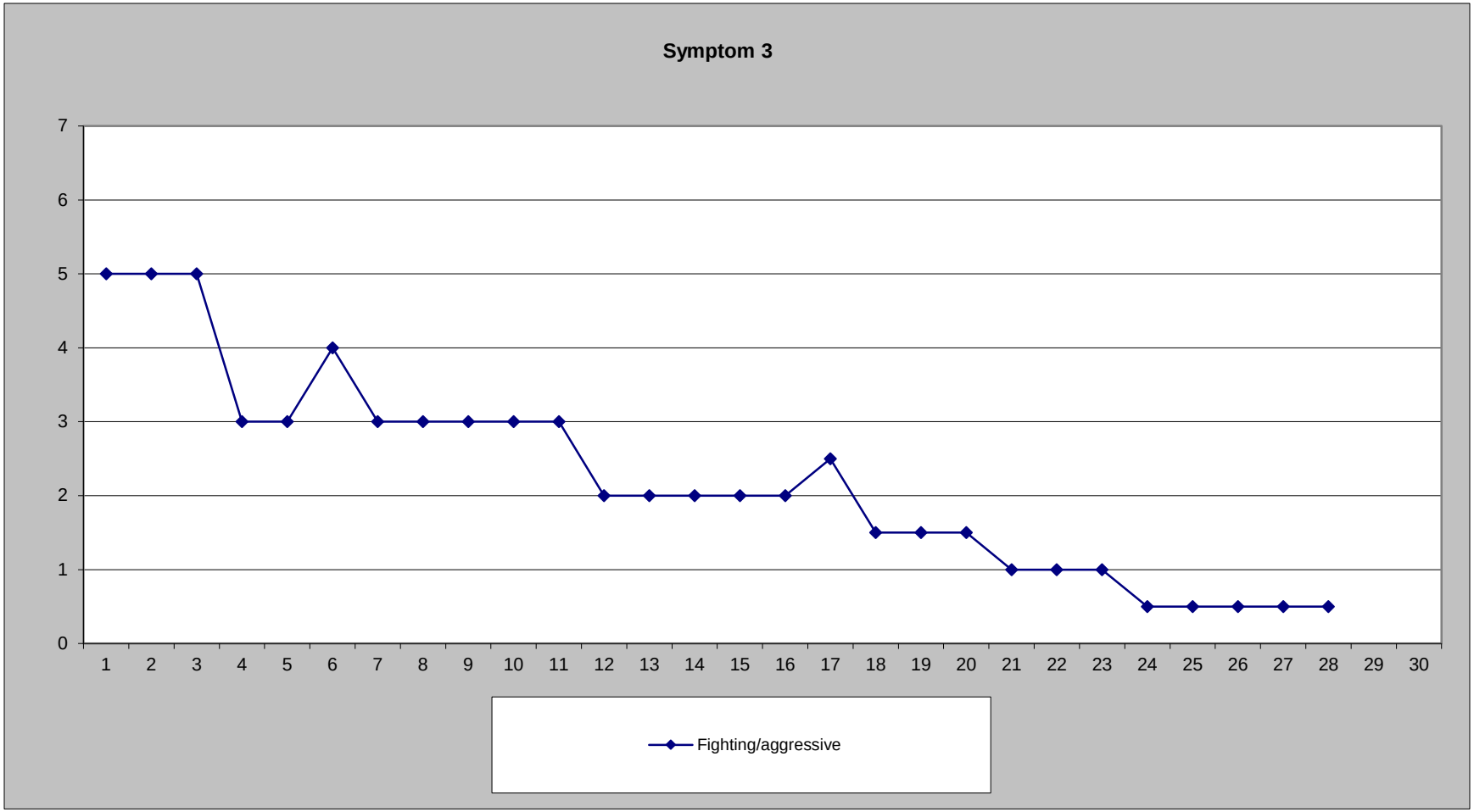
Anxious


Symptom 1
7
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Anxious

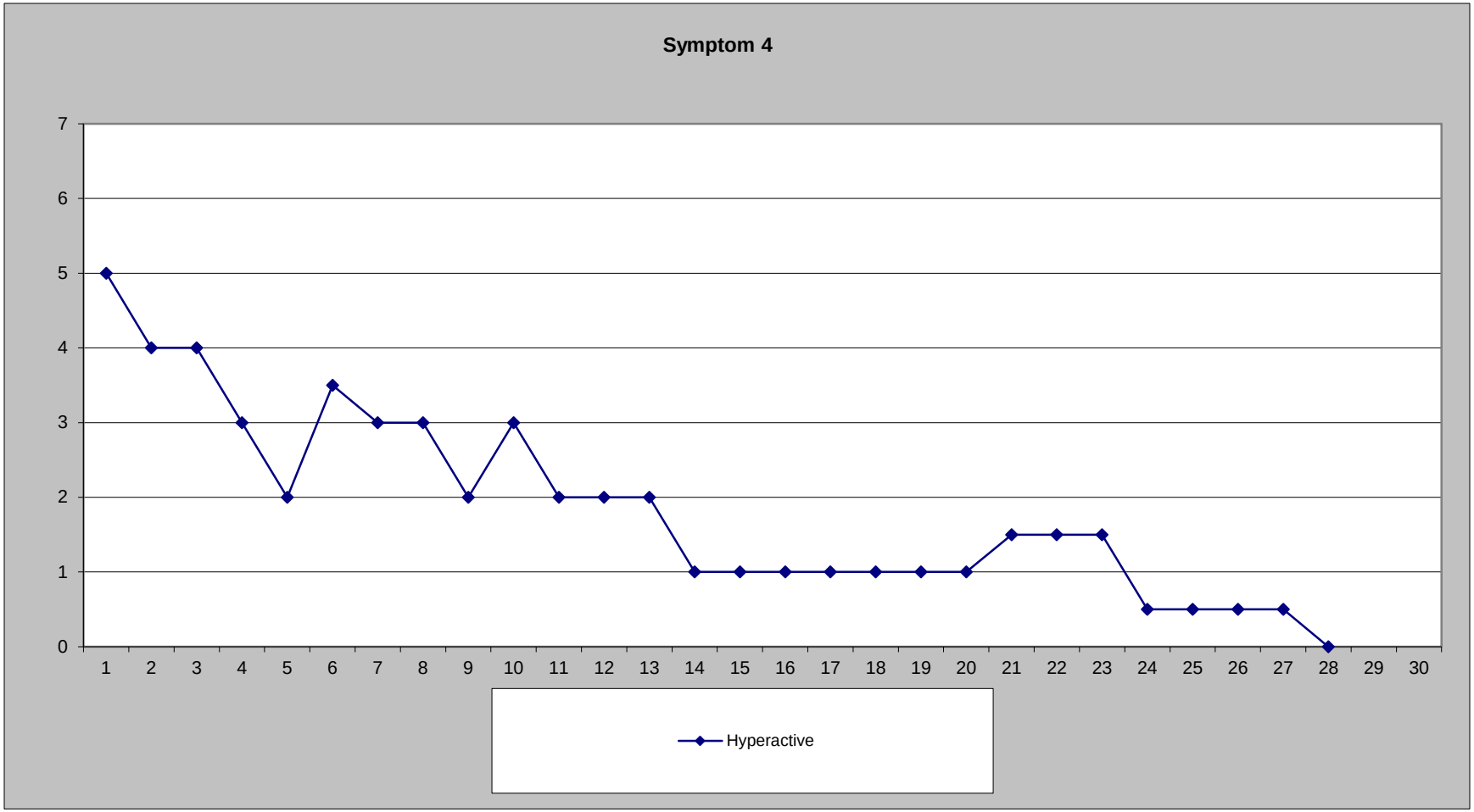
Fidgety


Symptom 2
7
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Fidgety

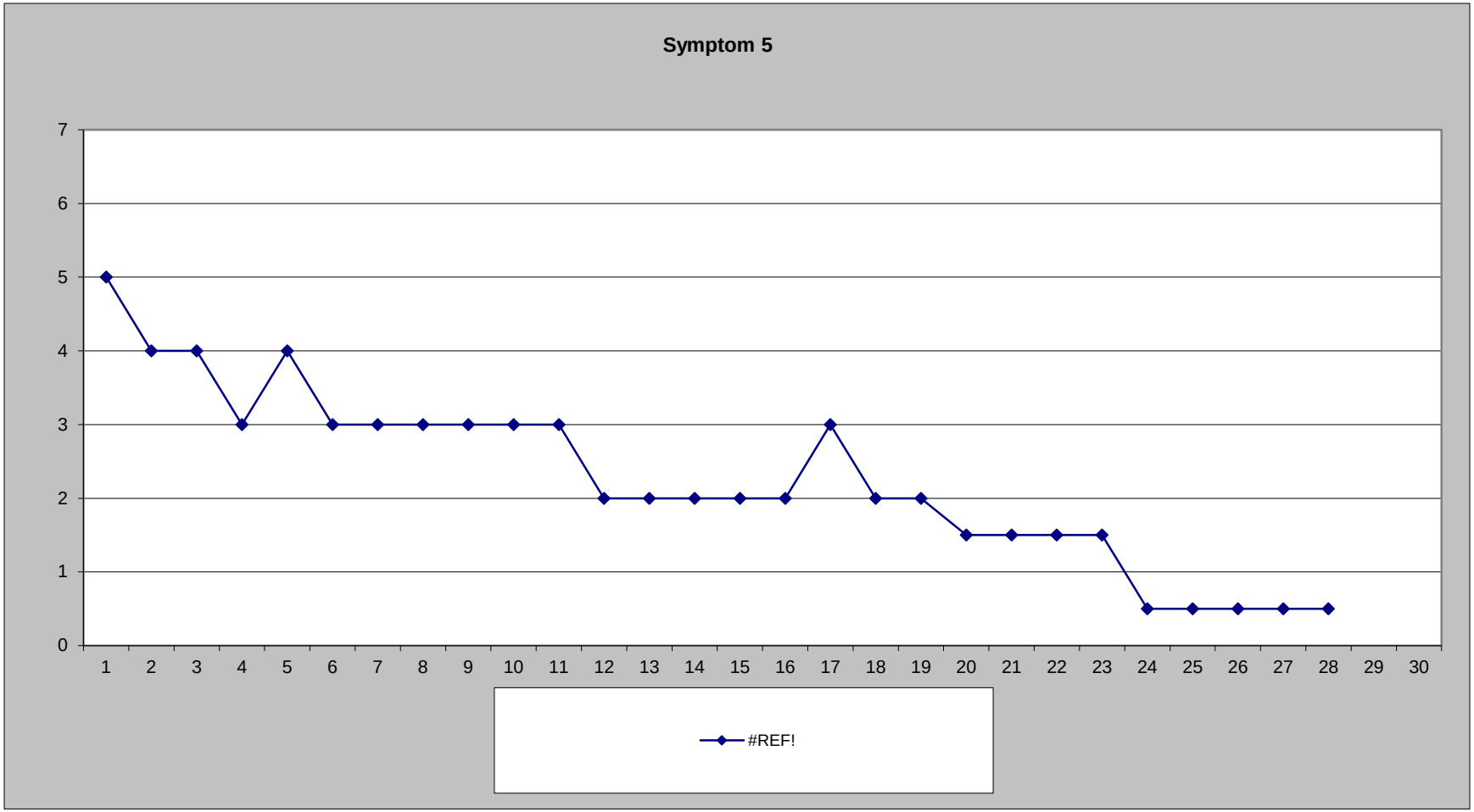
Fighting/aggressive



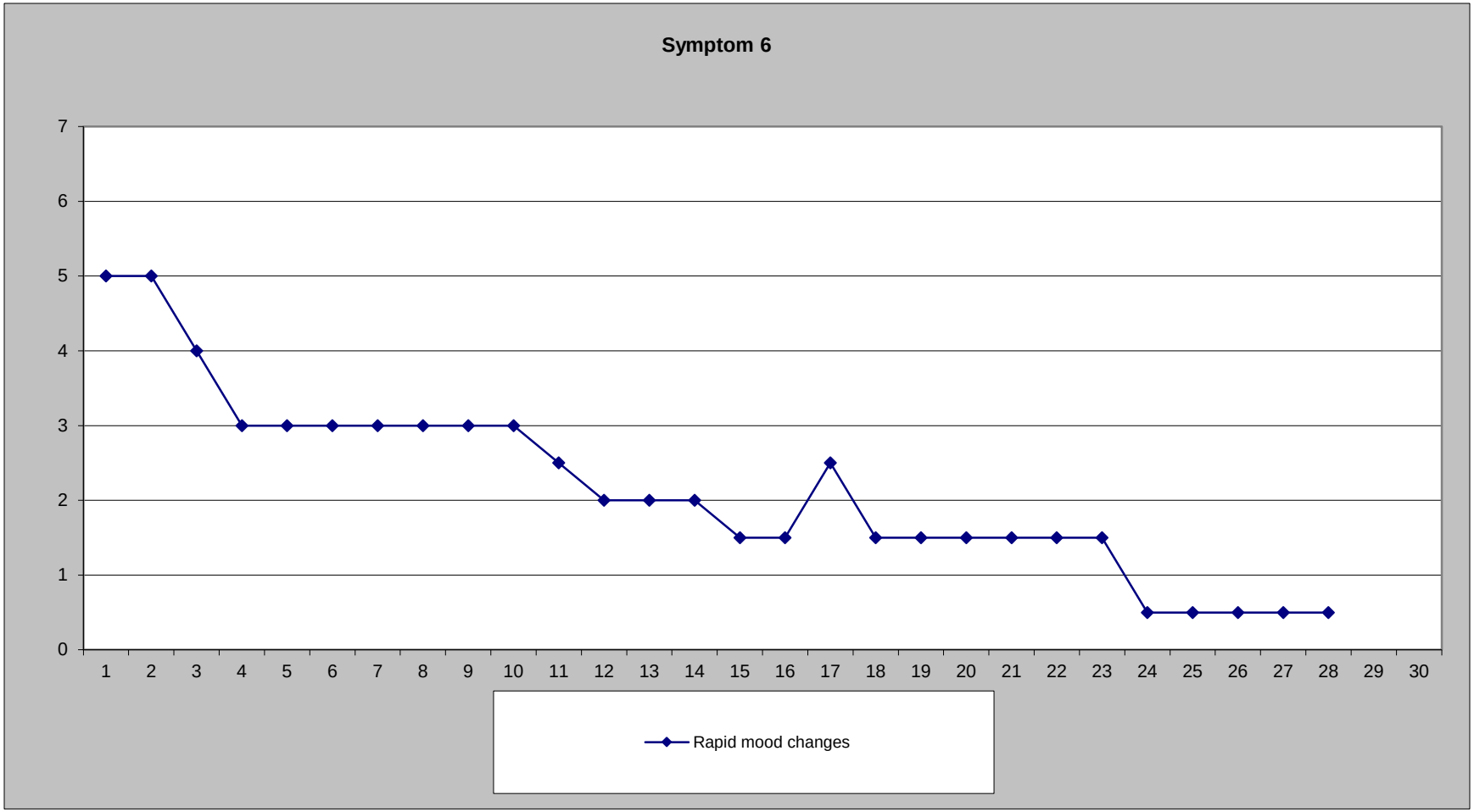
Hyperactivity



Loss of emotional control



Rapid mood swings



Summary of treatment

- Warm and friendly.
- No longer frowny.
- “no” is no longer her default position.
- Parents put additional supports in place to continue progress already established.
- Use of medication has been avoided.
- There is a more positive start in terms of personality development