

Setting-up-for-Clinical-Success SCRIPTS

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The first edition of SCRIPTS for “Setting-up-for-Clinical-Success” comprises 12 scripts. Scripts are only a ‘start’. As any professional knows, many other components must be integrated into the program for the individual client. The scripts must be altered to meet the needs of the individual. But for the professional who is using the Infiniti, and has not yet mastered its rich complexity, these may be a helpful starting point. They are to be used after an assessment has been carried out, either single and/or 2 channel, or a 19 channel (full-cap) with QEEG and LORETA analysis. The latter, 19 channel assessment, is the gold standard but it is not absolutely necessary in all cases. Simple cases of ADHD, for example, may not require this and some alpha-theta work is done without this type of assessment. On the other hand, it is an absolute necessity, for example, in cases of head injury or seizure disorder.

You will notice that there is no script for ‘head injury’. This is because the point(s) of injury and the symptom picture can be so different from case to case. In addition, you will notice that the content of the scripts, for the most part, is directed towards key symptoms and not really towards a ‘clinical entity’. Thus with problems with focus and concentration after a head injury one might find the ADHD script useful depending on the QEEG findings. The ‘disorders’ for which scripts are written are ones where there are some reasonably common findings and therefore sites for intervention. However, no script should ever be considered a ‘protocol’. That word is forbidden at our centre because it implies that the practitioner has not carefully assessed the unique needs of the client. The scripts described here all require that the exact site for the ‘active’ and ‘reference’ electrodes, and the frequency bands used for enhance and inhibit, be derived from the QEEG assessment (single or multiple channels).

Goal for The ‘Setting-up-for-Clinical-Success’ Scripts:

To offer to professionals, who have not had years of experience with neurofeedback and/or biofeedback, a method for entering this field rapidly but in a responsible manner.

These scripts encompass the basic conditions for which a practitioner can expect to have a reasonable likelihood of attaining positive outcomes using neurofeedback and/or a combination of neurofeedback and biofeedback. Each script attempts to state a goal for the client and, in the instruction screens, to give succinct statements of the following:

1. The functional neuroanatomical reasons for the default, initial, 10-20 electrode placement sites suggested and for the enhance and inhibit frequencies used.
2. Cautions concerning the necessity of confirming or changing these sites and frequencies after careful QEEG assessment.
3. Cautions concerning the necessity of further evaluating the need for other neurofeedback approaches such as coherence or comodulation training.
4. Other cautions such as certain types of waves that must not be reinforced.
5. The rationale behind using metacognitive strategies for tasks, or for using tasks as stressors, with neurofeedback. These comments may include brief suggestions of

when and what metacognitive strategies should be used. [See the Neurofeedback Book for a chapter on metacognition (11)]

6. The reasons for combining neurofeedback with biofeedback and the goals the client should strive to attain for each of the psychophysiological measurements.

The instruction screens also attempt to briefly tell the trainer how to usefully use measurements including:

1. How to collect statistics in a manner that shows the client how they are progressing in each segment of the session. How to graph the statistics at the end of the session.
2. How to rapidly change settings in the channel set to enable the client to follow how they are progressing while the feedback is actually on. This method uses ‘% of time > a threshold constant’ reading that is visible beside each bargraph.

Scripts

For the Infiniti:

a. Single Monitor, one EEG Channel (C):

1. **ADHD General:** This is the usual starting script for children and some adults who tune out in Theta and/or Thalpha (1,2,3,4,5,6). Because this script places an emphasis on SMR enhancement on a number of the screens, it can be (and has been) successfully used for those clients who also have **Tourettes** (7).
2. **ADHD-Adult:** This script is used with adults (and a few children) who tune out in high frequency Beta (and, at times, Thalpha) (8,9,10).
3. **LD – Dyslexia:** This script is used for adults and children who have reading difficulties. The electrode placement could be moved and the specific tasks and strategies changed if the trainer wanted to use this script with other types of LD (11,12).

b. Single or Dual Monitors, one EEG Channel (C) plus Biofeedback Sensors:

4. **AAA-Anxiety** (Attention & Asperger’s): This script combines neurofeedback with biofeedback and is used with clients where anxiety and anterior cingulate dysfunction may be an important part of the presenting problems. This script is often used with clients who come to the Centre for ‘Stress-Management’ (11,13,14).

c. Dual Monitors, one EEG Channel (C) plus Biofeedback Sensors:

5. **Optimal Performance:** This script was specifically designed for very high level professional athletes and executives. The basic screens and feedback program was originally designed and given to AC Milan Soccer Team’s sports psychologist in the fall of 2005, for use in starting neurofeedback training their ‘mind room’. A great deal has since been said about the importance of this ‘mind-room’ in improving the performance both of the AC Milan soccer team and the

performance of the 4 players who subsequently played for the world cup winning Italian team. This is also a good script for **Stress Intervention** (11,13).

- A different placement for the ‘active’ electrode: The script is written for an initial placement of the electrode over FCZ. For executives and students and for the initial training of athletes this seems appropriate for most cases. However, with advanced athletic performance, at the point of, for example, releasing an arrow, pulling the trigger, hitting the ball (golf), and so on, the left temporal area goes quiet. ‘Self-talk’ is eliminated (15). At this point 11-12 Hz alpha may rise and all busy brain activity (19-35 Hz) and even 15-18 Hz activity should be reduced. This script can be adapted by the user to meet these training requirements. Place the ‘active’ electrode over T3 and the reference electrode on the right ear or mastoid. You would NOT reward 15-18 Hz. In addition the user might even decide to change (not really a necessity) the EMG noise (52-58 Hz) inhibit to a 15-18 Hz inhibit. (This is easily done by clicking “pause” when the recording has begun, and then clicking ‘edit’ and ‘Edit VC Settings’. Now change the first band width for 52-58 Hz to 15-18 Hz. After doing this you must remember to change it back to 52-58 Hz while your instrument is still turned on and attached to the computer. You must then record and save a few seconds of data. In this manner the program will be reset to emg noise for your client at their next session.)

d. Dual Monitors, 2 EEG Channels (C & D) and Biofeedback Sensors:

6. **Asperger’s** (Autistic Spectrum): This script gives a number of initial introduction information screens. These screens explain where electrodes are usually placed and the reasons for these suggestions. Channel C is used to address anxiety and attention span and usually has a central location (Cz or FCz or PCz). Channel D is used to address sensory and/or motor aprosodia and it has right hemisphere locations (usually T6 or T6P4, occasionally F4). We suggest the clinician read these information screens before beginning with a client. Most of them can then be skipped when the client begins their feedback session (11,16,17,18)
7. **Moderate Depression:** This script emphasizes activation of the left frontal lobe compared to the right. The word ‘moderate’ is used to emphasize that any person with a serious depression (always if there have been any suicidal thoughts) must first be under the care of a Psychiatrist who can consider the use of medications and/or ECT. Neurofeedback may then be added and may prove helpful (11,19).
8. **Agitated Depression (& Bipolar Symptoms)** – A number of our clients who have been given a diagnosis of depression (and often placed on antidepressants) do not show the “classic” inactivity of the left frontal lobe compared to the right. They do, however, show clear anterior cingulate dysfunction in terms of QEEG and LORETA findings. They also exhibit symptoms related to anxiety. These clients require a somewhat different intervention approach and this is described in this script. Again, if the client presents with anything more than mild symptoms then that the client must first be under the care of a Physician (Psychiatrist) who can consider the use of medications and/or ECT. Neurofeedback may then be added and may prove helpful (11).

9. **Seizure Disorder Script:** This script places channel D over the sensorimotor strip (often at Cz) to raise SMR (Serman's original published work). Channel C is placed over the site of seizure origin to decrease slow wave bursts. These clients must all be already under the care of a neurologist (11, 20).

- Because this script places a strong emphasis on SMR enhancement and biofeedback, it can be successfully adapted for use for those clients who present with a movement disorder such as **Tourettes or Dystonia** (often seen with Parkinson's). The neurological rationale for using this approach in movement disorders and in **Fibromyalgia** is given in our paper on a Parkinson's Case with Dystonia (7).

e. **Single Monitor, Biofeedback Sensors (EEG sensor optional but recommended)**

10. **Stress Assessment:** This script has been used for several years with great success. It clearly shows the client how even minimal stress changes physiological variables including: respiration, heart rate, heart rate variability (HRV), peripheral skin temperature, muscle tension (EMG), and skin conduction (EDR). It demonstrates how difficult it is to rapidly recover from stress, particularly after the second stressor. It also shows the client how they are able to control their physiology when they follow the trainer's breathing and relaxing in the last segment of the script (11,13).

f. **And for the Procomp2:**

11. **ADHD General:** This is the usual starting script for children and some adults who tune out in Theta and/or Thalpha.

12. **ADHD-Adult:** This is a different script. It is used with adults who tune out in high frequency Beta (and, at times, Thalpha).

Note: All of the scripts can be modified to fit different training requirements.

- a. Changes that are ONLY for the current session can be easily done when first entering any script. On double clicking a script you are immediately given the opportunity to: '*Edit Script Settings*'. By clicking on this and then clicking on the 'Activity' that contains the screen you wish to alter you have a number of options. If you click under '*Screen File Name*' the screen you wish to change and then click '*Instrument Step – Change Screen*' then you can change to a different screen. You can also change the duration of the step at this juncture.
- b. Changing the "duration" of all the 'feedback' screens from several minutes to 5 seconds will allow you to look at (and evaluate the usefulness of) the entire script in only a few minutes. Changing these times is a quick procedure which only takes a minute to do.
- c. Changing the bandwidth of a feedback bargraph can be done when the script is running. You may need to do this, for example, in the seizure disorder script in

order to have the exact delta or theta frequency at the site of the seizure origin. To do this, start the feedback 'recording' but **"immediately"** click 'pause'. Then right click over the bargraph and click 'Edit VC Settings'. Now click the bandwidth that the bargraph is attached to and on the right hand side enter new values for: 'Low Cutoff Frequency' and 'High Cutoff Frequency'. Then 'Save Changes'. Make sure you hit the right channel as it could be either Channel C or Channel D. In the upcoming new version of the program you will be able to do this on-screen.

- d. Permanent changes must be made using 'Script Editor'. This takes a little more experience.

When might you substitute more "interesting" feedback animations?

This is a reasonable question. With the Thought Technology Infiniti program we can put in a DVD for feedback in place of any of the animations any time we want. We have tried this with some very interesting DVDs such as the ones produced by National Geographic Magazine. These are educational and do not offend. These videos capture and sustain the focus and attention of children and adults alike. But when is this useful? We strongly believe that, for the most part, this is NOT the most useful feedback for persons with ADHD or LD. These individuals are usually quite capable of going into hyper-focus on anything they find personally interesting. This has never been their problem. They tune out when, in their definition, the task is boring or too difficult. They have been classically conditioned to tune out in these situations and have 'learned' to tune out when a text book or academic task is put in front of them. You can demonstrate this very easily to the parent of such a child in their first session. Our job is to train them to 'automatically' go into a state of high focus and concentration when such tasks are given to them. We therefore only "teach" when the EEG feedback says they are highly focused. We 'recondition' the brain. After a child or adolescent's initial interest in doing something new on a computer wanes, the usual animations do become boring. This is good. Feedback screens should be as boring as possible so that it must be the client's personal efforts to alter their mental state, in a situation that is not naturally very interesting, that gets feedback and earns tokens.

In contrast, the anxious and/or depressed client needs to retrain their brain in a manner that normalizes their EEG and Physiology. However, this abnormal mental state is usually not related to boring situations. Early on, with some of these clients, exercises that have pleasant encouraging feedback may be helpful. However, as training proceeds, it may be wise to revert to more boring animations or no animations and introduce stressors while the client practices remaining mentally calm and physically relaxed as evidenced by their EEG, their physiology, and their report of their thoughts and feelings.

No animations, boring animations, interesting animations; the choice is made from extensive clinical experience.

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