

The Evolution of a Trauma Protocol Over a Quarter Century

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This monograph is an augmented and updated version of our book chapter titled **Evolution of Alpha-Theta Training Over a Quarter Century**. This is Chapter 13 in **Alpha-Theta Neurofeedback in the 21st Century: A Handbook for Clinicians and Researchers** (Expanded Second Edition), Antonio Martins-Mourao and Cynthia Kerson, editors, Foundation for Neurofeedback and Neuromodulation Research, Murfreesboro, TN, pp. 317-344 (2017). We present what has emerged in our clinician network as a comprehensive neurofeedback strategy to resolve trauma syndromes. The historical development is presented, albeit from our own parochial perspective. The initial point of departure was the Alpha-Theta protocol targeting psychological resolution. Preliminary stages of brain training serve to enhance the subsequent success of the Alpha-Theta experience. These targeted physiological regulation in various ways. Over time, the primary burden shifted ever more toward the physiological resolution aspects of the therapy. PTSD came to be understood fundamentally in terms of a model of physiological dysregulation. This monograph relates how the comprehensive strategy emerged. Some case reports and group data are presented in support of the therapeutic strategy.

The Peniston Studies: Opening to a New Era

Our EEG Institute staff in Los Angeles has been involved with Alpha-Theta training since the early nineties, after becoming acquainted with the work of Eugene Peniston. Up to that time we had been working with SMR/beta training exclusively, ever since our entry into the field in 1985. In those early days, we had absorbed the prevailing wisdom of the field that alpha training had been thoroughly discredited in academic research. This sentiment was so well established that Peniston's presentation at the AAPB meeting in Washington, DC in 1990 encountered considerable resistance from the old-timers. Nevertheless, that presentation was so compelling that it launched numerous clinical initiatives within the biofeedback community, ours among them.

Peniston had simply applied the Alpha-Theta protocol to his treatment-resistant alcoholics among Vietnam era veterans. The protocol had been developed at the Menninger Foundation by the research group led by Elmer Green and his wife Alyce Green, starting in the late sixties. The protocol combined temperature training for autonomic nervous system regulation with the promotion of alpha and theta band activity in the EEG by means of a reinforcement paradigm. This was intended to promote entry into states that facilitate psychological resolution and emotional growth. In his first study, Peniston achieved sustained sobriety in his ten experimental subjects, whereas his ten controls, who received only another round of the standard treatment program at the Fort Lyons Veterans facility, all relapsed within the subsequent 18 months.

This kind of success was simply unprecedented in addictions treatment, and that was sufficient to evoke skepticism all by itself. But that was not all. Peniston had also demonstrated substantial

improvements in personality variables within the treatment cohort with the MMPI. The MMPI had not typically been used as a change measure for a number reasons, among them the expectation that these personality variables were relatively stable. So skeptics had yet another reason to reject the findings. Peniston's results are shown in Figure 1 for the treatment cohort. The controls showed essentially no change.

Over the next several years, Peniston followed up his first study with two replications that supported his early results. He acknowledged that his findings applied more to recovery from PTSD rather than to alcoholism in any generality, so PTSD became the designated target. But once there was blood in the water, the sharks continued to circle. Other clinicians came to the rescue with their own supportive data, and among them was our own group.

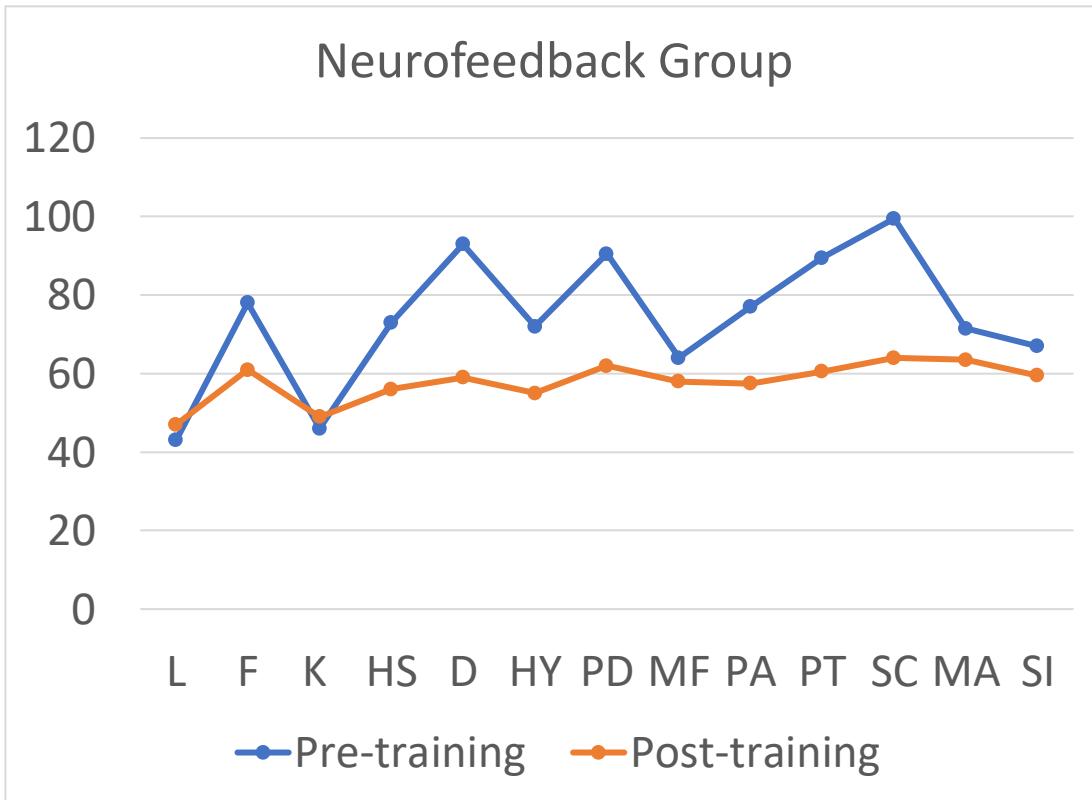


Figure 1. Pre-post MMPI data for Peniston's treatment group of ten participants. Controls showed essentially no change. HS: Hypochondriasis; D: Depression; HY: Conversion hysteria; PD: Psychopathic deviate; MF: Masculinity/Femininity; PA: Paranoia; PT: Psychasthenia; SC: Schizophrenia; MA: Hypomania; SI: Social Introversion.

The CRI-Help Study at EEG Spectrum

We developed the Alpha-Theta training capability for our NeuroCybernetics system in 1992, and in 1994 the opportunity opened up to do a large-scale controlled study, now known as the CRI-Help study. This likely remains the largest and most extensive controlled study ever undertaken in

biofeedback or neurofeedback. CRI-Help, a large residential treatment center in North Hollywood, sponsored the research and funded the study. There were 121 participants in two groups. Bill Scott, who was conducting Alpha-Theta sessions at our clinic in Encino, California, supervised the clinicians who guided the actual training sessions. David Kaiser was responsible for the study design. We saw this study as yet another replication of the Peniston Protocol, but Peniston himself demurred on our insertion of SMR-beta training in place of the temperature training element. We knew what we were bringing to the table. We did not know what we might be giving up by dropping the temperature training aspect. In retrospect, we were caught in a cognitive bias, with an emphasis on taming impulsivity and enhancing pre-frontal inhibitory control. The well-regulated brain, we assumed, is better able to exercise good judgment, thus paving the way for mastery over addiction.

Indeed, we were rewarded for our efforts with a normalization of TOVA CPT scores and improved retention in the program. Relapse prevention was successful at the 70+% level (after 1 year) for a population that was generally more impaired than Peniston's veterans had been (Scott, Kaiser, Othmer, & Sideroff, 2005). And there were nice improvements in the MMPI, which buttressed Peniston's claims. These are shown in Figure 2. But when participants were asked, at 3-year follow-up, to what factors they attributed their ongoing success in retaining sobriety, they mainly gave credit to their continued participation in group. Clearly, they still had to work at remaining abstinent, which meant that most of them were still contending with a physiological dependency at some level. We had not solved the problem of addiction categorically. The Alpha-Theta training had helped with the resolution of trauma syndromes where that had been an issue, and they were in better mental health status as judged by major improvements in their MMPI scores. But any acquired physiological drug dependency could still retain its grip. Liberation from drug cravings was certainly something we observed, but we could not count on it in the general case.

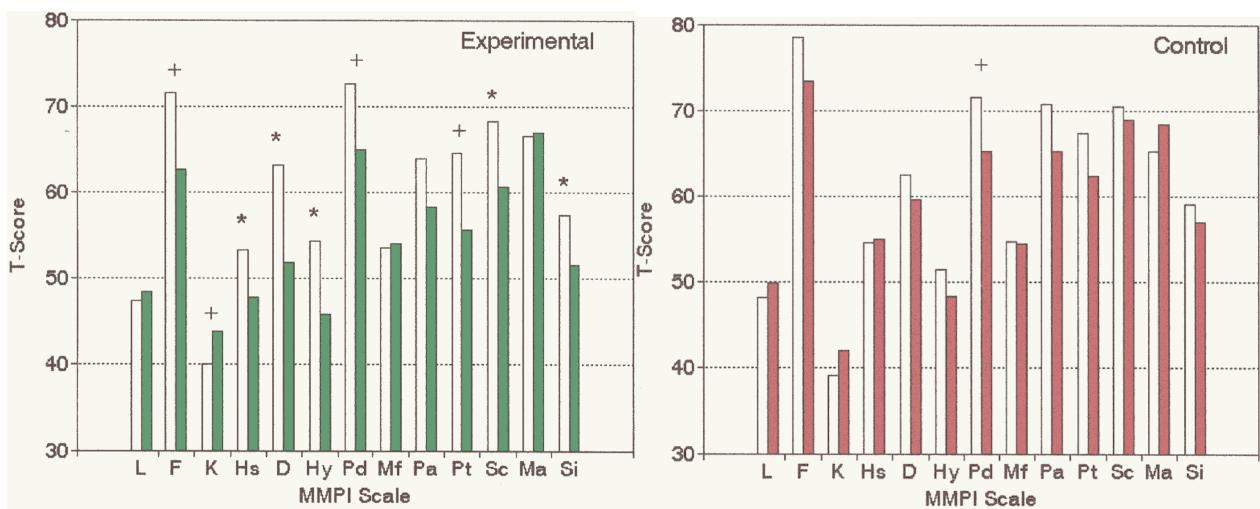


Figure 2. MMPI Data for the experimental and control cohorts in the CRI-Help Study. Seven clinical scales showed significant improvement; five showed significant treatment interaction (shown with asterisks).

Development now had to take place on another front, because the Alpha-Theta training was sufficiently mature technologically that it was accomplishing all that could be expected of it. Alpha-Theta has an experiential purpose rather than a brain-training objective. It merely provides the entry portal to our deeper, disengaged states, and gentle cueing with respect to alpha- and theta-dominant states is all that is required. That does not pose major technical challenges, so there was no obvious technological path forward.

Entry into deeper states is mainly a matter of removing impediments. Our central executive insists on its own priorities without reprieve. It will command the stage whenever it is given a chance. The Alpha-Theta process deposes the central executive for a spell; it silences the verbal scold that we carry around in our brains, the rule-maker, the bossy left hemisphere. Harsh self-judgment is silenced for the moment. The result can be a wholesome encounter with the core self. What follows is a breaking of boundaries internal and external, an enlargement of one's affective scope. There may be a healing of fractured relationships as they are simply re-envisioned. There is likely to be a healing of traumas as these are re-framed experientially by being revisited in a benign context. This experience separates the physiological response from the recall of the event, and allows it to be recommitted to memory as a historical memory like any other. On the basis of an apprehension of connectedness, there is the envisioning of a wholesome life going forward.

The Alpha-Theta experience is therefore best seen as a remedy for the grip of trauma rather than for addictions per se. Traumatic memories are whole-body memories, unitary phenomena in which the re-constitution of the memory trace extends into the peripheral physiology. Trauma memories are state-stamped rather than date-stamped. Recovery by Alpha-Theta is a psychological process, but it is one that is crucially dependent on what happens at the physiological level. That aspect, however, remained somewhat obscure, and needed further clarification. Such clarity was not available to us at the level of model understanding or of theory at the time. It came through further development of the clinical approach, which then allowed our understanding to evolve.

The further evolution took place on the SMR-beta portion of the protocol. In the CRI-Help study we had employed our first iteration beyond the then-standard “C3beta-C4SMR” protocol, which involved 15–18 Hz reinforcement on the left sensorimotor cortex (C3-T3) and 12–15 Hz reinforcement on the right (C4-T4). We modified the left-hemisphere training to introduce a frontal bias, and the right-hemisphere training to introduce a parietal bias. The new placements were C3-Fpz and C4-Pz. The training effects were distinctly stronger than before. The state of affairs at this juncture was captured in a chapter for a psychiatry textbook on addictions treatment (Othmer, S. & Steinberg, 2010). The (augmented) content is most readily accessible in a monograph available online: <http://www.eeginfo.com/research/pdfs/Addictions.pdf>.

The Journey to Low Frequency

The discovery of high frequency-specificity of the SMR-beta training prompted exploration of the entire EEG band, eventually leading to the very lowest frequency that was accessible with a 3-Hz bandwidth, namely 0–3 Hz, with a 1.5 Hz center frequency. The clinical strategy was to start

out with our standard bands of low beta and SMR and then to find the optimum response frequency (called the ORF) for each client. Clients distributed themselves over the entire spectrum, but more clients ended up preferring the lowest frequency than any other. By the time we were well along in this process, hardly anyone optimized at our old standard frequency of 15–18 Hz, where we had trained everybody over many years! The brain had been doing the best that it could with the information we provided at the standard frequencies, but that was not its own preference when we finally started paying attention to that issue.

The pile-up at the lowest frequency, which was well-established by 2004, was an invitation to explore even lower frequencies, the range below 0.1 Hz that is referred to as the infra-low frequency (ILF) region. Such low frequencies needed to be trained differently, in a signal-following manner, which meant the abandonment of any operant conditioning aspect of the feedback design. Thresholds lose their meaning in this context.

We initiated the exploration of the frequency range down to 0.05 Hz in 2006, and it was not long before we observed the same pattern as before: clients favored the lowest frequency, and they did so by an even larger margin than before. We needed to press on to lower frequencies, and on each occasion the pattern then repeated. For a substantial fraction of our clients, the favored frequency was always the lowest available. Work at such low frequencies does present technical challenges, however, and the invasion of new frequency space posed new clinical challenges as well. In consequence, this process of development has continued systematically to the present day, more than 10 years later, at a pace of about one decade in frequency space per year during the early years.

At the same time, a shift occurred in the priority being given to right-hemisphere placements. The right-parietal placement migrated from C4-Pz to T4-P4 for stronger effects. This protocol was more lateralized, and it brought the temporal site back into the picture. This became a priority for nearly every client. Sometimes we never got around to the left hemisphere placements at all by the time the client was ready to graduate out of the program. The subjective experience of the right-parietal placement was a profound and pervasive sense of calm, particularly in those who were most in need of it. We had finally found a way to calm the seas of a profoundly dysregulated physiology.

The use of the term dysregulation in this context bears further discussion. The medical use of the term tends to imply a physical basis for the condition, the standard preoccupation of medicine. The assumption is implicit that if the medical cause is removed, then the dysregulation status resolves as well. Whenever “medicine” is dealing with conditions where the failure of good regulation is itself the issue and no physical cause is suspected, the patient is referred to a psychiatrist. This is the turf where we find ourselves presently: facing conditions where dysregulation itself is the core concern, and no underlying medical cause is necessarily implied. In such cases, self-regulation constitutes the categorical remedy. Once the dysregulation status is resolved by means of a self-regulation process, there is no residue for the field of medicine to address. The divide between software and hardware failures in computers comes to mind as a ‘good-enough’ analogy.

With the progression deep into the ILF region, our success in re-regulating a severely dysregulated physiology mounted. The driver had always been our most challenging clients, after all, the ones where the lowest frequency was not low enough. At the same time, however, the role of volition in the feedback process was now precluded. The low-frequency signal moves sluggishly and is relatively featureless. There is no way for volition to engage. There is no better or worse. The signal simply is what it is, and it only makes sense to the brain that is producing it, and only while it is producing it. It carries no meaning for the individual, and in fact it has no meaning for the brain either except in the immediate context as an event in real time. The brain experiences the signal; it does not merely observe it.

We had arrived at a process that could be understood purely at the neurophysiological level. This is a matter of the brain engaging with a correlate of its own behavior. How the brain responds to that signal is entirely its own affair. The clinician's role is to observe the status changes and to discern implications for guiding the training. The clinical challenge is to find the ORF in each case, where the process can unfold most productively and benignly. The encounter is well characterized as a "dance with the brain, but the brain gets to lead."

This closely mirrors what happens in Alpha-Theta. Here a context is created in which the person is liberated to migrate in psychological state space toward the priorities of the core self. In ILF training the brain is liberated to migrate in neurophysiological state space toward its own priorities, namely restored functional competence. In this undertaking, the brain merely requires information; it is not in need of instruction. Both kinds of feedback are permissive rather than prescriptive. There is a remarkable parallelism here, and the two approaches clearly complement each other.

Infra-Low Frequency Neurofeedback: The Process

Inevitably, signal processing in the ILF regime both reveals and distorts the signal proffered to the brain. With frequency-selective filters we have made the process exquisitely sensitive to the choice of target frequency. On the one hand, that makes the training possible in the first place, and on the other, it constrains the process to specific frequencies, the ORFs that populate the entire frequency range for everyone. The highly dysregulated brain can be thought of in chaos theory terms as having a state space populated with adverse attractors. These, however, are not to be thought about as fixed entities, by analogy perhaps to Scylla and Charybdis, but rather as dynamically generated states. The power-law distribution of their incidence testifies to that. The ILF training process accelerates the journey through state space and thus magnifies the risk of encountering (precipitating?) adverse attractors. This means a clinician always needs to be actively involved to guide the process to its most propitious outcome through choice of placement and target frequency.

The rapid journey through state space can be a challenge to the brain that is susceptible to instabilities such as seizures, migraines, panic attacks, asthma attacks, and bipolar excursions. Brain stability may need to be targeted as a first priority, and it has been found that brain stability depends critically on the relationship between the two hemispheres (Othmer, Othmer, Kaiser, and

Putman, 2013). This aspect is trained using inter-hemispheric placements, in particular T3-T4. The various kinds of brain instabilities all respond to the same protocol, which suggests that all of them trace back to the same core mechanism, the delicate balance and coordination that must exist between the two hemispheres.

In ILF Training, the guiding principle is the brain's hierarchy of regulation. Stability of brain function is the first priority, as in any self-regulating system, but particularly so by virtue of the above considerations. The second priority is the quality of arousal regulation, to which the right hemisphere gives us preferential access. The training of self-regulation is therefore begun with a combination of enhancing arousal regulation with T4-P4 and of enhancing cerebral stability with T3-T4, each optimized based on client response. The ORF is invariably the same for both placements, but it has been found that the precision of the ORF is more critical with the instabilities than with arousal regulation. With respect to the latter, it is mainly a matter of calming the system, of restoring access to a well-regulated resting state. The regulation of physiological arousal is intimately associated with the regulation of the autonomic nervous system, which is a matter of restoring the proper balance between the sympathetic and parasympathetic arms. That, in turn, takes us back to the issue of balance between the hemispheres. Both arousal regulation and autonomic regulation are in turn intimately associated with the regulation of the affective domain, the province of the right hemisphere (Othmer, S. F., 2019).

In this manner, we have encroached upon the home turf of the traditional biofeedback modalities—the regulation of the autonomic nervous system. Here affect regulation is the secondary consequence of autonomic regulation, and the same holds for arousal regulation. The difference is that whereas peripheral biofeedback comes to the task of affect and arousal regulation by ‘going up the down staircase,’ so to speak, ILF neurofeedback goes more directly to the source of the problem. Arousal regulation, autonomic regulation, and affect regulation are simultaneously engaged at the level of the intrinsic connectivity networks. The two starting protocols in fact do most of the heavy lifting in the clinical work. Whatever is not dealt with by means of the two starting protocols is handled in the same manner by a small number of complementary protocols.

An Emerging Synthesis

Several elements of our narrative now fall into place. The ILF training covers the base that in the CRI-Help study was being targeted with the SMR-beta training. It also addresses the issues that Peniston covered with the temperature training component of his protocol. And finally, it handles the problems that Bill Scott encountered during the CRI-Help Study. Scott found that a number of clients did not respond well to the Alpha-Theta training at the outset, for reasons of their profound dysregulation status. His remedy was to train down elevated alpha amplitudes in a self-regulation model before initiating the usual Alpha-Theta protocol.

It turns out that attending to the client's general dysregulation status at the outset potentiates the Alpha-Theta experience when it is encountered later. It does so by removing impediments to the success of the latter. Additionally, there are the many cases where substance dependency or

addiction is traceable to physiological mechanisms rather than to the trauma response or other psychological factors. And finally, there are the many cases of addiction that are seen in conjunction with antisocial personality disorder or other personality disorders. In these cases, the underlying personality disorder needs to be addressed, for which once again ILF training is the remedy of choice.

Consider the implications of the following case vignette: an older veteran is court-referred for neurofeedback because of a violent episode. He has a 20-year history of both PTSD and schizophrenia. At the end of the first session of training, he remarks to the practitioner that—curiously—he does not feel like smoking. By this time, he has not smoked in several hours and would ordinarily need another cigarette. Coming in to session five some weeks later, he tells the therapist that he has not smoked since session four. Consulting his notes, the therapist establishes that it had been nineteen days.

It is well-known that nicotine is typically experienced as calming in schizophrenia, and would therefore not be given up readily. The fact that it was given up so easily in this case, and without any intention to do so, speaks volumes. There was no transformative moment here, no psychological involvement. There was no therapeutic mandate here, no moral suasion, not even a subtle suggestion. Smoking had even not been raised as an issue. What happened here must be understood entirely at the physiological level. The training had impacted the mechanism of nicotine dependency that had undoubtedly consolidated over many years. It had impacted the schizophrenia. And it had done so in very short order.

This was clearly a highly unusual case, unprecedented in our experience. And yet it was not unique. Sue Othmer once worked with a middle-aged woman who was well situated with an intact family and ambitious plans for her future. The roadblock was a dependency on heroin and cocaine that had a fifteen-year history. From the first moment the young woman experienced heroin, she was willing to move heaven and earth to have that experience again. She had undergone 25 failed addiction treatments of the conventional sort. After fourteen ILF training sessions, she declared: “There has been no urge to use drugs. Pretty shocking, actually. No craving since starting the neurofeedback. I feel like a normal person.” After 20 sessions: “Just getting off the drugs is such a great relief. I am much happier.” “Life involved this compulsive, self-destructive drug behavior. It’s gone. The desire for drugs is completely gone.” Observe that the subsidence of drug cravings was not mentioned until session fifteen, even though it was noted already after the first session. The reason is obvious: the client was reluctant to believe that the change would persist, so it went unmentioned.

All this transpired well before any thought was given to introducing Alpha-Theta. The later role of Alpha-Theta would be the appropriate one of resolving the traumatic aspects of this woman’s crushing failure to measure up in her own eyes and those of her family. Once the addiction itself was sequestered as a primarily physiological dependence, it no longer carried the stigma of personal failing. The two aspects of the protocol were both critical, and they reinforced each other.

The Further Evolution of Trauma Therapy

Throughout the history of Alpha-Theta, there has been an established pattern of promoting self-regulation by one or another means prior to initiating Alpha-Theta training. With ILF training we now have the additional rationale of redressing the physiological mechanisms of substance dependency directly. This gives us a multi-pronged ability to target both the physiological and the psychological drivers of the addiction process. This is best done sequentially, with psychophysiological regulation preceding the initiation into Alpha-Theta.

With the maturation of the ILF training over the past decade, the major burden of the recovery process has increasingly shifted to the ILF component of the neurotherapy. The Alpha-Theta experience is introduced only when the person is ready for it. This makes for a more efficient training process, and the term abreaction has slipped out of the conversation entirely. At an appropriate point during the ILF training, an Alpha-Theta session is offered on a trial basis, and if the client is drawn into the process, then it is continued and becomes part of the mix. If not, then the ILF training is resumed exclusively for a time before the Alpha-Theta experience is offered once again. Sooner or later, Alpha-Theta training will typically be welcomed. When that occurs, it is likely to become the preferred training mode from that time forward. Shorn of impediments, progress in Alpha-Theta may then occur swiftly.

With the ILF training assuming such a major role in the recovery process, it bears further discussion. All the ILF placements are either interhemispheric at homotopic sites, or they are lateralized to the four quadrants of cortex. The principal electrode sites consist entirely of those where the default mode network (DMN) are accessible to us at the cortical surface (Buckner, Andrews-Hanna, & Schacter, 2008). The primary task is the functional re-normalization of the default mode network, our task-negative network. Under this rubric we target brain stability and arousal regulation as joint objectives. This process can also be understood as instrumentally assisted relaxation training. The brain utilizes the information provided to re-acquire its desired resting-state configuration. Dysregulation status limits the brain's access to its full range of states, and makes for inefficient cortical processing. Fortunately, providing information back to the brain on its own function is usually sufficient to guide the process to its successful outcome.

The next step in the ILF training is to bring the salience network into the schema, and the control networks related to executive function, depending on the clinical priorities. The salience network mediates between the task-positive networks and the task-negative network, the default mode. The salience network plays a monitoring role, one that is largely responsive, and hence mostly passive. This involves the limbic system, and thus the most intimate association of the salience network is with the affective domain. Training this linkage is critical to the taming of emotional reactivity. The implications for the smooth unfolding of the subsequent Alpha-Theta experience are obvious.

The above schema carried us forward for several years, until David Kaiser alerted us to another critical aspect of default mode training. The primary axis along which the default mode network is organized is front-back, with the primary hubs being a frontal and a parietal hub (along with two

posterior lateralized hubs; Lehmann et al., 2014). It was in fact the close coordination of the frontal and parietal hubs of the DMN that led to the identification of the default mode in fMRI research originally (Raichle et al., 2001; Raichle, 2010). Curiously, the front-back relationship is not addressed at all in current ILF training! That does not mean, however, that it has been missing from the repertoire of neurofeedback protocols in general. It is simply a contingent fact of history that in all our development over the years the midline has gotten very little attention ever since we migrated from Cz to C4 in 1992 for a stronger, more hemisphere-specific effect in the SMR-beta training regime.

It may well be the case that the coordination of the default mode in general, and of the front-back axis especially, is the specific virtue of the alpha synchrony training that has been practiced since the early days of the field by Jim Hardt, Lester Fehmi, Chuck Strobel, and Adam Crane (Fehmi, 1978; Fehmi & Robbins, 2007; Hardt, 2007). This cannot be done as readily in the ILF regime. To promote coordination of the two primary hubs one would like to do synchrony training, which calls for a neutral reference that does not exist in the low frequency regime. Hence, the only truly valid signal there is a differential signal such as we have been using. Alternatively, coordination between sites can be promoted through feedback on relative timing, and such work is best done at the higher frequencies, namely in the EEG range, for improved timing discrimination. As it happens, the alpha band is the only one for which global synchrony over cortex is well tolerated. That presents the therapeutic opportunity, one that was seized quite early in the development of the field.

In our evolving worldview, we now understand alpha synchrony training largely in the frame of default mode training, and in pursuit of that objective it now goes hand-in-hand with the ILF protocols. Indeed, the experience of alpha synchrony training is typically very different from that of Alpha-Theta, at least partly because it is being done in a very different context, that of alert-state training. It has found its place as another steppingstone on the path to Alpha-Theta, following the ILF protocols. Rather than promoting whole-brain synchrony, however, our present protocols merely promote synchrony on the midline between AFz and Pz, in our own implementation of a David Kaiser protocol. In sum, we depend on the synchrony training to organize the front-back axis and on the ILF protocols to manage the inter-hemispheric and lateralized functional relationships within the default mode. That combination seems to be serving us well.

Since this monograph was first written in 2017, one further key innovation has been introduced. The coordination of the frontal and parietal hubs of the DMN via synchrony training has been achieved in the ILF region. We found that the lack of a quiet reference doesn't confound ILF training to the point of infeasibility. The same problem exists in the EEG range, after all, in that an ear reference is not quiet either, and yet referential training can be done successfully. The same holds for ILF synchrony; in consequence, it has assumed a preferential role with respect to Alpha Synchrony training in that cause. For certain clients, that turns out to be a critical protocol.

A Comprehensive Trauma Recovery Program

Taking stock of where we are presently, a comprehensive strategy toward self-regulation has emerged, one that respects the hierarchy of concerns. Core regulation is addressed at the outset, followed by more specific targeting of dysfunctions. Only after physiological regulation has been restored are the psychic wounds of trauma tended to. With respect to physiological regulation, the hierarchy we discern is also the developmental hierarchy, and this turns out to line up well with the hierarchy in the frequency domain. We have been well rewarded for our journey to the low frequencies. In view of the above correlations, this protocol can also be described as a journey back in time to the early phases of the child's development. In this manner, patterns of dysregulation that were consolidated via early trauma become accessible to remediation.

Subsequently, the EEG range of frequencies is addressed to achieve more refined regulation of temporal relationships in cortex. Finally, we arrive at the point where our intrinsically human faculties—as opposed to our brain's operating system—can become our primary concern through the Alpha-Theta experience. The individuality and particularity of the response to these protocols is evident in every phase of the program. And at each stage, it is either the client's brain or the core self that determines the journey. Full latitude is being given to the person's intrinsic healing resources, and these merely need to be potentiated by providing real-time information on the person's state, on the one hand, and the removal of impediments, on the other. The role of the therapist in this process is critical, but it is largely supportive rather than being directive or even prescriptive.

The natural history of PTSD, of substance dependency, and of traumatic brain injury (TBI) is that self-recovery is the predominant expectation. Most people age out of an addiction at some point in their lives, and most do so without the benefit of any therapy. Self-recovery has been the standard assumption in the field of medicine for traumatic brain injury—the default position in the absence of any available medical remedy. And most people recover from their traumas without lingering PTSD. This expectation holds even for combat-related trauma, as we observed after the Vietnam War.

The implication is that those who visit our offices with these conditions are most likely to be those whose nervous systems were more severely impacted by the trauma, or they were already dysregulated when they had their significant head injury, encountered their trauma, or were beguiled by their drug of choice. Their recovery potential had been compromised earlier in their history. We get to see the result of a cumulative history of prior traumas, minor head injuries, and chemical insults to the brain. We refer to this as the dysregulation cascade. The key factor that made PTSD and TBI such prominent issues in the recent conflicts was multiple deployments, leading to the concatenation of both physical and psychological traumas. The compounding of effects then makes self-recovery much less likely. Even minor traumas count.

The key factor that made TBI so prominent an issue in the recent wars was blast injury, where no physical injury to the brain could be identified and yet service members were rendered dysfunctional. For the first time, the field of medicine was confronted massively with the issue of

functional injury, in which manifest deficits could not be traced to obvious physical injury. All of this strengthens the case for redressing physiological deficits—the functional injury—prior to dealing with the psychological aspects of trauma. Finally, the physical trauma of TBI is simultaneously also a psychological trauma, as the victim surveys his uncertain prospects in the face of the precipitous loss of functionality. The close kinship of TBI and PTSD is manifest, and it is also traceable to commonality at the level of failure mechanisms. Both are grounded in altered functional connectivity of the neural networks, and both are comparably recoverable.

Clinical experience with both EMDR and exposure therapy is supportive of the above proposition. EMDR procedures frequently lead people into distress, just as exposure therapy does. In all such cases, one surmises, the causal chain involves responses triggered by dysregulation. Recovery from PTSD must therefore be understood firstly in a physiological rather than a psychological frame. Once the physiological aspects of PTSD are resolved, PTSD can no longer be diagnosed. At a superficial level, this is in consequence of the dominant role of physiological symptoms in the diagnostic criteria for PTSD. Once these are cleared, PTSD is unlikely to be diagnosed. At a deeper level, this is attributable to the intimate coupling of psychological aspects of PTSD with their physiological underpinnings. However, even this belies the yet deeper reality of the trauma response. PTSD is physiologically rooted in its essence. Now that we have the tools to resolve the physiological dysregulation with ILF training, combined with ILF- and Alpha-band synchrony training, the Alpha-Theta experience can finally assume its intended role, the healing of the psyche and the unbinding of the soul. This is an intensely personal and, for many, an essentially spiritual journey, one to which ideally everyone would be given entrée at some point in their lives.

The most critical test of the above propositions is provided by our military veterans. The Vietnam era veterans have lived for 40 years with the condition (some amalgam of PTSD and TBI), and have witnessed the progressive deterioration of their physiological integrity over that time. Veterans of the recent and ongoing wars give us a chance to work with PTSD and TBI in its early post-trauma status.

Clinical Validation

Franklin came to us in 2009 from Bell Shelter, a Salvation Army shelter for formerly homeless veterans, offering them transitional housing until they can be rehabilitated. At age 59, he was one of their most challenging residents. His family had cut off contact years ago. He had had a very checkered history with drug use and with the criminal justice system. By now he was diabetic, obese, and had sleep apnea. In consequence of poor sleep, it was difficult for him to stay awake during the early sessions of ILF training. Our symptom tracking program was used to record symptom severity every three sessions. Tracking the symptoms most closely associated with PTSD revealed the following: suicidal thoughts, flashbacks of trauma, nightmares and vivid dreams, and binging and purging were no longer listed as problem areas by the third session, and were never a problem again thereafter. Other rapidly resolving symptoms included irritability, anxiety, anger, and emotional reactivity, all of which essentially resolved in 18 sessions. By session 18, all the above categories

were listed as zero on a 10-point scale, whereas they had been key issues at the outset. In this compilation, only sleep symptoms remain. The symptom regression profile is illustrated in Figure 3.

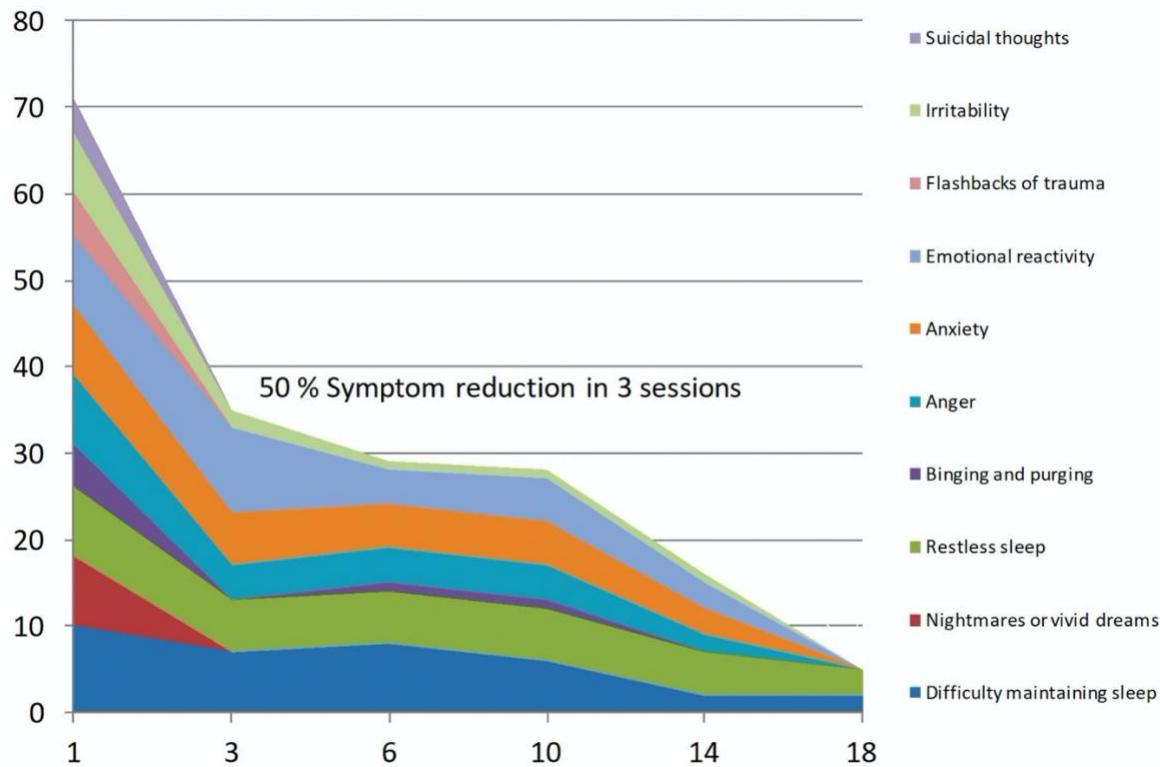


Figure 3. Progress in symptom severity for a Vietnam era veteran is shown here for the first eighteen sessions. a) The symptoms most directly associated with PTSD are illustrated here; they were also the symptoms most readily responsive. Overall recovery by more than 90% was observed over 18 sessions, and gains were sustained subsequently.

On the presumption that his extended history with PTSD had determined Franklin's total dysregulation status, symptoms of dysregulation were tracked comprehensively. These included (in addition to those already mentioned) peripheral neuropathy pain, chronic nerve pain, nausea, high blood pressure, fatigue, difficulty walking or moving, chronic constipation, lack of appetite awareness, tinnitus, sleep apnea, restless sleep, and difficulty maintaining sleep. Many of these are not expected to yield quickly to neurofeedback, yet collectively these symptoms exhibited more than 80% reduction in severity in 18 sessions. This symptom profile is illustrated in Figure 4. Symptom severity largely plateaued at that point for the subsequent 40 sessions, except for a transient increase in emotional reactivity as Franklin reconnected with his family at session 42.

At the point of graduating from the training at session 60, residual symptoms related to his obesity (difficulty walking, although he was now mostly out of his wheelchair); lack of appetite awareness; and the emotional reactivity already mentioned. Sleep apnea episodes had ceased to be an issue, apparently. There were no more complaints of pain. The 23 medications he was supposed to be taking were down to one: insulin. Franklin became the happy and joyful man that he had once

been, and he lives independently. There was never an opportunity for him to experience Alpha-Theta.

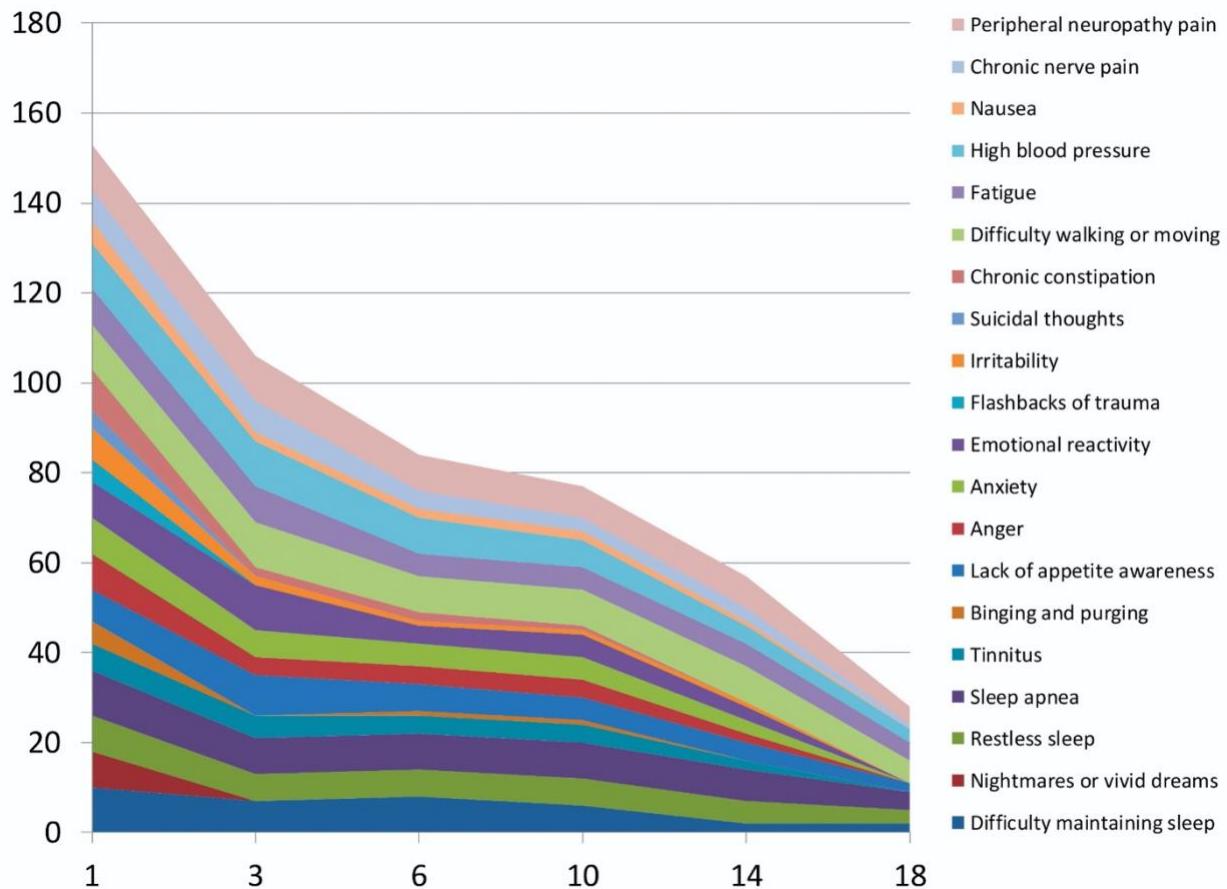


Figure 4. All the significant symptoms of dysregulation are tracked collectively (including those shown in Figure 3). Overall improvement was at more than 80% in eighteen sessions, and gains were sustained over the longer term. Prominent residual symptoms related to sleep apnea, obesity, and peripheral neuropathy pain attributable to diabetes. These are conditions for which neurofeedback is not expected to be a remedy.

This case report testifies to the proposition that PTSD is lodged largely in the physiological domain. After that aspect is resolved with neurofeedback, there may indeed still be trauma—moral injury, relationship loss, survivor guilt, etc.—but the classical disorder labeled PTSD will no longer be diagnosable. What remains can be aided by Alpha-Theta training, with the support of psychotherapy and the ministrations of the healers among us.

This conception—of PTSD lodged in the neurophysiological domain—is so contrary to prevailing perspectives that a single case report cannot be dispositive on the issue. A case report has just been published that implicitly makes the same case, and it does so by way of standard assessment instruments. Swedish trauma therapist Anna Gerde presented the case of a woman diagnosed with complex PTSD and unspecified Dissociative Disorder. Now in her forties, she had been sexually abused in childhood in a shame-based culture, and she had also suffered civil war-related trauma that

involved missing and murdered relatives. She suffered through an abusive relationship in adulthood. Her brother was murdered two years before therapy was initiated. Between two assessment events ten weeks apart, the one parent with whom she had a partly secure attachment died. She was also in refugee status in an alien culture that was not particularly welcoming.

Therapy consisted of ten sessions of Infra-Low Frequency (ILF) Neurofeedback, plus one session of EMDR. Between the second assessment and follow-up at four months, PTSD Checklist (PCL-5) score improved by 83%, from 71 to 12. Symptom Check List (SCL-90-R) score improved by 98%, going from 223 to 4. DES, the Dissociative Event Scale, improved by 97%, going from 62 to 2, with all of the improvement coming in the NF portion of the therapy. The Symptom Rating Scale, SR, improved by 98%, going from 8.1 to 0.2. The Positive States of Mind Scale, PSOM, improved by a factor of 3.6, going from 5 to 18, with most of the improvement occurring during the NF portion. The results are shown graphically in Figure 5.

Prior to this report, such rapid abatement of susceptibility to dissociative events would have been regarded as impossible. By the end of eleven sessions, neither DID nor PTSD remained diagnosable. Here the ILF neurofeedback served to calm and stabilize the nervous system to the point where even a single session of EMDR could be highly productive. In a comprehensive neurofeedback strategy, this part of the therapy would have been pursued with Alpha-Theta training.

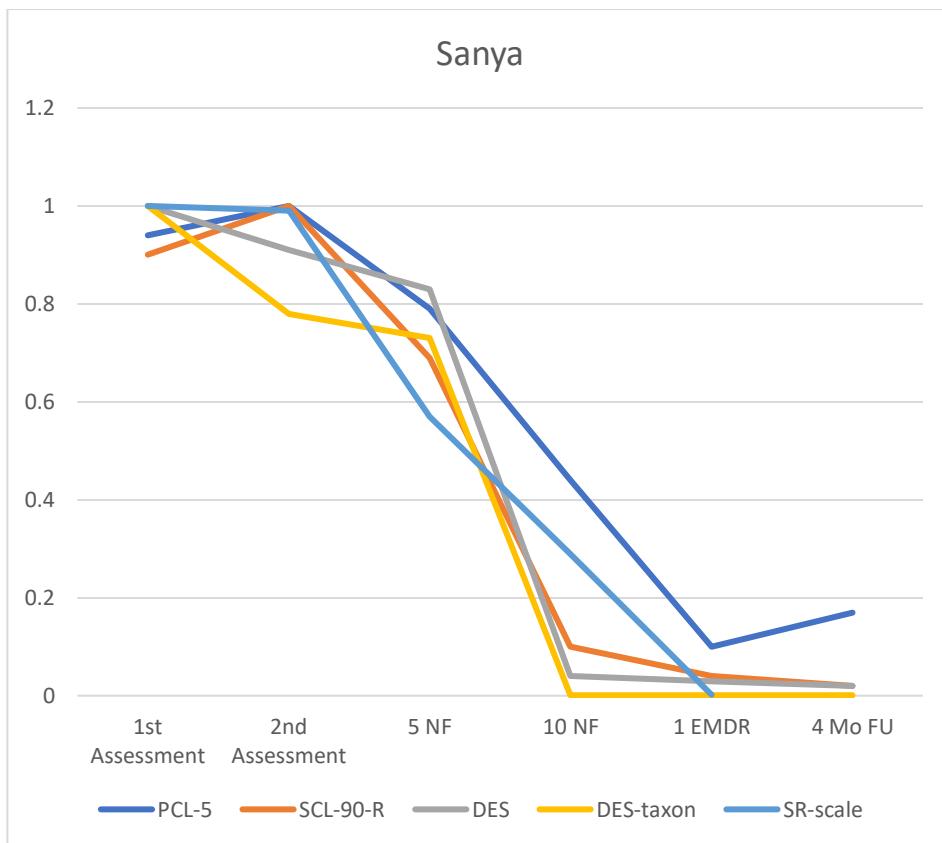


Figure 5. Symptom-tracking data for case of DID/PTSD. PCL— PTSD Check List; SCL -- Symptom Check List; DES -- Dissociative Events Scale; DES-taxon -- subset of DES; SR -- Symptom Rating Scale

Regarding PTSD and TBI relative to recent and ongoing conflicts, we have had the extraordinary opportunity to work with the Department of Deployment Health at Camp Pendleton (and the relationship continues with the Department of Mental Health). The staff there had heard Siegfried's talk at the Navy and Marine Corps Combat Stress Management Conference in 2008, which was followed by a presentation at Camp Pendleton. When the Department Commander realized that we were talking about nothing more than biofeedback, and that the procedure had the necessary approvals from the FDA, she saw no further barriers to a trial. It was not long before the ILF and Alpha-Theta training came to dominate the work at the Department, which had to give clearance to every service member planning to redeploy. The entire professional staff of the Department got trained in ILF neurofeedback. Between 2009 and the present, between one and two thousand Marines and Navy received the benefits of the ILF training to qualify them for redeployment.

For the first 300 going through the training in the 2009-10 time frame, the findings were as follows: some 25% of the service members reduced their symptoms below clinical significance within 20 sessions, with a median of about 10 sessions. A further 50% reduced their symptoms to clinical insignificance within 40 sessions, with a median of about 20 sessions. The remaining 25% either needed more sessions or complementary therapies in addition to the neurofeedback, or they were simply non-responsive. The staff was working under difficult circumstances of inconsistent scheduling, and estimated that under more ideal conditions the intractable fraction of the training cohort was likely around 5%.

In line with the above observations, most individual symptom categories distributed tightly around 75% to 80% response. Over 60 different symptoms were being systematically tracked, grouped into categories of sleep, pain, physical, psychological, psychophysiological, sensory, and cognitive function. The most responsive symptom was migraine, with 90% responding strongly. The least responsive symptom was tinnitus, with 50% showing substantial recovery. Addictive behaviors responded at the 60% level. Suicidality, hypertension, asthma, constipation, effort fatigue, and stomach pain responded in everyone where it had been an issue. The most dramatic response was for depression and anxiety, where scores for nearly all the responders were cut in half within six sessions.

Most of the trainees did not stay around for the Alpha-Theta experience. This was not much of a surprise to the clinicians, as they had already experienced the reluctance of service members to engage in psychotherapy before the neurofeedback was introduced. This can be attributed to the spirit inculcated in the Marines of taking responsibility for one's issues. One reason the neurofeedback flourished as it did was likely because it fit the military training model. ILF neurofeedback was seen as brain fitness training.

It is possible that in view of a rushed training schedule, Alpha-Theta was offered too early, at which point they tended not to like it or get much out of it. The experience is very different when Alpha-Theta is phased in appropriately, as now occurs with the veterans in private practice. They gravitate to the A-T readily, and from then on tend to prefer it to the ILF training.

Finally, we have the report on a pilot project conducted by the Swedish Red Cross, in which ILF training was offered to victims of torture among the refugees, all of whom had failed to respond to conventional therapies for from 6 months to several years. The results of 20 sessions of training are shown in Figure 6. A substantial reduction in symptom severity was achieved, even though the practitioners were relatively new to the method. Also, torture victims present a challenge to our method because they don't respond well to being asked to tune into their bodies. They have learned not to attend to how their body feels as a counter-measure against the torture. In consequence, it was difficult to determine the ORF for these patients. That, in turn, meant a slow start for the effective training process.

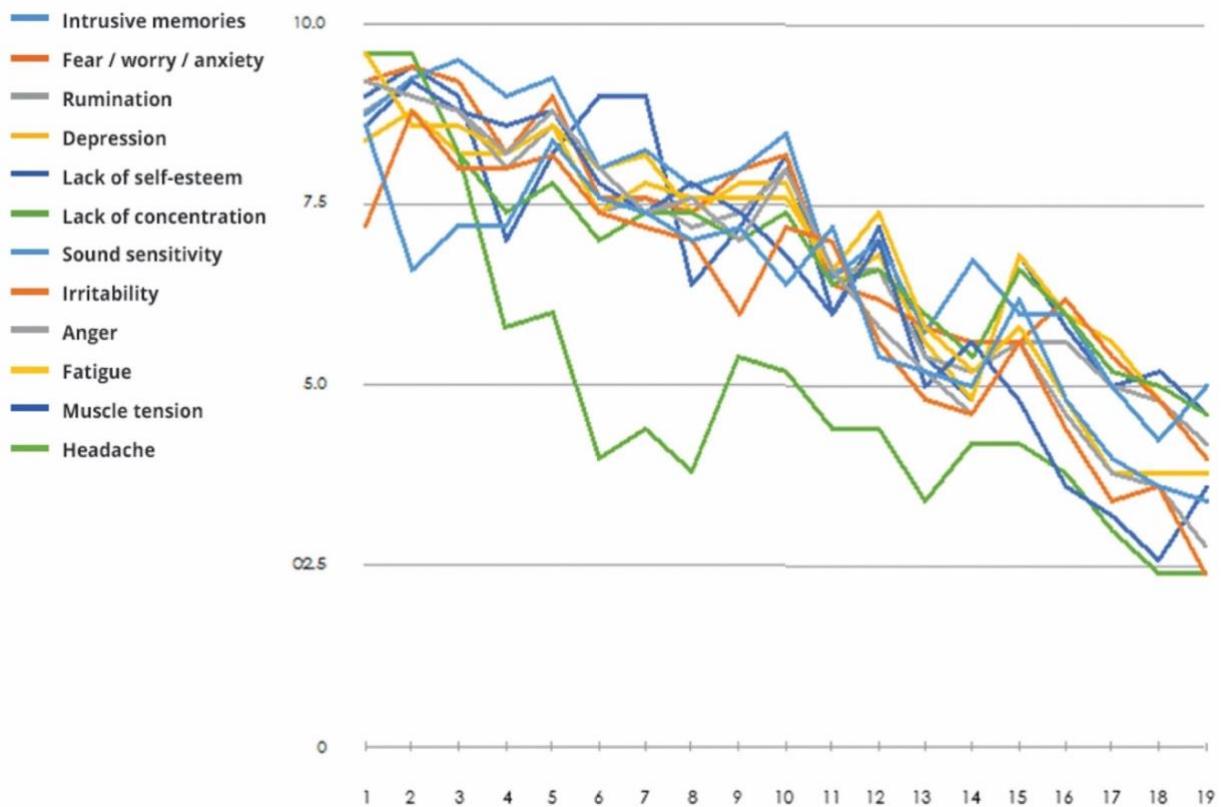


Figure 6. Average recovery curves for the five participants are indicated in the Figure for eighteen of the twenty sessions, for the symptoms listed in the legend. The first symptom appraisal took place only after the first session, and the last assessment took place at the twentieth session, and therefore does not reflect the gains attributable to the first and last sessions. Substantial remediation of their critical complaints is indicated.

Clinical Strategies and Clinical Realities

The tools are now in hand with which both the physiological aspects and the psychological consequences of dysregulation in general, and of trauma specifically, can be systematically, effectively, and efficiently remediated. The problem of addiction, in its various manifestations, fits nicely within this schema. Just where remediation is to be found in a particular case is not predictable in advance. It is therefore incumbent on the clinician to have at his or her command the full panoply of remedial techniques, along with skill in their deployment.

In this section, we shed more light on the respective roles of the two tall poles in the tent, the ILF and the Alpha-Theta aspects of the therapy. We do so with the aid of some instructive clinical vignettes. As indicated previously, the problem of drug craving can frequently be resolved within the ILF phase of the program, and sometimes quite readily. A clinician working with a binge drinker with ILF protocols reported that he had been “thinking about” his use of alcohol as he was undergoing the training for his general condition of overwhelm at work and at home. He had five training sessions over the course of seven weeks. Coming in after New Year’s he reported that he hadn’t had a drink since mid-December, despite severe year-end pressures on his job. When tempted to drink after work, he was now able to tell himself, “why blow it,” and to maintain abstinence even well before Alpha-Theta training was begun with him.

The resolution of drug craving fits into a larger picture of relief for the compulsive aspect of various addictive tendencies such as gambling, thrill-seeking, and lying, etc. The Alpha-Theta training is more specifically helpful in moderating and defanging particular triggers of addictive behavior. It buffers the person against the external, environmental, and contextual drivers of the propensity to use, whereas the ILF training resolves the internal, physiological drivers.

With the insertion of ILF training in advance of Alpha-Theta training, the subsequent experience is typically more consistently positive, with the dropout of concern about the abreaktions that exercised Eugene Peniston. Our professional training course environment, however, continued to present a special circumstance in which the training schedule was necessarily compressed, and Alpha-Theta was experienced before some attendees were ready for it. The experience of a seasoned trauma specialist who had been working with torture cases for many years is illuminating on the relationship of both aspects of the training.

Voces intruded on his first Alpha-Theta experience, and they were insistent and persistent. His outward demeanor was totally calm during this time, according to his partner in the training, and yet he was experiencing a lot of turmoil. This lasted about 15 minutes, at which time he removed the eye shades and headphones and ended the session. He continued with ILF for stabilization, and interestingly the thoughts were the same, but now he could manage them better.

All this came as rather a surprise to him, because as a long-time psychotherapist he thought that he had been successful in keeping himself in line with his skill set. And yet he was now confronted

with all these loose ends. It was unsettling. He was confronted with self in a new way. Here is how he described the experience:

"I just had these voices in my head; they were terrible voices... I couldn't stop it. It was quite awful... I was really in the grip of it... A lot of what my life is about is working with these systems... I started using everything I knew in terms of breathing and imagery, and it wouldn't quit... My question coming in [to this training program]: Is this real? Is this placebo? The reason I threw myself at this in this way... I wanted to see whether something was going to happen to me without my doing anything..."

That question was clearly resolved!

With the shift back to ILF after fifteen minutes in the boat, he said:

"My relationship to these thoughts changed. There was a qualitative shift in my experience of my own thoughts... The ILF allowed me to have the thoughts rather than the thoughts having me... From a psychotherapist point of view, it was about the absolute intra-subjective shift in my reaction to my own thoughts... [The experience] was great, but it was also 'oh, shit'... 'More work to do...' "

In the grip of the moment, he consoled himself with the realization that "I have lots of ways to get back to normal..."

Most unusual here is that his Alpha-Theta experience was so intensely verbal. And yet it had qualities of an Alpha-Theta experience—it came out of another part of himself that he had not yet tamed with his left-brain consciousness. From beginning to end his reaction to the new phenomenology was that of a psychotherapist—restoring control to the cognitive domain. Scariest was the loss of top-down control of his own thoughts, and the realization that the part of himself he had succeeded in mastering was only a part of the whole. The cauldron of his own collective trauma experience was in fact still bubbling.

The more generalizable aspect of this report is that people in general—but mental health professionals in particular—tend to react more strongly to both ILF and Alpha-Theta than they expect. Both kinds of training take them out of the comfort zone of their cognitively ordered self-perception. "I was not prepared for this. I did not think I had a problem," is a typical response. Plainly, the experience of the training acquainted therapists with their own dysregulation status, one that their self-management skills had not in fact conquered. A further observation, however, is that we know of no case in which the journey is regretted in retrospect. It is ultimately always ego-syntonic.

Sometimes the alert-state training has a transformational quality itself. Before the era of ILF training, Sebern Fisher worked with a CEO-type over an extended period with neurofeedback alone—no psychotherapy, as he was not there for that. At one session he became overtly emotional, and when Fisher inquired, said that "I have never known what love is. I don't know why my wife has stuck with me all these years" (Fisher, personal communication). Obviously, the connection had just been made in his internal circuitry. With ILF training we now have the key to the

personality disorders. This work takes a long time, and progress is largely accomplished in the ILF phase of the training, but at least this is now doable.

At issue here is the entire spectrum of attachment disorder, of which personality disorders are a manifestation. Fisher related yet another case in which extensive alert-state training had been done (at low EEG frequencies, but before the ILF era) with a young adult with an extreme case of attachment disorder. When Alpha-Theta training was finally initiated, the girl regressed, stopped coming to therapy, and even neglected the feeding of her dog. The conditions for successful Alpha-Theta training had not yet been met. There was no core self to come home to; the girl instead encountered a black hole, a total emptiness, without means of support. Matters might well have gone differently with ILF to shore up the scaffolding for the project of constructing a self. This cautionary tale remains a singular event in memory (and a good outcome was ultimately achieved). With ILF having priority in the training, nothing remotely similar has been observed since.

Transformational experiences are much more commonplace in the Alpha-Theta portion of the therapy. One middle-aged man reported that his journey took him back the New Jersey beaches where his father used to walk with him. At one point the father dropped his hand, and the 8-year old boy interpreted that as the loss of the love of his father, with long-term adverse consequences for their relationship. Revisiting that event in his adult consciousness, the man now realized the innocuous nature of that event, and in that moment repaired the relationship with his father. This was not a matter of mere cognitive reframing. It was affective, and it was visceral. The bond of filial affection had been restored.

A middle-aged woman reported on her remarkable Alpha-Theta journey as follows. She was an eagle flying near her childhood home. She flew higher and higher, with her house becoming ever smaller, until she was among the stars. Eventually she retraced her flight, ending back at her former home. Nothing more happened than that she had re-constructed her relationship to her mother and to her siblings in the course of that flight. This had occurred entirely non-verbally and essentially beneath consciousness. The negatives in each of these relationships from childhood times had simply shrunk to insignificance along with the house during that singular journey into space.

Another middle-aged woman, one with a history of early trauma, found herself walking the beach until she came upon an infant girl sitting alone on the wet sand. "I picked her up and realized that that was me." She would now get the caring that she herself had not had.

These are healing journeys that appear to be so totally inner-directed that one might readily ask just what the role of a therapist needs to be in this aspect of the work. One voiced his frustration as follows: "Personally, I am getting a little glum seeing people have amazing experiences, resolving intense trauma, and blossoming while I sit on the sidelines entering notes...." It is imperative, first of all, that clinicians have their own house in order. One M.D. who had transitioned to neurofeedback practice after burning out as an emergency room doc never had good results with Alpha-Theta work among her patients—by self-report. Her own unresolved PTSD may well have been the confounding issue.

One explanation for the lack of abreactions in our Alpha-Theta work could be that in connection with the CRI-Help study back in the mid-nineties we increased the center frequency of the theta band from what Eugene Peniston had relied on, from 4–8 Hz to 5–8 Hz. This may have kept clients from going too deep into theta dominance. In our present realization in Cygnet, the standard center frequency of the theta band is 7 Hz. There appears to be a relationship between the theta target frequency and early trauma: lower theta frequencies may target traumas that occurred earlier in the child's history or had more pervasive impact. This relationship became quite evident in one case of alert-state training in which Sue Othmer walked down the target frequency toward the delta band in one session and the client (with Dissociative Identity Disorder) transiently regressed to ever younger ages, eventually speaking in the high voice of a child. Walking the frequency back up restored her to her adult self.

The conjectured frequency dependence motivates a clinical strategy in which clients who are well along in their Alpha-Theta experience could be invited to venture into the lower frequency range for a deeper experience by gradually lowering the theta-band center frequency from session to session. This progression can be fine-tuned as necessary. One clinician recently reported on her results with this approach:

I started off slowly on the theta band, going from 7 to 6.5 and eventually to 5. [Clients] would come back with so much information and resolution of trauma that at times they themselves were overwhelmed with how much they achieved from Alpha-Theta versus years of talk therapy. It really digs deep and I think the client needs to be fully prepared in terms many sessions of awake state and regular Alpha-Theta...

The reader acquainted with EMDR will recognize the point of contact here between the two methods. EMDR was an early method of accessing traumas with a frequency-based stimulation technique in the delta range of frequencies. This allowed them to be dealt with cognitively. In our current perspective, the difficulties encountered in such work can be readily appreciated. In first instance, traumas can be stirred up that the client is not ready to handle either psychologically or physiologically. And the role assigned to the cognitive domain is more than it can bear. A proper sequencing of the process of trauma recovery (and of addiction recovery) is easier on the client and the clinician, as well as being much more successful.

Early on, in the Eugene Peniston era, Tom Allen turned Alpha-Theta sessions into something like EMDR. Armed with the physiological measures of finger temperature and galvanic skin response, he would seize moments of excursion in the measures to rouse clients from their journey and to engage them with whatever might have prompted that turmoil. He talked so proudly of his tactics, utterly persuaded of their merit. We now know better. This moment of transformational change is the absolute worst time for the clinician to come crashing into the scene.

What holds for EMDR holds even more for exposure therapy, which is surely the therapy from hell. It is simply perverse to think that exposing people to traumatic material ought to help them, particularly when the evidence is so strongly against it. The bifurcation point between de-sensitization and re-traumatization is not readily subject to external control. Relying on cognitive

control is likewise a false hope. Trauma is not lodged in the cognitive realm, and the solution is not to be found there. Once trauma is resolved by methods described here, previously traumatic material can be readily revisited without dramatic consequence. The trauma no longer has the person in its grip.

In one memorable instance from many years ago, Sue Othmer was working with a person recovering from rape. She was also seeing a psychotherapist, who in her wisdom decided at one point that flooding would be a good idea. The client completely cratered. She went home, took to her bed in fetal position, remained in seclusion for many days, and stopped all therapies. This is supposed to be helpful? Once again, the story ended well. Eventually, she came back for neurofeedback, where she also resolved her PMS, a major issue in her life. Years later, upon a reporter's inquiry, we asked whether she would be willing to talk to him. "Well, yes" she said, "but why are you asking *me* about PMS?" It had all been forgotten.

Contrast the above with the experience of a Canadian vet who had served with the UN in Bosnia, where he was compelled to witness horrors while being subject to official strictures on intervention. He came to our office in 2007 after some ten years of failed psychotherapy. With our first generation of ILF training, he shed his claustrophobia by the second session, and body pains were reduced. The garbage bags in the elevator that had triggered flashbacks after session two were no longer body bags at sessions five. The first Alpha-Theta session at session seven left him "strangely calm...." Images came up and did not elicit an emotional reaction. "Awesome. I can't wait to do it again." At the second A-T session he had a visit from his dead grandfather. At the third, he confronted his issues of guilt. Nightmares were subsiding. He had had his first panic attack in a movie theater, and subsequently avoided them. After the fifth A-T session, he could go to a movie theater without difficulty. At session #18 he came in 'craving Alpha-Theta.' He went very deep in that session. He disclosed that traumatic events he had never been able to bring up in years of therapy had ceased to be traumatic. The events never needed to be talked about at all. He had 24 training sessions in total, 12 of which had been Alpha-Theta, before returning home to Canada—a changed man.

Even worse than exposure therapy is the insult to the integrity of the human body that is represented by detox. In all instances of drug dependency, from anxiolytics to anticonvulsants to neuroleptics, whenever downward titration is called for, the watchword is to 'go slow.' The singular exception appears to be alcohol and illicit drugs. Why the infernal haste? Is this just the residue of the moral opprobrium that has historically attached to alcoholism and to illegal drug use? The physiological ravages attributable to detox are so unnecessary. Even the risk of seizure is tolerated. We can now train the brain away from its dependence on alcohol and it will be very clear when one has succeeded. Moreover, it will be the client's own victory over his condition. Success does not lie in the client clutching onto abstinence by sheer force of will. It lies in a life transformed... a brain restored to functional integrity and a psyche liberated from its traumas.

A common thread running through the above narratives is that historically clinicians have sought to install themselves as the central persona in the healing journey out of trauma and addiction, to

place themselves in charge of the process and to micro-manage it. This was necessitated because the pathway to healing was thought to be via the cognitive domain. This has been a monumental blunder. With core dysregulation at issue, there is no alternative but to facilitate the path to self-healing; it cannot be mandated, willed, or prescribed. The project cannot be outsourced—to a therapist, to a medical remedy, or even to an instrumental process. In the actual remedy, cognition plays only a minor role. Instead, the mission is to remove impediments to the intrinsic healing process, and to empower both the brain and the core self with guidance on its own journey—as opposed to prescription. The desired process of transformation must ultimately be self-directed. One therapist said:

"I have seen multiple sessions with nothing more than a good relaxed feeling and one 22 min session where someone goes back to Iraq, has a coherent conversation with dead comrades in the middle of battle, gets chewed out for having little to no insight, and returns with a more profound understanding of life than I could offer up in a century of therapy.'

I feel like a damn porter in a cosmic train station."

Perhaps it's time to board the train.

Optimum Functioning

Alpha-Theta training has been utilized and researched in an optimum functioning context for many years. The most prominent such study was undertaken at the Royal College of Music in London, where music students were offered beta and SMR training along with Alpha-Theta training, using our protocols and our first-generation NeuroCybernetics instrumentation. No benefits of the SMR and beta training was identified among these highly selected and highly functional students. The Alpha-Theta component, on the other hand, made a substantial difference in their musical performance. Gains were the equivalent of 2 years' progress in musical maturity, as established in blinded testing by professional musicians (Egner & Gruzelier, 2003). And yet the students had only experienced 10 sessions for 20 minutes each. In this study, one has the chance to observe the positive contribution that the Alpha-Theta experience can make in a context where no obvious impediments to functionality exist. In consequence of this finding, Egner and Gruzelier then studied the temporal dynamics of alpha and theta in more detail (Egner & Gruzelier, 2004).

It is in the optimum functioning context that synchrony training finds its most appropriate niche. It is also part of the healing journey, as previously mentioned. It was not dwelt upon in the above clinical discussion mainly because it does not pose great challenges to the clinician; secondly, because it lacks drama that compels our attentions; and thirdly, because of an absence of association with any "condition." It is typically inserted between the ILF training and the deep-state work, and it is either obviously helpful or it is not perceived to make much difference. Sessions are usually brief. Adverse reactions are typically quite mild and readily recovered from autonomously.

It would be preferable if no distinction were made at all between clinical applications and training toward optimal functioning. That would be entirely appropriate to the methods under

discussion here. These are all function-focused rather than dysfunction-focused. Irrespective of the specific objectives, the ILF training is always individualized with respect to target frequency, and with respect to the selection and sequencing of placements drawn from a standard set. Orientation is toward generality rather than specificity. Dysfunction subsides via the enhancement of function.

Alpha-Theta and synchrony training utilize standard bands and standard placements throughout. These methods are appropriate for the entire range of functionality from dysfunction to optimum functioning, and ultimately to the frontier of anomalous experience. This is also in line with the self-perception of our clients, who generally choose to see themselves as functional rather than as being defined by their condition. The optimum functioning perspective takes us beyond a narrow focus on symptoms and on functional shortcomings. It is the common ground that should be the point of departure for our therapeutic adventure.

Summary and Conclusion

Surveying the history of Alpha-Theta from the early discoveries at the Menninger Foundation to the present day, it appears that we have come full circle. The primary interest of the Menninger group early on was not in remediating addiction or any other condition. It was in exploring the dimensions of our human condition more fully, aided now with instrumental conditioning. Realization of the therapeutic potential of the method emerged over time. In the Peniston era, the late eighties and early nineties, Alpha-Theta became identified with recovery from addiction and PTSD. Even in our CRI-Help study, we saw Alpha-Theta as the essential core of the overall program, with the SMR-beta component playing a supporting role.

ILF neurofeedback now alters the landscape substantially. The burden of recovery has shifted toward alert-state training from the deep-state training of Alpha-Theta as the clinical priority. This follows straight-forwardly from the regulatory hierarchy: physiological self-regulation must come first. Further, the domains of physiological self-regulation and of psychological and spiritual healing are now more distinct. This brings us much closer to the objectives that the Menninger group had for Alpha-Theta training at the outset. Already during the ILF training at Camp Pendleton the trainees often complained that the focus was entirely on their symptom status: “Why don’t you ask about what is going well in my life?” They had moved on toward an optimum functioning orientation, and were no longer concerned with their earlier symptoms.

Liberated from the conceptual burden of being tied up with “recovery,” Alpha-Theta needs to be viewed in the positive frame of facilitating the journey toward wholeness, toward acceptance, toward integration of the fragmented self, toward personal integrity, and toward enlarging one’s affective depth and scope. It speaks to the yearning for transcendence. Alpha-Theta opens the door to an encounter with self that is likely to be welcomed by most people. It should be offered to all adolescents when issues of personal identity first arise for them. It should be available to all elderly as they approach the end of life’s journey.

But there is more. Ultimately one cannot make transpersonal phenomenology go away. It exists, and if that is the case, does it not make our universe richer and more interesting? Consciousness transcends the self. Does this not testify to our being in relationship in the larger sense? Consciousness is not bounded by space. Does this not contradict the materialist hypothesis, and thus give us grounds to believe that we live in a ‘warm’ universe rather than a ‘cold’ one? Consciousness suffuses our universe. What a comforting thought. This is the reality in which Elmer Green lived his entire life, and which inspired his work. We honor him by continuing his work in that same inquisitive spirit and with that same humane impulse.

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