Psychophysiology Today

the magazine for mind and body medicine

Don't believe what your eyes are telling you. All they show is limitation. Look with your understanding, find out what you already know, and you'll see the way to fly. - Richard Bach

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BFE
Biofeedback Foundation of Europe

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FROM THE EDITOR

Letter from the Editor-in-Chief:

I feel fortunate editing Psychophysiology Today. Editing has been a gift, allowing me opportunities for cultivating relationships with a wide variety of authors, asking them (sometimes repeatedly!) to submit articles about their hobbies and professional interests, that ultimately become real expressions of their professional thoughts, lives and personalities.

During the editing process, I am reminded that despite enjoying what we do professionally, we can feel stressed. For example, as editors or authors, there is often some voice in the back of our mind telling us that something else needs to be done. This nagging feeling can prevent us all from truly valuing and appreciating what we have achieved.

For many months I have been collecting interesting materials, chasing after people to submit their work and also kicking myself to sit down and finish the editing tasks. Although editing is stressful, luckily completing this issue of Psychophysiology Today was a positive stress. There are many people who helped minimize the stress and who should be acknowledged.

Thanks to Leah Lagos from Rutgers University who I met at the recent Biofeedback Foundation of Europe annual conference in Berlin. Please note that Leah is a talented author who we anticipate will continue making important contributions to this Psychophysiology Today as well as to the field. Even though she is still early in her career, I envision a great future for her. It is a real pleasure to work with such a smart and dedicated individual.

Thanks also to Patricia Norris, a remarkable clinician as well as daughter Biofeedback pioneers Elmer and Alyce Green and her husband Steve Fahrion, a clinician –researchers who have agreed to present at the upcoming Biofeedback Foundation of Europe meeting in Salzburg, Austria. In addition to their presentation, the contributed two articles for this issue.

The e-journal is growing and our board of editors has expanded with the addition of Richard Harvey, Ph.D. an associate professor from San Francisco State University. He will he will be actively involved in reviewing articles as well as submitting papers for possible publications. As part of the peer review process, we are seeking reviewers to help our editors to review the submissions. Please contact the journal if you would like to participate. In addition as an international e-journal, *Psychophysiology Today* urgently needs support for translating articles from languages other than English into English.

If you are able to help, please contact the editor at editor@bfe.org.

Finally I would like to encourage students, clinicians, researchers and professionals to submit articles related to Biofeedback, Psychophysiology, Mind/body medicine and health, We look forward to your contributions.

I hope to see all of you in Salzburg and join us at a meeting.

Monika Fuhs

Editor-in-Chief

RESIDENTIAL NOTE

As a forum for a community of clinicians and scholars, the Salzburg BFE meeting will offer in-depth training by international experts and stellar invited presentations and superb paper presentations during the scientific meeting. To my joy and surprise, the upcoming BFE meeting has expanded way beyond the initial training workshop programs that formed the basis of the first BFE meetings. Now besides the workshops and the scientific program, the BFE produces this peer reviewed e-journal *Psychophysiology Today* under the able leadership of Monika Fuhs and many international workshops.

The BFE would not have existed without the tireless effort and commitment by Hans Stodel, one of the initial founders, who died this year. For the first nine years of the BFE, he was the human face, the caring host and the pragmatic problem solver who nurtured the BFE. He organized and arranged the first meetings in Davos, Switzerland and at the meetings he provided the glue which connected the presenters and the participants. I will always remember him as Hans who treated and connected with people because of his genuine interest in them without regards to title and status.--he was equally concerned and generous to the custodian as to the professor. For him, they were just people. The upcoming meeting and the growth and aliveness of the BFE are a living testament to Hans. It demonstrates that his generosity and contributions were not done in vain—it formed the foundation of the BFE to provide ongoing education.

I have so many images of Hans such as getting the flowers for the people who helped with the conference, seeing him walking around and talking to people with humor and warmth, and finally, the last time when I saw him. Even though he was very sick, he still graciously drove me to the train station. Hans, we miss you and we thank you for the guidance, support and contributions which allowed the BFE to be born and be supported through its childhood and adolescence.

Erik Peper, Ph.D.
President, Advisory Board

Report from the last BFE Meeting

Professionals from all over the world met in the 11th International Conference of the Biofeedback Foundation of Europe in Berlin

A. Zemaityte, Dipl. Journ., M. Fuhs, Mag. and L. Lagos, Psy.M.

The 11th International Biofeedback Conference in Berlin, organized by the Biofeedback Foundation of Europe (BFE), took place from 27th of February to 3rd of March, 2007 at the University of Applied Sciences. The event attracted professionals from all over the world and featured experts like D. Moss, S. Porges, F. Andrasik from USA, V. Wilson, L. & M. Thompson from Canada, B. Timmer from Germany, M. Fuhs from Austria, B. de Michelis from Italy, D. Hamiel from Israel and many more.

The organizers of the conference provided clinical and scientific presentations for for all levels of experience. Beginners were offered introductory courses, advanced professionals attended specialized workshops, and all participants were introduced to the latest empirical findings during the scientific sessions…

The most challenging task for BFE participants was to make a choice about which offering to attend. The array of keynote presentations, workshops, and scientific programs stimulated many interests.

Each day, participants could chose among 6 to 8 parallel workshops. The presentations highlighted how biofeedback is a useful modality for treating clinical disorders as well as for enhancing wellness. During the conference, much attention was devoted to the treatment of "stress symptoms" manifesting as asthma, hypertonia, high blood pressure and phobic disorders. Workshops also explored how biofeedback is used as a tool for enhancing sports performance. Other workshops focused on strategies for applying Heart Rate Variability (HRV) protocols for treating anxiety disorders. In sum, the host of workshops showed how biofeedback is a discipline with great utility and value all over the world.

The conference orchestrated a forum for interdisciplinary exchange between professionals. The meeting provided a rich dialogue and a holistic understanding of biofeedback which was beneficial for all participants. Research presentations from experienced professionals served in promoting the development of biofeedback methods. For example, B. Brucker's (USA) presentation, discussed the application of biofeedback to treat patients with cerebral palsy, postnatal trauma, and related ailments. The success of his technique, termed the Brucker's Biofeedback Method (BBFM), evoked the interest of doctors and psychologists alike. Further, comprehensive knowledge from doctors, neurologists, psychologists, and physiotherapists served to highlight new strategies for biofeedback instruction.

The scientific program consisted of multiple presentations and lectures from experts and pioneers in the field of biofeedback such as the keynote presentions by V. Wilson (Canada) and Bruno de Michelis (Italy) who described the cutting edge applications of biofeedback and psychophysiological assessments for enhancing peak performance in sports and contributed to AC Milan dominance in soccer.

S. Porges (USA) and C.S. Carter (USA) presented outstanding basic research about neural mechanisms that determine social behaviour-a perspective that illuminates the etiology of numerous illnesses. During the breaks, participants informally and formally learned about current biofeedback research via poster presentations, conversations with conference speakers, and visits at the exhibitor booths such as Thought Technology and Mind Media.

The upcoming BFE Conference in Salzburg 2008 will provide an opportunity for scientific, clinical, and educational exchange with international experts and emerging leaders. Perhaps the most compelling reason to attend the BFE Conference in Salzburg, Austria is to experience the rare combination of informal sharing and regious learning from international recognized teachers, clinicians and researchers.

To view more pictures from the2007 Berlin BFE meeting – look at the website link:

http://www.bfe.org/meeting/11th/Berlin%2011th%20International%20Biofeedback%20Conference%20(2).pdf

"Am I Safe?"

A Neurobiological Theory of Social Engagement

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There is a little bit of Batman in all of us. We may not share his approach to scaling skyscrapers, but the detection of threat in social situations feels familiar. By processing information from the environment through the senses, the nervous system continually evaluates risk. While we may not be cognitively aware of danger, our body has already invoked a sequence of neural mechanisms that generate or inhibit defense behaviors such as fight, flight, or freeze.

Seeing the invisible

Exposed ongoingly to perils, you'd think that we would tire from exhaustion. Conducting risk assessments each time we start a conversation with the person next to us sounds effortful. But we would be wrong. Most of our keen risk detection mechanisms are mediated by the central nervous system and occur subconsciously, according to Professor Dr. Stephen Porges, Director of the Brain-Body Center at the University of Illinois at Chicago.

For more than three decades, Dr. Porges has studied the neurobiological mechanisms of social engagement. His recent work includes theorizing about the generation of prosocial and defensive behaviors. Instead of wondering why people freeze during a meeting of strangers or some other related social situation, Porges contends that we should instead recognize that our social behaviors reflect an evolutionary need for safety.

According to Porges' Polyvagal Theory, social engagement and defense behaviors are responses triggered by the perceived level of risk in the environment. To switch effectively from defensive responses to social engagement strategies, the nervous system must do two things: (1) assess risk, and (2) if the environment looks safe, inhibit the primitive defensive reactions to fight, flee, or freeze. After all, "a leisurely conversation," is not a particularly adaptive behavior in a precarious or life-threatening situation.

By processing information from the environment through the senses, the nervous system constantly evaluates risk. In detecting the person/environment as safe or dangerous, particular areas of the brain are triggered to support forms of social engagement. The cortex detects face expressions, prosody (movement, and intonation of a stranger's voice) and other features of a new environment. Researchers have identified that a particular area in the cortex becomes activated when we view familiar faces or hear familiar sounds.

Through this process of neuroception, the nervous system distinguishes whether or not to inhibit defensive behaviors.

"Only in a safe environment is it adaptive and appropriate to inhibit defensive systems and exhibit prosocial behaviors," says Porges. The bottom line is that even though we may not be consciously aware of how we perceive our environment, our body is responding as if we do. Our nervous system responds unconsciously even more rapidly than processes related to actively listening, thinking, or rationalizing.

An old system in a new world

Part of the problem with understanding the mechanisms of social behavior is that we are moving through the modern world with a prehistoric understanding of the autonomic nervous system. We've grown accustomed to the organizational model, developed in the late 1800's, that links the sympathetic nervous system to arousal and the parasympathetic nervous system to relaxation. This popular premise does not take into account how the human body and mind have evolved since the Paleolithic era.

According to the Polyvagal Theory, the autonomic nervous system has evolved new systems and orders of functioning. The first part of this theory emphasizes that a new system, called the social engagement system, links the nerves of the face with the myelinated vagus that regulates the heart and lungs. This system is intended to promote calm states and engender prosocial behaviors. The linkage between the nerves that regulate the heart and lungs means that we can use facial muscles to calm down. This might help us understand why "putting on a smile," can actually help us feel better.
Facial expression such as smiling exercises both the sensory and motor nerves, this means that by exercising our facial muscles, we are also controlling our breath and inhibiting defense systems in heart and abdominal viscera.

Ultimately, it makes Darwinian sense for the regulation of the heart and lungs to be controlled by the same part of the brain that regulates the muscles of the face. As the vertebrate of the nervous system became more complex during the course of evolution, its affective and behavioral repertoires expanded. Emotional expression, ingestion of food, listening, and social interaction all regulate our physiology. The complex linking of systems offers a very real chance to turn off defensive strategies. Resulting prosocial behaviors that get genes into the next generation-- offer a more valuable prospect in the Darwinian calculus than fight, flight, or freeze.

The second part of the Polyvagal Theory emphasizes that the autonomic nervous system is no longer composed of just a sympathetic and parasympathetic system in balance. It is actually a hierarchical response system. Influencing how we react to the world, three neural circuits compose this hierarchy.

The exact order in this hierarchy is determined by its newness. We usually react with our newest system, the myelinated vagus to calm or sooth. If that doesn't work, our sympathetic-adrenal system engages fight or flight behaviors. If our nervous system still detects risk, the most ancestral system is activated. The unmyelinated vagus triggers our most primitive form of defense known as immobilization. In the state of immobilization, our body reduces cardiac output to save metabolic resources. Behaviorally, immobilization with fear manifests as death feigning or passive-avoidance.

When we misinterpret risk

There is clearly an evolutionary benefit to detecting risk. What happens though if our ability to perceive risk is impaired?
The detection of risk in a safe environment means that defense systems remain active. This would explain why Porges proposes that maltreated and institutionalized children with Reactive Attachment Disorder (RAD) are often emotionally withdrawn and impassive.

The residual parts of the primitive brains did not give these children any choice but to engage in defensive social behaviors.

Still there is always a flip side. A person can trust their enemies and environments too much. Porges also noted that some children with RAD display uninhibited behaviors such as being indiscriminate in their attachments. A false sense of safety quelled each of their defensive systems.

Both examples of defective neuroception point to the most ironic of evolutionary psychology's implications: not all of the neural mechanisms generated by natural selections' imperative of genetic self-interest are adaptive. Indeed, faulty neuroception is a potential diagnostic feature of psychiatric disorders, including autism and schizophrenia, in which individuals have difficulty with social engagement behaviors.

The comforts of safety

The notion that innate sensors exist within us- that detect risk and transform messages of safety or danger into social behaviors- may sound like an unsettling perversion. Or at least it feels new. Yet, technological advancements have documented neural structures involved in the detection of safety.

Functional magnetic resonance imaging (fMRI) techniques document areas of the temporal cortex, fusiform gyrus (FG) and superior temporal sulcus (STS), as important arbiters of safe environments and trustworthy people. The FG and STS detect features such as movement, voice, and facial expression, to determine the level of risk in the environment. The detection of safety subdues the adaptive defenses mediated by the limbic system so that social engagement can occur. If danger is detected, however, an inhibition of adaptive defenses does not occur; the body physiologically prepares to respond to challenge.

When you watch these pictures - How safe do you feel right now?

The comforts of safety, neurologically speaking, afford individuals the ability to engage in two dimensions of intimacy including: 1) courting, and 2) the establishment of enduring pair bonds. According to the Polyvagal Theory, courting depends on a synergism between the social engagement system (including the myelinated vagus) and the sympathetic-adrenal defensive system to promote trust and safety.

The establishment of enduring pair bonds, however, depends on the release of oxytocin to regulate the unmyelinated vagus and block aspects of defensive freezing behaviors to enable immobilization without fear. The distinction between flirting and love may have never been as pronounced as in our neural pathways. Is this knowledge useful? Porges suggests it is.

Armed with an understanding of how social behaviors are mediated by neurological substrates, he is changing treatment options for children with deficits in social engagement.

Making the world safe for our children

The primal need for safety follows us from birth to adolescence to adulthood and beyond. In that sense, we never grow up. The concept of safety, of course, is relative. There is the psychodynamic view that a child's need for safety can be considered a dependency on the caregiver and a manifestation of fears of abandonment and rejection. Behaviorists posit that children's attitudes about safety reside in their habitual behaviors, habits that have been selectively reinforced. Neither addresses the neural mechanisms that filter cues from the environment about risk evaluation.

Thanks to Porges, who designed the "Listening Project," data is being collected in a study determining how the triggering specific neural pathways improves the behavioral functioning of autistic children. He posits that social behaviors such as looking, listening, communicating, and engaging in facial expressions are triggered by neural mechanisms that detect safety. Porges theorizes that brainstem structures associated with social behavior, known as special visceral efferents, are no longer function appropriately in children with behavioral and conduct related disorders. He explains that the disinhibition of the special visceral efferents promotes mobilization behaviors (e.g. hyperactivity, poor state regulation and lack of attention) and compromises prosocial behaviors (e.g. looking, listening, facial expressions, and vocalizations). Thus, Porges predicts that the stimulation of phylogenetically newer structures associated with the myelinated vagus will trigger coordinated responses in efferent visceral pathways. He predicts that spontaneous prosocial behaviors will result.

As currently implemented, the intervention involves five consecutive trainings, each of 45-minute duration. During the initial training, the frequency band is narrow. Over the course of the training, the frequency band expands. Preliminary data, collected on approximately 200 autistic children, demonstrated immediate and significant effects on behavior. Results based on behavioral coding of videotapes, parent questionnaire data, and psychophysiological monitoring indicates that most of the children experienced changes. These included reduced auditory hypersensitivities, increases in facial affect, spontaneity, listening, communication and behavioral state regulation. At a three-month follow-up, parents report that children's improvements persist.

The implications of "The Listening Project," extend to the deepest concerns of childhood development. How do we create environments that make our children feel safe? How does the perception of safety change the nature of a child's social interaction with the world? How can our understanding of the heart and face connection change treatment options for youth with listening, communicating, organizing and behavioral difficulties? These questions remain an integral focus of Porges' research.

Dr. Porges and his wife Sue Carter who is a leading scientist in the oxytocin research are going to offer an outstanding 2 day workshop at the upcoming BFE meeting in Salzburg, February 19 and 20. For more information see: http://www.bfe.org/meeting/12th/WORKSHOP%20SCHEDULE%20Salzburg%202008.pdf

Personal Transformation in Healing*

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> *…For in every action what is primarily intended by the doer,*
> *whether he acts from natural necessity or out of free will is the disclosure of his own image.Thus nothing acts unless by acting it makes patent its latent self.*
>
> *DANTE*

Over the years of our professional collaboration, my husband Steven Fahrion and I have focused much of our clinical and research work on substance abuse treatment and personal transformation. A large clinical research program was conducted in prison settings. My earliest work with prisoners began in 1970, and sought self-image change is the primary effector of transformation. My other professional specialty has been with a psychoneuroimmunology approach to the treatment of cancer and other immune system disorders. This paper demonstrates the many common bonds in treatment emphasizing self-transformation.

It would be hard to find any setting more in need of transformation and an infusion of positive energy than our prison system. Right now the fastest growing industry in the entire world is the American prison system. There are more people in prison in this country than there are in universities. The United States has 6% of the world population, and 25% of the world's prisoners. We have more people in prison per capita than China, Russia, the European nations, the rest of the Americas, the Middle East, anywhere. An epidemiology of prisons is needed, in depth studies to try to determine the underlying causes of this spreading condition.

As we recognize the intimate relationships between energy, energy balance, and well-being, caring for the energy of those being treated should become a priority. It goes without saying that prison settings are an energy drain, depleting mental, emotional, and physical energy, and alienating individuals further from the great wellspring of their being, the human spirit. We believe our treatment program addresses all aspects of the person, helping participants make physical changes in stress levels and reactivity, expand their beliefs about themselves and their potential, and gain empowerment and self-esteem.

Our substance abuse program is a unique, integrated program using a number of distinct elements. The major elements are:

1) Temperature biofeedback and breathing exercises for self-regulation of the autonomic nervous system;

2) Neurofeedback therapy for self-regulation of brainwaves and states of consciousness, and for correcting the neurobiology of addiction;

3) Visualization and Psychosynthesis for modifying contents of consciousness; using elements for gaining awareness and volition of personality, psychological and psychodynamic aspects of self.

A most essential and we believe unique feature of our substance abuse treatment program is that it is entirely affirmative. We do not ask or expect participants to attest to anything they do not believe. We discourage them from telling us, or group members, anything just because they think that is what we want them to say, think, feel or believe. Our intention is to operate with mutual love and respect, with unconditional positive regard, and with a belief in our participants' potential to grow, change, gain self-regulation, and transform.

Autonomic self-regulation

The protocol includes learning to control autonomic nervous system arousal and stress responses generally. In achieving autonomic nervous system balance we find temperature self-regulation and deep diaphragmatic breathing are the most useful. These are the first self-regulation techniques taught in *all* our treatment protocols, including in addition to substance abuse programs, cancer and immune system disorder treatments, cardiovascular (migraines, hypertension, etc), digestive system (ulcers, Irritable Bowel Syndrome, etc.).

The ability to warm the hands to a criterion level of 97^{o} at will enables one to effectively decrease general sympathetic arousal under any condition. Increased blood flow to the extremities has major beneficial effects for the whole body, restoring blood flow also to the kidneys, the entire digestive tract, and all the other organs and tissues in which, with arousal, there is an ensuing constriction. Our circulation is regulated by the hypothalamus, part of the limbic-hypothalamic-pituitary axis recognized as the emotional brain.

Breathing also interacts with the autonomic nervous system. Each inhalation stimulates the sympathetic, and each exhalation stimulates the parasympathetic, so that with regulated, deep relaxed breathing, a healthy balance between the two is achieved. Both breathing and circulation are part of the internal bioenergy system, the internal Qi. Regulating these aspects of our bodies impacts health and emotionality favorably.

Neurofeedback

Alpha-Theta neurofeedback was employed as a treatment of choice because both alpha and theta are often deficient in individuals with alcoholism and other substance abuse problems. Neurofeedback addresses both states of consciousness and the neurobiology of addiction. Research has shown that many alcoholics have little or no alpha rhythms in their brain signal when they are not drinking. Children of alcoholic parents have demonstrated low alpha and other neurologic signs designating inherited potential for alcoholism. Chronic alcohol and drug use over a long time can also deplete alpha and theta production, so that abstinence feels uncomfortable and unfulfilling.

The presence of alpha as the predominant rhythm is characterized by feelings of well-being, a capacity to be absorbed by and get pleasure from simple activities like sunsets and playing with children. Alpha is sometimes referred to as "a natural high." One effect of alcohol on the brain is to increase slow-wave activity, particularly alpha. It began to be apparent that alcoholics were drinking, and continuing to drink, as the only way they knew to get the "alpha experience" and enjoy a sense of well-being.
Many alcoholics and substance abusers believe that if they become abstinent, they will never experience happiness again.

Our original idea, in its simplest form, was to teach addicts how to produce and/or increase alpha without the use of alcohol, generating the same sense of well-being and capacity for happiness through voluntary control.

Neurofeedback is biofeedback that aids an individual in developing self-regulation of neural activity. In alpha-theta neurofeedback, the participants sit quietly in a comfortable chair with eyes closed, and attention is directed inward. The participant first initiates the relaxation, warming and breathing learned in the first week. The mind is quiet and the body is prepared to receive communication from the unconscious, often from the high self. Feedback of the presence of specific brainwaves is received in the form of auditory signals, and using this information the individual gradually learns to voluntarily produce the desired rhythms in abundance.

Especially at these times, when the brain rhythms are slow, the brain produces mind-altering and brain-healing substances, such as neuropeptides, enkephalins and endogenous opiates that have been shown to ameliorate craving and promote abstinence. As attention is directed inward, increased self-awareness, insight and changes in self-identity emerge.

Psychosynthesis

Psychosynthesis is at the core of all the therapeutic work we do. It provides an ideal theoretical model for self-regulation and for expanding human potential. In psychosynthesis the very core or essence of an individual psyche is conceptualized as a center of consciousness and will, capable of observing and integrating both the psychological processes and the physical body; and the essence of biofeedback training is extending awareness and volition . . . consciousness and will, over any process being monitored and fed back to consciousness.

Our entire theoretical framework and philosophy of treatment for all our work is based on the psychosynthesis model. In our addiction treatment program we use some of the visualization and meditative procedures widely used in psychosynthesis. Psychosynthesis is an ideal psychology for partnering and harmonizing with meditation, relaxation, and self-regulation of psychophysiology. In the case of Psychosynthesis, consciousness and will are the essence of the person, the core around which all the psychological processes and the physical body can be harmonized and integrated; in the case of psychophysiologic self-regulation, acquisition of skills is dependent upon awareness and volition; in fact, all of our actions except the purely reflexive ones, all deliberate actions, proceed on the basis of awareness and volition, of consciousness and will.

Finding Connections

Our program is designed to help participants identify, experience, and relate to their greater self. We believe that recovery depends largely on self-discovery. A very important part of knowing who we are, is knowing how we are related to the rest of creation, how we fit. Many of the prisoners we worked with do not feel connected to anything. They have little connection, or have lost connection, with their family; have no connections with school, the community, the government (other than the courts and prison system) and actually have no felt sense of belonging anywhere. Those who have no sense of belonging suffer from anger and depression, ennui, a sense of abandonment by society, and poor self-esteem.

It is often a sense of separation from one's larger self, and from others, from our oneness that brings people into drugs and alcohol, crime, and prison.

The psychosynthesis practitioner is aware that there is much more to an individual than his or her abuse or crimes, and addictions. We relate primarily to that "much more" part, the Self of the individual, and help them to do the same, expanding their sense of their own potential. Our goal is to give each participant a glimpse of their true self, an enlarged potential, to help them gain genuine self-esteem, to recognize their innate value and personal worth, to feel the joy of connectedness, hope, and empowerment, and to believe in themselves. If all of this is accomplished, they are bound to do well.

Special Aspects of Cancer Treatment

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The spirit is the master, imagination the tool,
And the body the plastic material…
The power of the imagination is a great factor in medicine.
It may produce diseases…and it may cure them.
…Ills of the body may be cured by physical remedies,
or by the power of the spirit acting through the soul.
PARACELSUS

Since the early 1980's, I have participated in holistic treatment of cancer patients, attending to body, emotions, mind and spirit. Some of the treatment aspects are now well known. For the body, diet including nutrients, exercise, relaxation; for emotions, stress management, control of autonomic arousal; for mind, a new way of visioning self, use of visualization and imagery, working with mind-body relationships. Mind-body work as we conceive of it is an integral part of energy medicine.

Defining spiritual factors in energy medicine challenges us to examine the relationship between healing energy and over-arching spiritual experiences common to various healing traditions. Love, connections, unity and oneness are emphasized in every spiritual tradition. At this time in world affairs, there is an urgency that we as a human collective begin to recognize our oneness. In this exploratory process we can become aware of the common bonds of love that cement our connection to the universe, that define the Self for whom we search. Some of the techniques for achieving this are described in this brief paper.

Visualization and Imagery

In ancient and modern times, in both East and West, visualization has with few exceptions enjoyed an illustrious history, and has been a cornerstone of many healing traditions. From the famous healing temples of ancient Greece to present-day pilgrims traveling to Mecca and Lourdes, from the Hermetic rites to help a person visualize himself in perfect health to modern day Christian Science and Science of Mind, visualization has been employed as a powerful tool for inner change.

Among the forty-two books of Hermes, considered to be the earliest-known founder of the art of healing, there are six that are medical, classified as the Pastophorus or "image bearers."

In the Middle Ages Paracelsus (1493-1541) devoted his entire life to the study of Hermetic Healing. Many remarkable cures are ascribed to him. The Essenes, early Christian mystics, were also healers of this order. The name Essene is derived from an ancient Syrian word meaning "physician" and the Essenes are believed to have held as their purpose of existence the healing of mind, soul, and body.

The power of images to affect physiology is no longer in dispute. Since the imagery a person holds of the disease process or, of the healing process can affect the outcome of the illness to *any* extent, the question can be asked, *How* is the imagery related to the condition of the body? Does the imagery precede the condition, influencing or even causing it? Or does it simply reflect the condition as it exists? And, if so, why is it so much a predictor of outcome, regardless of or separate from severity of disease? Asking questions like these is like asking the famous question, *Which came first, the chicken or the egg?* The point of the question is, of course, to point out they do not come separately; chickens contain eggs, and eggs contain chickens. They are both a part of a process of *being* and *becoming.* This is exactly the relationship between body imagery and the condition of the body.

In our work with cancer patients, biofeedback plays an immensely important role, not only for all its good effects on reducing stress, pain, anxiety, and fear, but especially because it provides indispensable *experiential* evidence of mind controlling body, of visualizations influencing physical processes. It is not a question of *believing* that mind can effect healing, but of *knowing* from the inside that this is true.

Biofeedback has been instrumental in furthering mind-body research and understanding. In the late 1960's Elmer Green formulated the now-familiar Psychophysiologic Principle, first published in the Proceedings of the International Congress of Cybernetics in London in 1969. The psychophysiological principle affirms that "Every change in the physiological state is accompanied by an appropriate change in the mental-emotional state, conscious or unconscious; and conversely, every change in the mental-emotional state, conscious or unconscious, is accompanied by an appropriate change in the physiological state." Elmer pointed out that it is this principle, when coupled with volition that makes mind-body self-regulation possible. In the psychophysiologic domain, the mind-body, or the bodymind as Candace Pert calls our embodied self, is one entity: the mind and the body aspects of ourselves are indivisible.

Biofeedback therapy of various sorts has been found to be efficacious in a wide variety of conditions. Persons using biofeedback-assisted self-regulation can bring about voluntary changes in blood circulation, muscle tone and activity, galvanic skin response, blood pressure and pulse rate, frequency and amplitude of brain rhythms, gastric motility, and indirectly, hormone levels, immune responses, and the psychological correlates affecting anxiety and panic attacks, depression, pain and fear. For many, the sense of self-mastery outweighs the benefits of symptom reduction, and carries over into every aspect of their lives, bringing with it confidence and joy.

An illustration of the power of conviction is shared by the noted cardiologist, Bernard Lown, in his introduction to Norman Cousins book, The Healing Heart.

He describes a patient who was critically ill with irreparably damaged cardiac muscle following a massive heart attack. With congested lungs, uncontrollable rapid heart beat, chaotic arrhythmia, and labored breathing, he required both oxygen and an intravenous drip of cardiac stimulant to keep him alive.
On rounds at his bedside with a number of other physicians, Dr. Lown pointed out the patient's "wholesome, very loud third sound gallop," denoting the heart was straining to the point of failure. Following this, the patient remarkably improved and was discharged from the hospital. Later Dr. Lown asked the patient about his miraculous and unexpected recovery; and the patient indicated he knew exactly what had happened. When he heard the doctor tell his colleagues his heart had a wholesome gallop, he knew he was going to get well. He realized that Dr. Lown might try to soften things for him, or cheer him up, but he knew that the doctor wouldn't lie to the other doctors, so he knew he was going to get well. Faith, in this case, played a huge role, and changed his belief, his visualization, changed the "field of mind" inside his skin, and changed his heart behavior and physiology.

Was his healing a placebo response? Placebos are, by definition, inactive. But the placebo effect is both active and specific. The same inactive ingredient— a "sugar pill"—can cause nausea and vomiting when posing as an emetic, pain relief when posing as an analgesic, sleepiness when posing as a hypnotic, and wakefulness when posing as an amphetamine. The reaction is caused by the "name"—the meaning—given to the placebo and by the ensuing visualization and expectation of the named change occurring. Dr. Lown's patient recognized this in saying he thought the doctor might tell him his heart was healthy just to cheer him, but knew he wouldn't lie to his colleagues. . . ipso facto. Responding to suggestion, responding to a placebo, and responding to prayer are all forms of field-of-mind action. And the responding, itself, is a form of self-regulation, albeit not always conscious. This can help explain why a prayer "that the best outcome for the individual will happen," or that "God's will be done," works the best. And when to us it seems that a prayer was not answered, the person did not improve, perhaps those prayers are answered just as much, and the very best thing for that individual has indeed occurred.

In starting a visualization process, it is important and necessary to analyze the individual's own conscious and unconscious imagery regarding what is presently occurring in their body. Recently there have been many attempts to create ready-made visualizations on video or audiocassettes, but I believe that "canned" imagery can only be of limited value, according to how well it matches the person's own unconscious belief and knowledge about what is actually happening inside his own body. An important part of self-regulation is development of one's own individual visualization, using internal symbology, which has deep unconscious meaning for the individual.

Gradually, through a process of visualization and imagery, a bridge is built between conscious and unconscious processes, which include cortical and subcortical processes, the conscious and "unconscious" portions of the brain. Evidence is mounting as to neurohumoral and biochemical mechanisms whereby this can take place.

No uniform terminology exists, but I want to distinguish between *visualization* and *imagery* in the following way. *Visualization* is the consciously chosen, intentional instruction to the body. *Imagery* is the spontaneously occurring "answer" qualifier and modifier from the unconscious. Thus, a two-way communication is set up by the interplay of visualization and imagery.

The relationship between visualization and imagery can be thought of as a metaphor, as the relationship between a transmitter and a receiver. The visualization acts as a message *to* the unconscious, including the sub-cortical parts of the brain, and particularly the limbic system, hypothalamus, and pituitary.
The images are messages *from* the unconscious to consciousness, much as dreams are. Over a period of time, through an educative process, through asking the body what needs to be done, consulting the "inner physician" and through the psychotherapeutic processes, images are modified, if necessary, to become more productive of the results desired. This is the process of building a visualization, and usually, especially with adult patients, it is an ongoing process.

A New View of Our Connected Self

Coming back to the topic of how we are connected, how we fit in to the greater scheme of things, the following exercise is often very useful with both cancer patients and addicted persons. We hear that we are a part of our planet, but for most of us this is not experientially real. We feel and experience ourselves as separate, as just riding on the planet, and this determines our thinking. I want to share some imagery that enables us to look at and even experience ourselves in a way that is different from the usual.

The way we perceive the world is a function of the type of organism we inhabit. We assume that the way the world looks to us is the same as it looks to other people. It's natural to assume that how the world looks to us is how the world really looks. However, the visual appearance of the world to us is a function of our particular type of eye, and the sounds we hear are a function of our particular type of ear. Humans cannot hear dog whistles, with frequencies well above the audible range of our ears; nor do we hear the trumpeting that elephants can hear as far as forty miles away, because they hear sounds far below the range of human ears. How the world appears to creatures with multi-faceted eyes, or long-range, movement-sensitive eyes like an eagle soaring high in the sky, we can only imagine. Each creature lives in a different visual and auditory world.

More significantly, the way we react to the world, and the beliefs we hold, are functions of our perceptions . . . an exaggeration of "*seeing is believing*." Scientific technology in the form of instrumentation is greatly enlarging our ability to get new data, and convert it into pictures, increasing what we can perceive, but that does not affect our every day internal experience of the world very much.

Here is an imagery exercise that is based on changing perception. It gives us an interesting glimpse of the world and our connection to it in an experiential way. Imagine that we can make a small physiologic change in our organism, by simply replacing the lens of our eyes with a lens that sees at the level of a high-powered microscope. If we were able to see each individual cell, and if we could watch our cells in their living presence, we would be able to see their activities; their metabolism, their relative health, and their interactions with other cells. Close your eyes for a moment and imagine that you now have eyes that can see like a high-powered microscope. How would our seeing the world this way affect our relations with each other, and with our own bodies? How would this sight affect our eating if we could see the relative health and vitality of the food we eat? What prejudices (if any) would humans hold if we didn't see skin color and racial characteristics, but rather could see the life and vitality of the cells of each other's bodies? Imagine how this might affect how we raise our children.

I think our education, music, art, and culture would be radically different, as well as our every day life.

Now, let's take this a step further, and imagine that we remove this microscope lens, and replace it with a lens of such high magnification that we can see atoms and molecules. What would our world look like to us then?

A description of an atom in Fritjof Capra's book, *The Tao of Physics*, states that if we could enlarge an atom to the size of the biggest dome in the world, the dome of St. Peter's Cathedral in Rome, the nucleus, consisting of protons, neutrons etc., would have the size of a grain of salt, suspended in the center of the dome, and the electrons orbiting it would be the size of motes of dust, at the outermost edges of the cathedral.
All the rest would be space. More visually, while watching a program on Nova, the Los Angeles Coliseum was shown, with the statement that if an atom was enlarged to the size of the coliseum, the nucleus would be about the size of a little pea, and the electrons like grains of table salt, orbiting at the outermost tiers; and all the rest, space.

Imagine how the world might look to us, with this sort of eyes. We can imagine that each atom might look like a minute sun, or each molecule like a tiny solar system. A human being might appear as a person-shaped galaxy, with denser and less dense clusters of stars (atoms); the blood stream perhaps as a flowing milky way. If someone went to an apple tree, climbed it, picked an apple and ate it, it might look like a person-shaped constellation approaching a tree-shaped constellation, getting into it and plucking a smaller apple-shaped constellation from it, and eating it. A teeth-shaped field of stars biting into an apple-shaped field of stars, and then, through the interstices, we might watch the atoms separated, reaching the digestive tract, eventually absorbed and disseminated throughout the body. If we watched a mother feeding a bottle of milk to her baby, we might see this as did the child Teddy in a J. D. Salinger novel, in which he relates that he was just an ordinary kid until one day, watching his mother give his baby sister a bottle, he saw that it was simply God pouring God into God.6

If we could see ourselves, and the world and everything in it, on the level of atoms and molecules, how would that affect our actions, our culture, our child rearing (we might watch our children grow from conception through birth, as well as after they are born), our education, music, art, and our own evolutionary process? How would we experience our physical relationship to the world and everything in it? This is a level of reality that we seldom relate to.

Going back to cells for a moment, in High School biology it was once taught that we get a whole new body every seven years. Now through research, it is clear that the rate of cellular renewal is much faster. We get an entire new skin every 16 days or so, as the cells of the top layer are sloughed off, and the newer layers grow toward the top; it takes about 16 days for the deepest layer of skin to reach the surface, and in turn be shed. In some parts of the body cells are replaced in hours or days, in others months, but in all parts of our bodies there is a constant renewal at the cellular level. At the level of atoms and molecules, the exchange is much faster, and it has been estimated by some physicians in molecular medicine that the chance of even one of the atoms or molecules presently in our bodies still being there in 6 months is on the order of one in two billion!

Here we are in this room, breathing together. With every breath we take, some of the atoms of oxygen and nitrogen we inhale were exhaled by others, and in the hour we will spend here together it is likely that we will breathe in at least one atom from everyone in the room.

One statistic says that in every 20 breaths we take, the likelihood is great that at least one of the atoms of oxygen we inhale was once breathed in and out by Jesus, Buddha, Genghis Khan, Hitler, the man next door, a little girl in China, everyone.

The same molecular exchange is essentially true of our food, and water. Let's take water as one more example. So far today I have had two cups of coffee, two glasses of juice, and about four glasses of water. I have put an equal amount of liquid down the drain, where it will, perhaps after many side trips, find its way to the ocean, from which it will eventually evaporate out and join the great water cycle again. It has been said that all water eventually reaches the ocean. On the way a drop may enter a river, get cast into a side eddy, flow to the roots of a tree, move up into a leaf, evaporate from there, join a cloud, rain down in another stream, enter a fish which is eaten by a bear… If we could see this at the magnification of atoms and molecules, we would watch a continuous process of air, water and other substances in the form of food pass into and out of us and all other living creatures, continuously transformed and reused.

Looked at from this perspective, we could observe our physical selves as some sort of an energy structure through which the substance of the planet is flowing; a structure organized and held together by energy fields, informed by DNA.
Take a moment now .... see if you can imagine seeing the planetary surface from the point of view of all the atoms and molecules of air, water, leaves, apples and oranges, etc. flowing in and out of everything else. This sensed connection, this dance of each part caring for, interacting with the others is a manifestation of love. Physically we are totally connected with all living creatures, an integral part of the web of life on our earth.

Note from the editor: Patricia Norris, is a daughter and professional colleague of the Biofeedback pioneers Elmer and Alyce Green and has collected experience in psychophysiological research from the very beginning. She and her husband Steven Fahrion are offering a one day workshop at the upcoming BFE meeting in Salzburg on Feb, 22 on **"Mind Body Approaches for Addiction and Substance abuse***" and a one day workshop on Feb, 23 on* **"Psychoneuroimmunology**: *Techniques and Applications in Cancer and Immune disorders". Don´t miss this very special chance!*

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* This paper is a compilation of excerpts from the following sources:

- *Clinical Work on the New Frontier Using Elements of the Map.* Bridges, Vol. 11, No. 4, pp 1-5.
- *Choose Life, The Dynamics of Visualization and Biofeedback.* Patricia A. Norris Ph.D. and Garrett Porter. Walpole, NH: Stillpoint Publishing, 1987. Originally published as *Why Me?* Stillpoint publishing, 1985.*Psychophysiology, Psychosynthesis, and the Search for Self.* Subtle Energies and Energy Medicine, Vol. 8 No.1, pp 1-19.

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Human Potential and Personal Transformation

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Abstract

Alpha-theta neurofeedback is becoming recognized by clinicians who are engaged in its use as an extremely powerful therapeutic technique affecting both personality and human relations. Neurofeedback transduces brain electrical activity to produce and present aural representations of this activity to the individual under treatment. When addicted individuals receive this feedback information of slow (alpha-theta) brain rhythm activity with instructions to increase it, they are able to do so. Increased alpha-theta activity corrects for a long-known deficit in such activity typical of addicted individuals. Addicted clients who are followed through the course of neurofeedback training reveal changes in EEG patterns that are consistent across individuals. These changes point to a comprehensive integrative adult developmental process of psychophysiologic reorganization.

Theoretical considerations proposed by James P. Henry suggest similar, parallel transformative processes involve the brainstem as well as cortico-limbic structures. Personal and interpersonal effects of these transformative processes include improved mental flexibility, humor, creativity, and rapport with others. After treatment using alpha-theta neurofeedback, significant percentages of convicted felons with diagnosed substance abuse problems recover from addictive behavior.

I want to begin this journey with both a poem and a poetic statement. The poem is from Novalis, a young German romantic poet of 1800 in his work Leviathan (vol. i, p.13). It goes like this:

When pure statistics and measured features
Are no more keys to living creatures,
When dancing and bursting into song
Proves our most learned scholars wrong,
When all the world is fresh and new
And once more nature to herself is true,
When light and darkness merge their love,
Into a higher unity above
When fairy tales and legends old
Tell the true history of the world
Then, but a single, secret phrase
Shall put to flight our mixed up ways.

There is much about the world that seems mixed up to a person able to step back and take a discerning look. The daily evidences of inhumanity that abound, the pollution of our world with chemicals and electromagnetic and nuclear radiation reveal that humanity has only begun to approach an awareness of the connectedness of all people, and of all of us to the world we live in. To suggest that when one suffers, all suffer still brings a blank stare from

many an eye today. And yet deep within, each of us holds a sacred trust, a candle that never flickers in the certain knowledge that, there in our core we are OK, we are loved and cared for, we are perfect as we are. We both hunger for the opportunity to touch that space within us, and at the same time we mightily distract ourselves from it by participating in one illusion after another that draws us away from the ultimate truth of our wholeness. We avoid the void. No wonder the yogis think of this time we live in as the Kali Yuga, the ultimate low point of the penetration of sparkling spirit into dense matter. But in the yogic model, we live at the end of Kali Yuga, and perhaps it is time for each of us to do our part to facilitate release of ourselves and all sentient beings from this world of illusion by recognizing our wholeness. In this spirit, I want to turn to one more quote, this time from Joseph Campbell, The Power of Myth, (1992):

> *There are a number of sources for the holy grail. One is that there is a cauldron of plenty in the mansions of the sea. It is out of the depth of the unconscious that energies of life come to us. This cauldron is the inexhaustible source, the center, the bubbling spring from which all life proceeds.*

My focus now will be upon one aspect of our potential as humans: the kind of transformative process that puts us in touch with our unconscious roots, with the energy of our life! You must be forewarned though—by necessity we are not talking so much today about facts as about possibilities and speculations with regard to the fascinating personality changes that we see occurring within the context of neurofeedback training. It seems that we are being provided with a tool to become integrated and whole, to open ourselves to our previously unconscious wellsprings. What kinds of psychophysiologic changes are likely to underlie the powerful shifts in personality patterns seen in those we treat with alpha-theta neurofeedback?

In considering our topic, we must take clear note of the fact that successful alpha-theta training is not, and can never be, a purely mechanical process of following a protocol, but rather is a process that requires, and only emerges successfully, during a caring relationship that is focused on authentic self-discovery, on un-covery of primal sources of behavior and belief that have operated unconsciously in the individual's life, but which can be brought to the light of day during treatment, and integrated into ongoing behavior as a part of a maturational process. One word of warning in all of this—I am calling for all of you to engage your scientist mode as you follow along with this story. Or as that inimitable and irreverent interpreter of our culture, Groucho Marx put it, "Who are you going to believe, me or your own eyes?" Such caution is an ever-present necessity, since we have come to know that processes of perception determine observations—that observation is an active process determined in part by the structure of our beliefs. Observation by its very nature is a feedback process in which organs of sensation are biased by the brain. This fact is part of the answer to the problematic question we raise in saying, "Healing works, so why do we need science?"

Historical Background

My involvement with biofeedback began in the early 1970s, first with thermal biofeedback for stress management, and then with alpha-theta training to facilitate meditative states of consciousness. Even before developing this interest in biofeedback and self-regulation, I had an interest in relationship of mind and body—my dissertation was on heart rate during dreaming.
I remember running a subject in a sleep lab and observing a highly unusual pattern of rapid eye movements during an apparent dream period.

The eyes moved rapidly straight up and down in a regular pattern. I awakened the subject and said, "What was going on?" He replied, "Oh, I was watching a basketball game!" His eye was on the ball! Events such as this stimulated my interest in mind-body events.

Some years later after experience in a major medical tertiary care facility, I moved to the Menninger Clinic in Topeka. There in a study called Biofeedback for Mental Health, initiated by Dr. Elmer Green, a 10 percent sample of Menninger in-patients were treated with brainwave biofeedback and large personality changes on the Minnesota Multiphasic Psychological Inventory were observed following brief treatment.

Brainwave Biofeedback

Much attention in the early days of biofeedback focused on alpha EEG biofeedback. The over-promotion that reigned on this topic eventually became known as the "alpha craze" after debunking studies conducted by academics raised questions as to whether it was even possible to increase alpha activity. Brainwave training is only now beginning to re-emerge from the shadow cast by those times.

I, along with a relatively small group of others, was always much more interested in theta activity than in alpha. Theta was largely spared the over-promotion aspects because it was much more difficult and expensive to produce good theta filters. There was also fear of theta (which still exists today) on the part of a certain group of professionals who were used to thinking of theta, not as a natural accompaniment of meditation, but as a neurological sign of brain injury. The group in the Menninger Center for Applied Psychophysiology (as it came to be called) used alpha-theta brainwave training with a number of clinical patients with addictions in the 1970s and 1980s with generally positive results.

Neurofeedback for ADDICTION

It had been noted in studies since the 1940's that addicted individuals manifested a relative absence of slow (alpha and theta) brainwave activity compared to normal individuals. This difference was suggested to be a biologic marker for addiction that could result in reduced satisfaction and reward from everyday life experiences.

In the late 1980's Eugene Peniston, a psychologist working in a Veterans Administration Hospital in Colorado came to The Menninger Clinic to participate in brainwave training workshops for professionals. There, while in a high-density theta state during EEG biofeedback training he had images of how to conduct a small controlled study of alpha-theta training in relation to addiction. He returned to his work in the hospital addiction unit and conducted the study he had first seen in imagery. The results were revolutionary.

Peniston modified the Menninger protocol by (1) adding the use of specific imagery prior to (2) each of 30 alpha-theta brainwave training sessions, intensively delivered five days per week over three to six weeks. Thermal feedback was used prior to beginning EEG biofeedback.

Drs. Peniston and Paul Kulkowsky designed and conducted a study in which individuals were randomly assigned either to experimental alpha-theta EEG biofeedback combined with

traditional Alcoholics Anonymous 12-Step programs, or to the control condition, a

conventional Veterans Administration Hospital addiction treatment program combined with Alcoholics Anonymous programs. All of the addicted individuals were chronic alcoholics with 20-year histories of alcoholism and four hospitalizations in the previous five years. An additional control group was comprised of non-addicted individuals.

The experimental treatment demonstrated effectiveness (very low relapse rates over three years post-treatment) in studies with the chronic Veterans Administration alcoholic patients. Treated patients (in the experimental but not the control group) also showed statistically and clinically significant reductions in psychopathology, both on objective testing and by behavioral observation. Indications of depression in the experimental group were reduced to levels seen in the normal control group. Alpha and theta brainwaves were increased to levels seen in normal individuals or beyond. Finally, it was observed that experimentally treated patients experienced 2-3 days of flu-like symptoms if they ever again attempted to use addictive substances, and that these substances tended to no longer produce a subjective "high," resulting in much reduced motivation to use addictive substances.

As noted, broad, far-reaching positive changes in personality characteristics occurred only in the experimental group. Normalization was seen in Minnesota Multiphasic Personality Inventory (MMPI) scales in neurotic, psychotic and character disorder domains. Significant decreases were observed in the Millon Clinical Multiaxial Inventory (MCMI) scales labeled schizoid, avoidant, passive-aggressive, schizotypal, borderline, paranoid, anxiety, somatoform, dysthymia, alcohol abuse, psychotic thinking, psychotic depression, and psychotic delusion. Alcoholics receiving standard treatment decreased on only two MCMI scales, avoidant, and psychotic thinking, and increased on one scale, compulsive.

On the Cattell Sixteen Personality Factor Questionnaire (16PF), brainwave-trained alcoholics increased in warmth, abstract-thinking, stability, conscientiousness, boldness, imaginativeness, and self-control. Conventionally-treated alcoholics increased only in concrete-thinking. Beck Depression Inventory scores generally normalized.

In summary, alpha-theta brainwave training appears to produce fundamental changes in alcoholic personality variables, changes which may underlie the sustained relapse prevention observed with this treatment. The degree of positive change in personality factors seen is particularly surprising in that it occurs within a few weeks of training. In a number of cases, a pre-treatment automated interpretation of an MMPI profile would state with regard to numerous pathologic indications, "Stable profile, unlikely to change." A few weeks later, the profile was observed to normalize in most of these details. In 30 years of eclectic practice as a clinical psychologist I have not observed any form of treatment capable of producing the level of change seen with this treatment in such a short time period.

After the Peniston and Kulkosky papers were published, we established an out-patient substance abuse treatment program at the Menninger Clinic, the Wellness Addiction Treatment and Comprehensive Health (WATCH) Program. During a one-year period 15 participants completed treatment and, of these, 13 remain in recovery with varying follow-up periods ranging up to 2 years. Our observations of treatment results were exactly in accord with the previously reported results. Specifically, we observed similar positive results no matter what the drug of choice might be; subsequent to his controlled studies, Peniston has also reported positive results with abusers of cocaine, crack, prescription drugs, morphine-like drugs, and heroin.

As far as we know, the technique has not yet been applied with meth-amphetamine addictions.
A controlled case study with our first-treated case was published in Alcoholism: Clinical and Experimental Research. This individual had been in recovery for 18 months before he was treated for continued craving. Pre- and post-treatment digitizing EEG evaluations were conducted under instructions to relax and during two types of stress, designed to assess alpha-adrenergic ("cold-pressor", uncomfortable holding a hand in ice-water task) and beta-adrenergic (serial-sevens math) stress responses. Improved performance in response to both types of stressful task was observed. We also observed reduced heart rate and blood pressure under stress (and otherwise), positive changes in personality testing and, beginning in the third week of treatment, positive reports from the client's wife of behavioral changes indicating increased relaxation under pressure. The significance of this result goes beyond confirmation of the earlier reports; it shows that similar gains can be made with individuals in extended recovery.

As mentioned above, previous research had shown that many alcoholics show a "poor alpha" EEG record which is considered to represent a genetic marker for alcoholism. What this means is that a consistent body of literature has developed that suggests that a relative absence of slow EEG activity (associated with pleasure and satisfaction from everyday life events) is seen in association with addiction. In some sense, then, alpha-theta neurofeedback therapy may be seen as correcting disturbed neurophysiologic functioning and anhedonia that is at the base of addictive problems. Taken together these observations suggested that it might possible to base a treatment program for addiction on the new biology of addiction as summarized and detailed by Kenneth Blum and others. Now let us turn to another, albeit a speculative piece of the puzzle.

DELTA SPECTRALS AND TRANSFORMATION

EEG Data

Analysis of increased delta EEG activity associated with Stage 4 sleep is excluded from the following analyses, as is artifactually increased "delta EEG activity" due to heart rate artifacts from placement of measurement electrodes too close to scalp arteries. Once such artifactual data is eliminated from consideration, ***a basic phenomenon has been observed to be associated with treatment-related personality changes.*** The elegant spectral graphs representing EEG activity during alpha-theta feedback training sessions will be presented and described. Patterns of spectral EEG changes in delta activity from early to later sessions across addicted patients will be indicated.

Physiologic brainwave changes over time are also associated with changes in the content of subjective imagery reports occurring during treatment sessions.

Subjective Imagery Reports

Examples of imagery reports from one of these clients are reported below as they are illustrative of patterns seen in reports of many clients. Imagery reported in early training noted that the client felt only "a little" drowsy, that the session seemed generally relaxing and peaceful, that he felt "a little sad at first," but without any images.

On the other hand, a middle training session was associated with the following report:

> *"I had flip-flops in my stomach and an 'acid-peak' kind of feeling in my chest. I cried at first and felt like I could not let go or relax. I heard bells (twice), once in the middle of the session and once near the end.*
> *"I was in a city that was on fire. I was a little child amazed at the immense surroundings. I was standing on a big iron bridge that collapsed in the fire.*
> *"I heard bells and saw Indians dancing, then they faded away.*
> *"I saw a naked woman lying on a queen's red bed. The room was light blue and fairly dark. She was crying and pleading to something above her, which I could not see, but she was waving her arms as if she was begging.*
> *"Standing in a dry creek bed, it was very quiet and peaceful. Then nearby a Chevelle was parked on a very secluded road. Two men pulled a woman out of the back seat and tied her up and threw her in the trunk. I think they were kidnapping her. She was very hysterical."*

A report from this subject associated with final training reveals a more serene vista:

> *"I was on the back of a hawk or eagle and we dropped off of a high perch on the top of a mountain. Then we flew through the clouds looking down over the world for a long time. I saw no other people or animals—just clouds, mountains, and desert."*

A slightly later session from the end of training included the following:

> *"I was spinning in space. I tried one way to counteract the way I was spinning (to stop) but I couldn't stop.*
> *"I saw myself working out on a Stairmaster from down a long corridor. I was moving towards it without using my feet, kind of like I was floating.*
> *"I saw a golden mummie's casket (King Tut) then the image changed to the desert where the sand looked like gold. I could see the ancient pyramids which I was flying away from through the eyes of a golden eagle and occasionally through my own eyes but I was always in contact without the eagle.*
> *"Opening a door, a vision quickly popped into my head. I could see the moon and stars, very brightly, and a horizon filled with pine trees. Then I recognized my surroundings. The bright moonlight revealed a lake without a tall sheer cliff to one side, and pines around the others. It was a good feeling."*

In summary, relatively consistent psychophysiologic patterns have been observed in many addicted individuals undergoing alpha-theta EEG biofeedback training. The physiologic pattern involves across-session increase and subsidence of delta EEG activity, associated with (the previously observed) increase in alpha and theta activity. This physiologic pattern is associated with change in imagery reports, with (1) those reports from the early sessions being more concerned with personal daily problems in living, (2) reports from the middle period of training more often reflecting highly symbolic and archetypal material, and (3) reports of later training reflecting more present-centered, but also more universal or transpersonal (as opposed to personal), and non-problematic content.

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Note: This paper represents a tribute to the ideas of Dr. James P. Henry concerning psychophysiologic development and adult human growth processes. Dr. Henry has kindly given permission for the use of this material including some figures from his still not widely known original book,* ***Instinct, Archetypes and Symbols: An Approach to the Physiology of Religious Experience,* *written more than 30 years ago, but finally published in 1992. This seminal conceptual work has much to say to us today, as exemplified by the useful model it provides to explain processes revealed in the current results presented here.*

In: Peper, E. and Gibney, K.H. (2003). A teaching strategy for successful hand warming. Somatics. XIV (1), 26-30.

A Teaching Strategy for Successful Hand Warming[1]

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> *"I truly feel relaxed. I did not know it was possible. I opened up my eyes after following the guided instructions and my finger temperature had increased from 78° to 96° Fahrenheit. I literally can feel the warmth in my hands and a slight pulsing in my fingers. I now know I can influence my health. I wonder if I can get rid of my chronic irritable bowel?"*

Increasing peripheral hand temperature is a powerful demonstration that voluntary self-control is possible. Peripheral warming with temperature biofeedback is also one of the common biofeedback approaches for the treatment of vascular related disorders such as migraine (Green and Green, 1989; Peper and Grossman, 1976; Fahrion, 1977) and Raynauds Disease (Freedman, 1987; Sedlacek, 1989). It is also used in the self-regulation of blood pressure (Fahrion et al, 1986; Blanchard, 1990), as part of general stress management and an integral part of many relaxation procedures (Schwartz, 1995). Although, it can be used as a treatment approach, peripheral hand warming is a strategy to demonstrate passive attention. This is a non-striving way of being with the soma and experiencing that an autonomic physiological function can be voluntarily influenced.

This essay outlines a successful approach used in groups to elicit rapid peripheral warming as a strategy to encourage learning and personal beliefs. It is an useful tool to demonstrate to an audience to the value of a biofeedback approach to mobilize health. Through this educational/clinical strategy, almost all participants experience an increase in hand temperature. The experimental data of 219 subjects who participated in this structured temperature warming experiment is included.

A Structured Group Experience

The structured guided imagery practice is an integral component of our general lectures on stress management, healthy computing training seminars, specialized skill learning in peak performance training and specific treatment protocols in which peripheral warming is indicated. We recommend teaching this procedure in groups because most participants will experience an increase in peripheral temperature. For the few for whom there is no or very little change, or for whom the temperature decreases, they observe that almost all people were successful in significantly increasing their peripheral temperature. Hence, the group experience reverses the skepticism that often occurs when individual subjects do not increase

[1] For more detail see: Peper, E., Gibney, K.H. & Holt. C. (2002). *Make Health Happen: Training Yourself to Create Wellness.* Dubuque, IA: Kendall-Hunt.

peripheral temperature. Instead of knowing that temperature does not increase, they now observe that it is a natural skill and can occur in most participants.

This practice is adapted from the integrated practice described by Peper and Holt (1993) and integrates the components from Quieting Reflex (Stroebel, 1982), guided mental focus (Cousins, 1982), and breathing (Peper, 1990).

Instructions

The exercise sequence is done in the middle of a lecture after participants have adapted to the room temperature. The following steps are detailed below:

1. Develop an atmosphere of fun and exploration in which passive attention is enhanced
2. Quieting Reflex with touch role rehearsal
3. Handout small glass thermometers and record index finger thumb temperature (Pre-measure).
4. (Optional: Hand out an optional data sheet to record room temperature and subjective experience.)
5. Guide an integrated relaxation, focus of attention and breathing practice (approximately 7 minutes)
6. Record the temperature of the index-thumb finger (Post-measure)
7. Record the temperature data on the black board
8. Discuss subjective experiences and implications of these experiences

1. Develop an atmosphere of fun and exploration in which passive attention is enhanced.

Begin the sequence of the practice by setting a framework that you want to teach some useful self-regulation skills. You would like to teach a rapid stress reduction technique that can be done anywhere. We usually discuss this with humor (e.g., if I became stressed when I saw my supervisor and I needed 20 minutes to lie down to practice relaxation—my supervisor would not appreciate it). Therefore, we need to learn a technique that takes only three seconds (e.g., something I could do while standing in line at the supermarket even though they promised that they would open another register if there were more than three people in line—except when I am there!). In addition, it is assumed that the instructor is himself/herself successful in warming his/her own hands. If one can do it, then there is no issue of belief. One knows it is possible. This knowing is covertly communicated to the audience and will facilitate hand warming (Peper and Sandler, 1987).

2. Quieting Reflex with touch role rehearsal (about 10 minutes)

Begin with a short discussion of a simple stress response (fight/flight alarm reaction). We usually model and exaggerate this reaction in front of the audience by showing how our bodies would react to a very loud noise (e.g., we gasp and hold our breath, clench our jaw, frown, flex our arms, etc.). Then we make the point that we do this unknowingly many times during the day (e.g., when the phone rings, during traffic when some one cuts in front of you). Laughter and heads nodding confirmation of this response pattern usually follow.

We then point out that in many cases this reaction carries is a significant personal cost because they have no control over the stressors. They just need to learn to control or inhibit their own response. The process includes: 1) recognition of the beginning of the stressor and stress reaction and
2) use of the stress reaction to automatically trigger the opposite body responses. This anti-stress response consists of a smile to stop the frowning; gentle diaphragmatic breathing to counter the breath holding; a gentle exhalation while loosening the jaw and shoulders, to relax the tense jaw; and imagining the breath flowing out while allowing hand warming (to reduce the sympathetic arousal).

After the discussion, practice this change in alarm response with the audience (e.g., clap your hands loudly and, in response to this startle, ask them to smile, take a deep breath, exhale through their mouths allowing their jaws to relax and their shoulders to drop, while imagining their breath flowing down their arms). We then ask, "How many of you feel air flowing through your arms." Most will usually confirm the feeling. With humor we respond that many of our engineering clients look at us strangely and say, "I know you are a professor at the University, however, I know air goes out of my nose and mouth and not through my arms!" At this point we would agree with them and explain that we mean it is a felt sense of going down their arms. This felt sense is then illustrated in front of the audience with a volunteer.

The volunteer stands facing one of us and we explain that we will rehearse the quieting reflex. Namely, we will clap and, in response to the clap, he will smile, take a gentle breath and, while loosening his jaw, exhale down his arms. As he exhales, we begin stroking from his shoulders down his arms and hands. (Remember, as you stroke down the arms you are role modeling relaxation and exhaling at the same time as the volunteer.) The touching down the arms is performed in rhythm with his exhalation. Often we squeeze the arms as if squeezing the toothpaste out his fingers. This demonstration usually results in the volunteer reporting that he feels better and more relaxed.

After the demonstration, have the audience work in pairs practicing with each other while standing. Allow them to do this to each other for three or four breaths each. When done, let every one sit down and explain how they can now do this Quieting Response in many situations. It can be done during meetings, each time the phone rings, when they think of family conflict, distressing thoughts etc. Remind them that, if they practice this many times during the day, many symptoms such as tension headaches and hypertension will be reduced.

We point out that the purpose of imagining blowing air down their arms is to elicit hand warming as a way to reduce sympathetic arousal since many people experience cold hands under stress. Hence, let's practice learning hand warming.

3. Handout small glass thermometers (optional data sheet to record room temperature, subjective experience and index finger thumb temperature - Pre-measure).

For systematic studies we handout a short data collection form to record the room temperature, age and sex and subjective experience of stress as shown in Figure 1.

Small glass hand thermometers are handed out with the instructions that they initially do not hold the bulb but look and record the room temperature. The initial temperature of the thermometer reflects the room temperature.
Then instruct the participants to hold the bulb end of the thermometer between their right index and thumb while letting their hands relax on their laps. (Option: tape the thermometer to the tip of the index finger.) After two minutes of holding the thermometer, they record their index finger-thumb temperature (Pre measure). They are then instructed to sit comfortably on their chair with their hands on resting on their lap while still holding the thermometer as is shown in Fig. 2.

Figure 2: Holding thermometer between fingers

Date:_____ Time:_____ Gender:___ M ___F Age:_____
Room Temperature _____
PRE: Hold thermistor between right thumb and index finger: Pre Temp:_____

Rate how you feel (Please circle)

Relaxed **Tense**

0 1 2 3 4 5 6 7 8 9

Describe:

_____
_____
_____
_____

****

Imagery exercise

****

POST Temp:_____

Rate how you feel (Please circle)

0 1 2 3 4 5 6 7 8 9

Relaxed **Tense**

Describe:

_____
_____
_____
_____

Calculate temperature change: Post temp – Pre temp = _____

Figure 1: Short temperature assessment form

4. Guide an integrated relaxation, focus of attention and breathing practice (approximately 7 minutes)

Read this script to the audience. (... means wait a few moments before going on).

Wiggle around…. Sit comfortably in the chair, let your weight just rest against the back of the chair and seat of the chair…Allow your eyes to close; if you want to keep them open, that is all right too.

…Now press together your ankles, now knees and continue pressing while tightening your buttocks, raising your shoulders and frowning. Hold this for the count of 10…. Now let go and relax and let your eyes be closed… Feel your body relaxing and being supported by the chair… Just keep gently holding the thermometer between your thumb and index finger. In case you relax so much that the thermometer drops just pick it up again and continue with the exercise.

…Now think back on a nice memory. Think of the nicest thing that happened to you—something that made you feel very good at that time. When you think of this memory, just nod your head…. (Usually, it takes no more than 30 seconds for a memory to be summoned and most people will nod. In response to the nod, just say, "Good"… "Good"…) In case no memory comes up, which is very common, just create some imaginary place or event…..
Allow this memory to be as real as possible, so real you can almost taste it. Imagine that you are reliving that experience. Go slowly, breathe easily…. Feel the way you did during that experience… Let everything about that experience give you the same pleasure now as it did then…Enjoy the feeling… Breathe evenly and easily…. (Allow this to continue for a minute or so).

…Now let go of the memory, and imagine that you can focus your concentration and attention so that it is like the tip of a blackboard pointer that you can move from place to place inside your head. Let this point of consciousness and focus of attention slowly move and come to rest toward the front of your face, just behind your nose. Then concentrate on the tip of your nose... Keep focusing on the tip of your nose. Imagine the sensation of touching the tip of your nose with your mind… (Allow this to continue for about 30 seconds).

…Now elevate this point of consciousness until it comes to rest just behind your eyes. Bear down at that point… When you are bearing down on the point just behind your eyes, gently nod your head (Use the nod response to pace the sequence of the instructions). In a little while you may experience a pulsing sensation behind your eyes… (Allow this to continue for about 1 minute).
…Now raise your point of consciousness even higher until it comes to rest just under your scalp in the middle of your head. Concentrate on that point. Concentrate hard….(Allow for about 90 second). In a little while you may experience slight tingling sensations. When you feel those sensations, gently nod your head. (When a number of people have nodded continue).

…Now bring your attention to your hands and allow blood to flow into them. Just visualize you heart pumping your blood up to your shoulder, across your shoulders, and then down your arms, past your elbows, down your forearms, past your wrists,

and into your hands… Let this flow of warmth into your arms and hands continue…. (Allow this to continue for about 30 seconds).

Allow your breathing to go slowly and easily. Each time you exhale imagine your breath flowing through your shoulders, down your arms, and out your hands…. Imagine your breath flowing like a gentle warm breeze through your arms as though they were hollow tubes…. As you are breathing allow your exhalation to go slower…. Allow each exhalation to flow through your arms… If your attention wanders that is OK, just gently bring it back to an awareness of feeling the air flow down your arms and out your fingers. As if you can still feel someone stroking down your arms … Continue to allow the air to flow down your arms… (Allow this for about two minutes). Feel the warmth flowing out through your fingertips…. You may want to repeat to yourself, "My arms are heavy and warm…. My arms are heavy and warm….." Many of you may notice gentle pulsation and tingling in your fingers…. Be aware and feel the sensations while you continue to exhale slowly and allow the air to flow down your arms and out your hands and fingers… (Continue for one minute). …Now let go of breathing down your arms, become aware of the room, take a deep breath, stretch, open your eyes and look at the temperature of the thermometer held between your thumb and index finger.

5. Record the temperature of the index-thumb finger (Post-measure)

Record this temperature (Post-measure) and optionally fill out the questionnaire to rate your experience of stress level at this moment.

6. Record the participants' temperature data on the black board

Ask the members in audience to raise their hand if their temperature went up. Usually about 90% report an increase in temperature. Tally their findings on the blackboard. Ask, "For whom did the temperature decrease?" Usually a few will report a decrease. Most commonly, the decrease is reported by those who have very cold hands (less than 80 degrees)--they are too chilly to warm up--or those who have very warm hands (greater than 95 degrees)-- they are sitting and relaxing and beginning to reduce their metabolic rate and cool down.

Now do a tally of the observed temperature change of the participants. How many –2 degrees, -1, no change 0 degrees, + 1, 2, 3, …20, 21, etc. As numerous members of the audience report temperature increases of 10 to 20 degrees, a sense of wonder ripples through the audience. All of a sudden, they realized the impossible is possible—for them a shift in beliefs has now occurred. Control over peripheral warmth is possible. At this point they may begin to wonder about other possibilities.

7. Discuss subjective experiences and implications of these experiences

"I feel incredibly relaxed right now, and somewhat surprised that I raised my hand temperature 26 degrees"

Lead a discussion on the factors that are involved in peripheral warming and the implications of this experience. Discuss the concept that many people would have said that they have cold hands because of poor circulation.

Yet, if it was poor circulation, how could their hands warm-up? Most likely, they maintained a covert state of chronic arousal by breathing shallowly and thoracically, and remained anxious or worried throughout the day. Remind the audience that the goal is to recall the sense of streaming and hand warming when they practice the Quieting Response as they react to life's compulsory stressors. Discuss the implication of chronic arousal and how hand warming could reduce the risk of illness and promote health.

The practice also calls attention to the fact that awareness and imagery affect peripheral temperature. Explore the implications of the relationship between thinking and body. Namely, be careful what you think and imagine; it may affect your physiology.

One major concept to point out is the Law of Initial Values. That is to say, if your hands are very warm, the increase in temperature is limited to the core temperature. Other important considerations in temperature regulation include:

- Thermo-regulation (the brain likes to stay at the same temperature). The peripheral blood vessels will constrict to preserve warmth. Hence, one way to warm your hands and feet is to reduce heat loss by wearing a hat (something our grand mothers knew when they wore a nightcap to bed if they had cold feet and could not fall asleep).
- Chronic arousal and probable thoracic breathing. When relaxation occurred in the guided exercise and the body was attended to passively and without judgment, the blood vessels dilated which allowed more blood to flow through the tissue. This process evokes an anabolic state that facilitates regeneration and healing.
- Pharmaceutical agents and hormonal processes. Certain chemicals such as caffeine and nicotine induce peripheral vasoconstriction (hand cooling) while alcohol induces peripheral vasodilatation.

If the participants rated their stress levels before and after the exercise, they would have observed a significant decrease in subjective stress. Discuss the usefulness of using hand warming as a technique to reduce stress.

Research Data: Hand Temperature Changes and Correlation between Change in Temperature and Perceived Stress:
Using the above procedure, we collected data from 219 subjects in different groups: physical therapists in the Netherlands (86 females and 26 males, mean age 39.4 years, SD 8.4) and San Francisco State University Students (81 females and 25 males, mean age 25.4, SD 7.7).

Results:

The average temperature increased from 85.3° to 95.4° Fahrenheit during this exercise as shown in Figures 3. In addition, the change in subjective stress level as measured from the university students decreased from 4.3 to 2.2 (on the scale from 0 relaxed to 9 tense) as shown in Figure 4. There was no significant difference in peripheral hand warming due to gender.

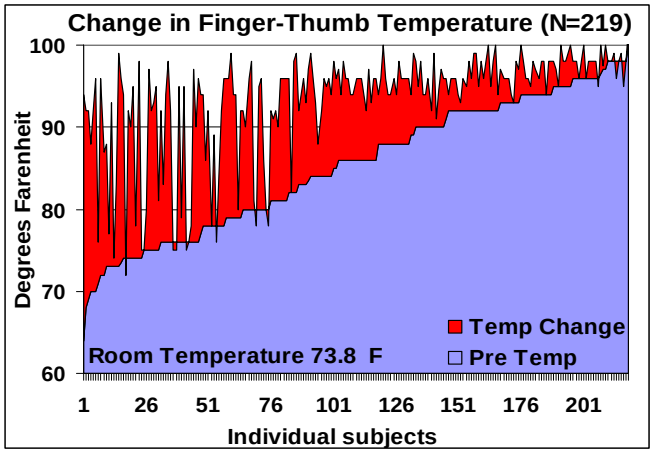

Figure 3. Change in temperature for each rating and peripheral hand warming

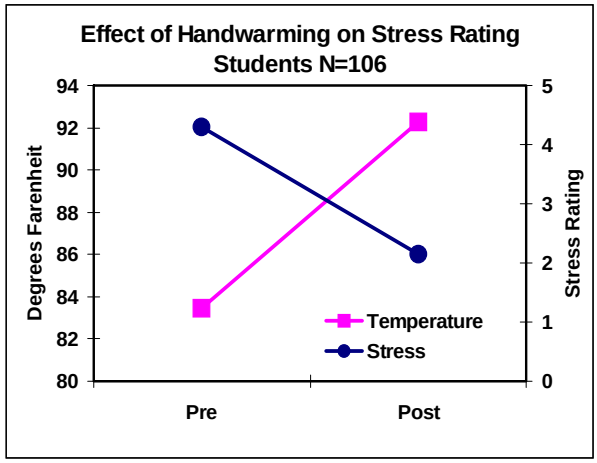

Figure 4. Change in subjective stress individual subject

Discussion:

In our experience with thousands of students, workshop and lecture participants, the practice works best if the room is not too warm. The data shows that if people have very cold hands then fewer will warm their hands, however, those who do warm will warm them more (Law of Initial Values). If the room is too warm, the hand temperature of the participants is too high and will not increase again due to the Law of Initial Values. We usually give the workshop/lecture participants the glass thermometer to take home so that they can continue to practice this skill. It also is an advertising tool, since the cardboard is printed with our address. Thus, it is a reminder for referrals.

A Lasting Experience:

This detailed guided practice is a pragmatic and successful strategy to evoke peripheral hand warming. It can be done very effectively in different groups of various sizes. The most important experiential value of this practice is that so many people can rapidly warm their hands, thus it facilitates a shift in participants' beliefs that voluntary control is possible. With this change in belief structure, participants understand that they can regain control; there is hope that they can prevent illness and mobilize health.

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How to Authenticate the Effects of Autogenic Training2

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When practicing Autogenic Training to what extent is there congruence between the subjective experience and objective physiological measurements? Can trainees subjectively distinguish between muscle relaxation and tension and between peripheral constriction and dilation as monitored by hand temperature? Would electrodermal activity as an indicator of decreased arousal decrease during the practice session?

Autogenic Training (AT) is a technique that is used to improve physical and mental well-being through self-regulation (Luthe, 1969; Linden, 1990). The trainee, however, is not always aware of their physiology. Some may think they are relaxed when practicing when they are actually tenser during practice. Some report that they experience "no subjective change" which may lead to a lack of interest and missed practice (e.g., "It is not working and I am wasting my time"). This study compares the actual physiological changes that occurred when participants practice AT and compare this to their subjective self-reports.

Procedure

Students from a Biofeedback and Self-regulation class in the Holistic Health Department at San Francisco State University were physiologically monitored to check if they would they be as relaxed during their autogenic training session as they reported to be. The student trainees were asked to practice AT three times a day and to keep a log of their experiences while practicing for six weeks. Each session consisted of three rounds of topographical phrases while assuming a Coachman position. This position or posture alleviates exteroceptive and proprioceptive afferent stimulation. It allows the body to assume a relaxed position, hanging from the fascia. The phrases were to be repeated sub-vocally with one new phrase added each week.

According to the student logs and experiences while practicing expressed during class review, some students initially complained of neck pain or discomfort while assuming the Coachman position but reported they felt relaxed with no muscle tension, some felt no effect from practice, others missed practice, sometimes days at a time, and a few experienced the sought-after "heaviness" that AT can provide,

Seven students were monitored with biofeedback sensors to record their physiology during their sixth week of AT practice. Muscle tension, hand temperature and electrodermal activity were measured. Two sEMG triode electrodes (Myoscan Pro, wide band pass filter (20-500 Hz), Thought Technology Ltd., Montreal, Quebec, Canada) were placed on the upper trapezius muscles on either side of the neck (C5-6) with the ground electrodes away from the vertebra (Figure 1).

Fig 1. SEMG sensor location.

A thermistor (Temp Flex/Pro, Thought Technology) was attached to the lateral side of the distal phalange of the index finger of the dominate hand. EDA electrodes (SC-Flex Pro, Thought Technology) were placed on the distal phalange of the index finger and ring finger of the non-dominate hand. Data were collected using a Biographtm computer system, Version 2.01 software (Thought Technology).

Each student sat in an upright position (SU) on the edge of a chair without a view of the monitor. They were instructed to assume the Coachman position (CP) for the AT stage repeating, "My right arm is heavy," "My arms and legs are heavy and warm," followed by, "My neck and shoulders are heavy," and ending with, "I am at peace." They were then instructed to sit in an upright position again. This procedure was repeated two more times. At the end of the three rounds the students were asked if they experienced muscle tension or relaxation in their neck while in CP.

Results

The students all subjectively reported that they felt their neck was relaxed during AT. However, SEMG values increased for 5 of the 7 trainees during CP. This usually occurred on one side of the neck more than the other. A typical example of increased right upper trapezius muscle tension during CP is shown in Figure 2.

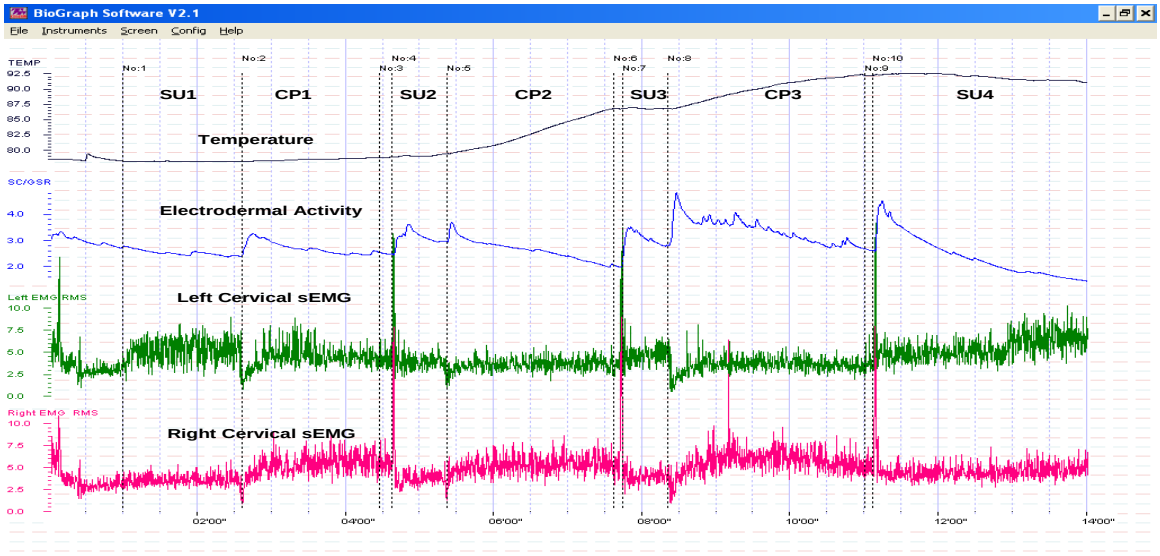

Fig 2. Physiological recording of right and left cervical sEMG, electrodermal activity and skin temperature. During the AT Coachman position (CP1, CP2 & CP3), the Right Cervical sEMG increased even though the person reported being totally relaxed.

Subjectively the students were unable to discern muscle tension from relaxation. When they were sitting in CP, they were sure that they were relaxed. However, when they either received sEMG feedback or were coached to drop their head and neck more, the back rounded and the sEMG decreased as illustrated in Figure 3.

Figure 3. Participant practicing AT in the coachman position. The left figure is the person practicing normally and reporting that they are totally relaxed even though the sEMG indicated increased cervical muscle tension. The right figure illustrates actual physiological relaxation in which the sEMG is totally relaxed and the person is not holding themselves erect. She is just sitting collapsed and hanging from the ligaments.

The student trainees were able to increase peripheral temperature as well as decrease electrodermal activity while practicing AT.

Although skin temperature and EDA were not a primary concern, the trainees were surprised at the vast increase in hand temperature during AT. Again, as in the muscle tension of the neck, they were unaware that their hand temperature was increasing during AT. Although some participants reported that they experienced a "throbbing sensation" in their fingertips they did not equate this with increased blood flow.

Discussion

Subjective evaluation of muscle relaxation in most cases did not match actual sEMG measurements. Neither the participant nor the practitioners of AT were always able to distinguish a state of relaxation from visual observation or from the participant's subjective report. The discordance between the subjective report of relaxation and the actual physiological measurements could be a possible mechanism why some participants appear not to benefit from practicing AT—they think that they are relaxed, however, they are continuously and covertly muscularly bracing. We recommend that practitioners who incorporate AT in practice use sEMG biofeedback as well as other physiological signals to confirm and train concordance between subjective and physiological relaxation. The physiological feedback is a powerful tool to increase awareness of ones physiological state as well as serve as a motivational tool for continued practice.

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Stress Management Improves Long-Term Glycemic Control in Type 2 Diabetes

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Abstract

Objective

There is conflicting evidence regarding the utility of stress management training in the treatment of diabetes. The few studies that have shown a therapeutic effect of stress management have used time-intensive individual therapy. Unfortunately, widespread use of such interventions is not practical. The aim of the present investigation is to determine whether a cost-effective, group-based stress management training program can improve glucose metabolism in patients with type 2 diabetes and to determine whether a particular subset of patients is more likely to get positive results.

Research design and methods

Patients with type 2 diabetes were randomized to undergo a five-session group diabetes education program with or without stress management training. Participants (n = 108) were followed for 1 year, during which HbA1c tests (markers of diabetes progression) and questionnaires assessing perceived stress, anxiety, and psychological health were administered at regular intervals to evaluate treatment effects.

Stress management program

The stress management program included 1) Progressive Muscle Relaxation (PMR) training, 2) instruction in the use of cognitive and behavioral skills to recognize and reduce physiological stress levels (such as recognition of major stressors in life, guided imagery, thought-stopping, and deep breathing), and 3) education on the health consequences of stress. PMR training consisted of consecutively tensing and relaxing a prescribed set of muscle groups in the body, starting with the feet and progressing through the head, with specific attention paid to tense regions of the body. This was combined with techniques such as deep breathing and mental imagery to produce a deeply relaxed state of mind and body.

Participants learned PMR in part by listening to an audiotape during each group session. They also were instructed to practice muscle relaxation at home twice daily with the aid of the tape, first using a longer exercise to achieve relaxation and then advancing to a shorter version. After some skill was developed, mini-practices were introduced. Mini-practices are a brief, 30-s version of a PMR session using deep breathing and imagery. Incorporation of mini-practices into daily life to maintain a relaxed body and mind is the eventual goal of PMR training. Participants were instructed to engage in mini-practices at least two times per hour. During the last session, patients were encouraged to keep practicing their acquired skills during the remainder of the study. This included incorporating frequent mini-practices into daily life as well using the relaxation tape during more stressful periods or when their skills needed enhancement.

During the follow-up assessments at 2, 4, 6, and 12 months, patients in the treatment group were asked how many times they listened to the audiotape in a typical week and how frequently they used mini-practices in a typical day.

Results
Stress management training was associated with a small (0.5%) but significant reduction in HbA1c. Compliance with the treatment regimen decreased over time but was similar to that seen in patients receiving stress management for other reasons in the clinic. Trait anxiety (a measure of stable individual differences in anxiety proneness) did not predict response to treatment, showing that highly anxious patients did not derive more benefit from training.

Conclusion
The current results indicate that a cost-effective, group stress management program in a "real-world" setting can result in clinically significant benefits for patients with type 2 diabetes.

Abbreviations
DASI, Duke Activity Status Index • GHQ, General Health Questionnaire • PMR, progressive muscle relaxation • PSS, Perceived Stress Scale • STAI, Spielberger State-Trait Anxiety Inventory

Footnotes
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Controlling Blood Glucose through Biofeedback and Relaxation Therapy

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What is the problem and what is known about it so far?
Everyone experiences stress in their lives. For people with type 2 diabetes, stress can prevent them from being able to keep their blood glucose at a normal level. This can lead to a cycle of stress and poor health that can result in long-term problems related to diabetes, such as heart disease, eye disease, and kidney failure.

Why did the researchers do this particular study?
Stress management can include exercise, meditation, or relaxation techniques. Biofeedback is a type of therapy that uses a machine to measure the body's responses to stress. The machine records changes in the body due to stress, such as a rise in skin temperature or tense muscles, and helps the patient to learn how to control their body's reactions to stress. Researchers wanted to find out whether biofeedback could be combined with relaxation therapy, a technique that lowers stress through deep breathing and soothing images, to lower short-term and long-term blood glucose levels.

Who was studied?
A total of 30 adults with type 2 diabetes completed the 3-month study.

How was the study done?
The study participants took either 10 individual sessions of biofeedback and relaxation therapy or 3 individual diabetes education sessions. Before the survey began, each person recorded their blood glucose levels two times a day for 4 weeks. This information was used to measure each person's average blood glucose level. Then, the researchers measured signs of their stress levels, including skin temperature and muscle tension. Each person completed a survey about their medical history and exercise habits. They also answered questions about their mental health to see if they had depression or anxiety. After the sessions ended, they measured their blood glucose levels again for 4 weeks, and the researchers compared their blood glucose levels before and after the study.

What did the researchers find?
Biofeedback and relaxation therapy helps patients to change their physical and mental responses to stress, which both play roles in controlling blood glucose levels. For example, the chemical cortisol is released when a person experiences stress, and researchers know that cortisol causes the body to not absorb insulin properly. The people who took the biofeedback and relaxation therapy had much lower short-term and long-term blood glucose levels than the people who completed the education sessions. They also lowered their muscle tension, depression, and anxiety more than the people in the education session. And, those who took part in biofeedback and relaxation therapy were able to maintain better glucose levels for longer times. When the researchers checked up with each person 2 months after the study, they found that the people who took biofeedback and relaxation therapy continued to manage their glucose levels better than the people who took the education sessions.

What are the limitations of the study?
The study groups were small, and there were few minority participants, so the results may not apply to the general population. The people who took part in biofeedback and relaxation therapy had more sessions than those who had education only, which may have affected the results. The researchers checked up with the people for only 2 months, which means that they are not sure if their results will apply for a longer time.

What are the implications for the study?
Biofeedback and relaxation therapy can help people with type 2 diabetes manage their blood glucose levels. Better blood glucose management can reduce the chances of suffering from complications from diabetes. Biofeedback and relaxation therapy can also help lower anxiety and improve mental health.

http://www.diabetes.org/diabetes-research/summaries/mcginnis-biofeedback-relaxation.jsp

Neurofeedback May Benefit Singers and Performers

(Summary of abstract provided by L. Lagos, Psy.M. at Rutgers University)

New York- Neurofeedback may be useful to improve many conditions, including the ability sing well in the Metropolitan Opera. Rae Tattenbaum, a biofeedback practitioner who specializes in neurofeedback with opera singers, conducted a study in 2001 to evaluate if

neurofeedback improved singing performance. She found noticeable improvements in voices and performances of singers who underwent neurofeedback training.

"Since the 1970's, neurofeedback has been used extensively to treat disorders ranging from epilepsy to ADD," reports Tattenbaum. "It was known for mitigating disorders rather than enhancing talents." Yet, the promise of using neurofeedback to enhance normal brains rather than just treat disorders, is an emerging area of interest to professionals and performers.

"The voices were richers and more resonant, and the singers who were trained in neurofeedback weren't fatigued or wiped out," said Nancy Anderson, one of the vocal coaches. "It allowed singers to combine their ability to move with voice, drama, and acting."

Such findings have woven together a tapestry for singers to coordinate vocal skills with focus, control, and relaxation. By employing neurofeedback to enhance performance, Tattenbaum continued, "many singers are learning how to quiet the noise in their brains and maintain an attentive and relaxed state."

According to base-baritone, Metropolitan Opera singer, John Cheek, many of us lose our edge by becoming overloaded during a show. "Neurofeedback training has helped me to stay in the moment so that I am less anxious and more consistent on stage."

"This" he concluded, "has increased the success of my performances."

Stress: It's Impact is Quicker Than You Think

(Summary of abstract provided by L. Lagos, Psy.M. at Rutgers University)

In the University of California at Irvine's lab of neurobiologist Frank LaFurla, four-month old mice have developed symptoms of Alzheimer's Disease (AD) at an unusually young age. Researchers injected mice with dexamethasone similar to the level of hormones that would be seen in humans under stress. After only seven days, the researchers found significant increases in beta-amyloid and tau proteins. When beta-amyloid proteins aggregate, they form plaques, one of two hallmark brain lesions of AD. Relatedly, tau accumulation leads to the formation of tangles, the other defining lesion of AD. At this young age, the formation of plaque and tangles in the brains of mice is unusual. Indeed, the levels of beta-amyloid and tau proteins compared to what is seen in the brains of untreated eight to nine month-old mice. When 13-month old mice, who already possessed plaques and tangle pathology, were injected with dexamethasone, the stress hormone significantly accelerated the plaque lesions in the brain and increased the production of tau.

One conclusion from this evidence is that the increased production of stress hormones may take a grave toll on the body. Ultimately, the system starts to wear out an accelerated rate.

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Biofeedback Foundation of Europe

More information: ***www.bfe.org*** or ***editor@bfe.org***

COLLABORATION FOR INTERNATIONAL STANDARD

The BCIA Biofeedback Certification of America – Following a Need for International Standards specific to Biofeedback

Celeste De Bease, Ph.D., BCIAC
Chair of the **B**iofeedback **C**ertification **I**nstitute of **A**merica

….The New York Times announced his death in 2002: "Neal E. Miller, an experimental psychologist whose conviction that the brain affects human behavior led him to conduct groundbreaking work in biofeedback, died on March 23. He was 92." The article then quoted Dr. James S. Gordon, founder of the Center for Mind-Body Medicine in Washington, DC, who recalled the following, "when Neal Miller first suggested that the autonomic nervous system could be as susceptible to training as the voluntary nervous system, that people might learn to control their heart rate and bowel contractions just as they learned to walk or play tennis, his audiences were aghast. He was a respected researcher, director of a laboratory at Yale, but this was a kind of scientific heresy. Everyone 'knew' that the autonomic nervous system was precisely that: automatic, beyond our control."

Our mission at the Biofeedback Certification Institute of America (BCIA) is to create and promote the highest standards of biofeedback training by certifying individuals who wish to walk in the footsteps of pioneers like Neal Miller. Our motto is "more than qualified; BCIA certified." Many consider the BCIA certification to be the "gold standard" in the field of biofeedback therapy.

BCIA was formed in January 1981 and offered one certification in general biofeedback. We now offer three certifications. In 1996 the Board of Directors of the BCIA and the Academy of Certified Neurotherapists collaborated to develop a specialty certification in EEG Biofeedback. In response to a need for standards specific to biofeedback used to treat continence, BCIA launched the Pelvic Muscle Dysfunction Biofeedback (PMDB) certification program in 2004.

Recognizing the importance of standards for all biofeedback professionals, BCIA launched Certification by Prior Experience (CPE) in 2006. This program certifies licensed professionals and gives them the opportunity to come under the BCIA standard of excellence. CPE is open to those licensed professionals who can demonstrate education and training that surpasses our entry level requirements.

BCIA is recognized by the Association for Applied Psychophysiology & Biofeedback (AAPB) and the International Society for Neurofeedback and Research (ISNR), the premier membership organizations for biofeedback and for neurofeedback. BCIA is a member of NOCA – the National Organization for Competency Assurance, the premier US credentialing membership organization.

Recently BCIA has been contacted by several biofeedback groups outside the Americas asking for help in establishing proficiency standards. We are collaborating with the Biofeedback Foundation of Europe (BFE). By building important connections worldwide we hope that our "gold standard" for biofeedback competence will become an international standard. With this in mind, we are beginning the process of changing our name by dropping the word "America" ushering in a new era of international certification!

Please visit www.bcia.org to read more about our certification programs.

RELAXATION EXERCISE

R. Harvey, Ph.D.
San Francisco State University
Contact: rharvey@sfsu.edu

Finish each day and be done with it. You have done what you can. Some blunders and absurdities no doubt crept in. Forget them as soon as you can. Tomorrow is a new day. You shall begin it well and serenely.
- Ralph Waldo Emerson

Biofeedback therapy includes the following three broad steps: (1) raising consciousness by increasing awareness of internal psychophysiological processes; (2) creating some ideal vision of a change that is hoped for; and, (3) developing strategies for accomplishing our idealized goals by practicing skills for reducing symptoms and improving performance.

Strobel (1982) published a book on the 'quieting reflex' (QR) describing a non-instrumented biofeedback technique for stopping stressful thoughts that often manifest as physical 'alarm' reactions such as holding your breath, grinding your jaw and tightening your neck and shoulders. Luskin & Pelletier (2005) published a book about empirically validated strategies for reducing stress, including a technique for replacing stressful thoughts by remembering acts of kindness. Gevirtz (2003) and Lehrer, et al (2003) have each written about techniques for increasing the synchrony between the heart and the lungs, including suggesting that breathing in a 10 second cycle, for example, inhaling for a count of four and exhaling for a count of six, could increase cardiorespiratory synchrony.

The suggestions from these authors for reducing stress have been incorporated the following modified 'quieting reflex' (QR) exercise. The adapted activity includes a series of steps that are useful for biofeedback patients and clients who are learning about their reactions to stress and, raising their awareness of new relaxation skills. Whereas it takes several sessions to master this mini-relaxation technique, it should prove a valuable tool for patients and clients who are looking to deepen their understanding of their psychophysiological processes.

Six Second Mini-Relaxation

First, begin by acknowledging when something is bothering you, for example, identifying anger towards someone, fear or sadness over negative events or some other process. Recognizing these thoughts becomes the cue for starting the "quieting reflex"

Second, state the following to yourself, repeating "Alert mind, calm body."

Third, relax by smiling inwardly, softening your gaze or closing your eyes, loosening your jaw and shoulders, thinking of someone kind.

Fourth, slowly inhale, internally counting to four, imaging the breath coming through the bottoms of your feet. Then slowly exhale, internally counting to six, feeling the breath moving back down your legs and out through your feet. With each breath, allow the loosening of the jaw, tongue, and shoulders muscles, letting the tip of the tongue rest at the bottom of mouth.

Relaxation materials adapted from:

- *Gevirtz R.* (2003): The promise of HRV biofeedback: Some preliminary results and speculations. Biofeedback, 31(3), 18–19.
- *Lehrer P. M., Vaschillo E., Vaschillo B., Scardella A., Lu S. E., Siddique M., et al.* (2003, May): Heart ratevariability biofeedback as a treatment for asthma. Paper presented at the annual meeting of the American Thoracic Society, Seattle, WA.
- *Luskin F. and Pelletier K. R. (2005)*: Stress free for good: 10 scientifically proven life skills for health and happiness, New York: HarperCollins Publishers.
- *Stroebel C. F. (1982)*: QR, the quieting reflex. New York: G. P. Putnam's Sons.

EDITORIAL BOARD

Leah Lagos, Psy.M.

Leah Lagos is a faculty member at the Center of Alcohol Studies at Rutgers University (RU), who has completed her academic coursework in applied clinical psychology at the Rutgers' Graduate School of Applied and Professional Psychology. She recently defended her doctoral dissertation, "A Manual for Implementing Heart Rate Variability Biofeedback with Collegiate Athletes." In the upcoming year, she will be implementing her dissertation with RU sports teams to teach athletes how to cope with stress. She has worked in the field of sport psychology for more than eight years. Her background includes producing a sport psychology segment for "Inside the PGA Tour," aired on ESPN in 1999. Leah also helped Career Consultants, Inc. interview draft prospects for a professional football team at the 2007 NFL Combines. She is a co-author on an article about "High School Athletes and Alcohol Prevention," published in the *Journal of School Sport Psychology* (2005). Further, she is applying to APPIC-accredited internships, this fall, to meet her doctoral degree requirements and to advance her specialty in biofeedback.

Don Moss, Ph.D.

Donald Moss is adjunct graduate faculty in Health Psychology at Saybrook Graduate School in San Francisco, California, and a partner in West Michigan Behavioral Services in Grand Rapids, Michigan. He is Editor of the *Biofeedback Magazine* and Consulting Editor for the *Journal of Neurotherapy* and the *Journal of Phenomenological Psychology*. Dr. Moss has over 50 publications in the fields of psychophysiology, biofeedback, and mind-body therapies, including an edited book (*Handbook of Mind Body Medicine for Primary Care*, Sage, 2003). He has given lectures and workshops on these topics throughout the world, including recent presentations at the Association for Applied Psychophysiology and Biofeedback, the International Association for Cognitive Psychotherapy, the World Congress of Behavioral and Cognitive Psychotherapies, and the Biofeedback Foundation of Europe. He is also past-president of AAPB.

Erik Peper, Ph.D.

Erik Peper is an international authority on biofeedback and self-regulation. He is Professor of the Institute for Holistic Healing Studies / Department of Health Education at San Francisco State University. He is President of the Biofeedback Foundation of Europe and past President of the Association for Applied Psychophysiology and Biofeedback. He holds Senior Fellow (Biofeedback) certification from the Biofeedback Certification Institute of America. He received the 2004 California Governor's Safety Award for his work on Healthy Computing. He is an author of numerous scientific articles and books. His most recent co-authored books are *Healthy Computing with Muscle Biofeedback, Make Health Happen Training: Yourself to Create Wellness* and *De Computermens.* He is also the co-producer of weekly *Healthy Computing Email Tips.*

Gabriel Sella, M.D.

Gabriel E. Sella has been a member of AAPB for over 10 years. He has done research and clinical work in the area of biofeedback for over 10 years. Dr. Sella has published 85 peer-reviewed papers, 10 textbooks and 1 technical CD ROM. He has written chapters in several scientific textbooks and publications. Dr. Sella has given 267 international conferences and seminars, many of them in the area of SEMG investigation and neuromuscular rehabilitation as well as soft tissue injury and pain. Dr. Sella is a founding member of the Biofeedback

Foundation of Europe. He is on the editorial board of several journals, including *Europa Medicophysica.*

Dianne M. Shumay, Ph.D. (*Section Language and Style)*

Dianne Shumay is a specialist in self-regulation strategies for preventing and coping with pain, advanced disease, and aversive medical treatments. She has designed and delivered interventions for children and adults in hospital, outpatient, workplace and community settings. She has over 12 years experience in biofeedback and has co-authored articles with Erik Peper on biofeedback approaches to Healthy Computing, as well as numerous other scientific publications including research on coping, treatment decision-making and alternative medicine use among patients with cancer.

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