Psychophysiology today

the body - mind magazine

MIND-BODY - a real tight connection

Issue 1/2004

BFE
Biofeedback Foundation of Europe

Our Age of Anxiety is, in great part, the result of trying to do today's jobs with yesterday's tools.

Marshall Mc Luhan

On that note let's contribute to help to develop some new and urgently needed tools for today's complex life.

Welcome note from the President of the BFE Scientific Advisory Board

To encourage rapid information exchange and updates of the recent findings in the areas of applied psychophysiology and biofeedback/neurofeedback, the Biofeedback Foundation of Europe has decided to publish a BFE Newsletter. We are honoured that Monika Fuhs, Psychologist from Vienna, Austria has volunteered to be the editor of the Newsletter. She can be contacted by email: editor@bfe.org.

The purpose is to offer a platform and an opportunity for scientific, clinical and educational exchange and a forum for participation. We hope that the BFE magazine is a mechanism to exchange information, ask questions, describe successful and unsuccessful case reports, and include information and suggestions from related approaches such as:

- Articles and studies about Biofeedback/Neurofeedback
- Therapist's case descriptions
- Clients descriptions of what changed while doing Biofeedback training
- News from the world of science
- The "best of exercises " corner: A place to share your favourite exercise/practice that enhanced biofeedback training
- Q & A Corner: Questions on specific Biofeedback training.
- Announcement of interesting conferences, meetings and workshops (if you want to announce an interesting workshop let us know)
- Special advertising for Biofeedback users
- Quotes and thoughtful stories that may be helpful

We look forward to your active participation in the newsletter. Please contribute and send materials to the editor. The BFE Newsletter will offer a rapid, yet personal opportunity, to share information to optimize biofeedback.

The deadline for the winter issue is December 29, 2004. Send your contributions to editor@bfe.org

We thank you in advance.

Erik Peper
President of the BFE Scientific Advisory Board

Table of content

Highlights of the upcoming BFE meeting 2005 :

- **Vietta E. Wilson, Ph.D.**

"Why do something complicated when something simple works more quickly"

She is a sport psychology consultant and has trained many Canadian Olympic Gold medal winners. She is known as an excellent teacher in workshops and seminars on sport psychology, learned self regulation and how to teach biofeedback assisted relaxation. She offers knowledge in an experiential edutainment format.

Her remarkable skill is to find simple solutions to enhance performance and health. Whether you take her workshop or listen to a talk, you always learn something new and useful that can be used immediate to improve your personal efficacy and clinical skills. She provides participants with practical 'how to' exercises and information that can immediately be used by practitioners.

She has 30 years of education and experience in sport, business, and psychology (clinic for cerebral palsy & counselling centres). She has worked with almost every sport in the alphabet from archery to yachting with athletes ranging in expertise from novice to Olympic and professional champions.

She has authored *Learned Self-Regulation(LSR),*
Owner's Manual for Controlling the Mind and Body, and *How to Teach Biofeedback Assisted Relaxation* (in press)

- **Jan van Dixhoorn, Ph.D.**

He is a well known authority in breathing and teaches a 3 year long post graduate class in breathing and relaxation therapy, co author of a book on breathing therapy and directed one of the first Biofeedback clinics in the Netherlands.

He will teach a workshop on improving self regulation and improvement of psychosomatic disorders. Participants in this workshop will learn strategies to enhance self regulation through changes in posture, breathing, attention and mood. He will focus on a greater understanding of individual differences and ways to find effective strategies to enhance positive self regulation.

- **Kawakami Mitsumasa, Yoga Master**

As a very special guest we will present a yoga master who has already volunteered ever so often to studies on his perfect self regulation and contributed a lot to the recent research on Psychophysiology.
He will demonstrate perfect body and mind control while doing a live demonstration in piercing his tongue and throat and at the same time being monitored with Biofeedback.
We'd suggest to not missing that event!
Additionally for all who are interested in the fields of body and mind mastery and eastern healing he will lecture a workshop about different healing practices.

Original Article

Heart Rate Variability (HRV) Biofeedback

Donald Moss, Ph.D. (2004)

Abstract: Heart rate variability (HRV) is a critical marker of a healthy organism. Low HRV predicts greater morbidity and mortality after heart attack, and also predicts death by all causes. HRV biofeedback can increase the adaptive and coherent variability in heart rate, and moderate the symptoms of asthma, COPD, and other autonomically mediated medical conditions. Diaphragmatic breathing, cognitive relaxation, and positive emotion are conducive to optimal increases in HRV.

Key Words: biofeedback, heart rate variability, asthma, anxiety, COPD, cardiovascular rehabilitation

Heart Rhythms and Human Health:

The human heart is a four-chambered bioelectric pump beating at an ever changing rate. This variability in heart rate is an adaptive quality in a healthy body. By variability we mean changes in the interval or distance between one beat of the heart and the next, as measured in milliseconds (DelPozo, et al., 2004). The *interbeat interval* (IBI) is the time between one R wave (or heart beat) and the next, in milliseconds. The IBI is highly variable within any given time period. Multiple biological rhythms overlay one another to produce the resultant pattern of variability. Interbeat interval variations, or heart rate variability, have relevance for physical, emotional, and mental function.

As human beings age or suffer illness, the total variability in heart rate is reduced, and the risk of illness and death increases. Regular exercise increases heart rate variability. Scientific study of the variability in heart rate is fairly recent, and only in the past ten years did it become possible to train human beings to change the variability in heart rhythms, through biofeedback training.

Several clinical findings show the importance of the heart's variability: Changes in the rhythms of the heart occur before a fetus goes into distress, and decreased variability may predict sudden infant death. Lower variability in heart rate predicts a greater risk for further cardiac symptoms and death after a heart attack (Kleiger, et al., 1987). Clinical depression also lowers heart rate variability, and increases risk for coronary artery disease (Carney, et al., 2001). Heart rate variability has come to be regarded as a useful prognostic index or marker for morbidity and mortality.

Autonomic Balance

The rate at which the heart beats is governed by two internal "pacemakers" -- the sinoatrial (SA) and atrioventricular (AV) nodes, which are responsible for heart rhythms. The SA node initiates an electrical signal which begins each cycle of the heart's pumping action. This signal passes through the AV node which spreads the electrical current through the ventricles of the heart.

The body's autonomic nervous system (ANS) governs many of the body's internal functions, through the two pacemakers. The sympathetic branch of this ANS activates or increases the heart's action, while the parasympathetic branch acts as a brake slowing the action of the heart. The vagus nerve plays a role in the parasympathetic braking action. The balance between this throttle and brake system produces an ongoing oscillation, an orderly increase and decrease in heart rate. Training in HRV biofeedback does not appear to simply increase parasympathetic or sympathetic dominance; rather it exercises the balance between the two.

A variety of factors, including breathing, pressure sensors (Baroreceptors) in the arteries, the body's thermal regulation, and anxious thinking, increase specific rhythms in heart activity. The overall process of heart function is the end product of these various sub-rhythms.

Research on Heart Rate Variability

Research on HRV traces back in the United States to the research in the 1960's and 1970's by John and Beatrice Lacey (Lacey, 1967; Lacey & Lacey, 1964, 1978), suggesting that changes in cardiovascular function facilitated or inhibited cortical processing. Their classic 1978 article suggested a "two way communication between the heart and the brain." They showed, for example, that the greater the cardiac deceleration, the faster the individual's reaction time. Cardiac deceleration coincides with a phase of attention and preparation for action. This perspective was applied by Carlstedt to athletic performance (2001).

A second thread of applied research on HRV leads back to Russian researchers, who trained subjects to increase heart rate variability by a combination of biofeedback and breath training, producing decreases in asthma symptoms and other autonomically mediated disorders (Lehrer, Vaschillo, & Vaschillo, in press). It was largely this second thread of Russian research which spurred the current interest in clinical applications of HRV biofeedback to medical and psychological disorders.

Heart Rate Variability Biofeedback

Heart Rate Variability Biofeedback, or HRV biofeedback, is a relatively new technique training human beings to change the variability and dominant rhythms in their heart activity. Research is now going on in several sites, applying HRV biofeedback to medical and psychiatric conditions including: anger, anxiety disorders, asthma, cardiovascular conditions, irritable bowel syndrome, chronic fatigue, chronic pain, fibromyalgia, etc.

Initial case reports and small research studies are raising hopes that HRV biofeedback can help patients with these conditions (Bhat & Bhat, 1999; Gevirtz, 2000, 2003; Herbs, Gevirtz, & Jacobs, 1994; Del Pozo & Gevirtz, 2003).

Some more rigorous recent studies are strengthening these hopes for HRV biofeedback. For example, Lehrer and colleagues recently published an article in *Chest*, describing substantial moderation of asthma symptoms, using a protocol including HRV biofeedback, with or without training in pursed lipped diaphragmatic breathing (Lehrer, et al., 2004). Similarly, Giardino, Chan, and Borson (2003) combined HRV biofeedback with exercise guided by pulse oximetry feedback for patients with chronic obstructive pulmonary disease, and reported a significant improvement in the distance walked in six minutes, and in quality of life as measured by a respiratory questionnaire. Significant improvements were also seen in self-efficacy, disability, and dyspnea.

Finally, Del Pozo, et al. (2004) provided HRV biofeedback to patients with coronary artery disease, and demonstrated a significant increase in the patient's heart rate variability (as measured by the SDNN index). This result suggests that HRV biofeedback is a promising tool for improving survival rates in coronary artery disease.

Training Criteria for HRV Biofeedback

Research and clinicians reports frequently refer to "providing HRV biofeedback training" to a group of subjects, without specifying further what specific responses the biofeedback is monitoring or reinforcing. Others report "doing RSA training," which can mean anything from training the subject to create parallel sinusoidal line graphs for respiration and heart rate, to training the patient to increase the amplitude in the sinusoidal line graph. In the following we will describe several complementary training strategies, each of which can effectively be used to increase cardiac variability in a health enhancing fashion. Today's computer interfaced biofeedback systems can be programmed to guide the subject in each of the training strategies described here.

Increasing Heart Rate Variability

One measure of heart rate variability is the difference between the highest heart rate and the lowest heart rate within each cardiac cycle. Twenty year olds often show a swing of five to ten points between the high and low points in their heart rates. Persons over fifty often show changes of only three to five beats. Persons who are more physically active show a wider range between their maximal and minimal heart rate. HRV biofeedback can enable the individual to increase this variability in heart rate, sometimes producing a range of fifty beats a minute during training. HRV biofeedback training can focus on increasing the HR Max –HR Min index. (Objective 1 = increasing HR Max – HR Min).

SDNN

Another Index of Heart Rate Variability, widely used in medical research is the Standard Deviation of the N to N interval. The N to N interval is the "normalized" beat to beat interval. The SDNN is the standard deviation of those intervals, a measure of how variable those intervals are. The SDNN is a measure in milliseconds (ms). The trainee in HRV biofeedback can also be directly reinforced for including the SDNN index. (Objective 2 = increasing SDNN).

Directing Heart Rhythms

A statistical technique called "spectral analysis" allows us to see the component rhythms that make up the overall rhythm of heart activity. HRV biofeedback uses this spectral analysis to train increases in specific rhythms.

Heart rate changes are driven by several biological governors, each producing changes in specific time frames. Statistically, these can be separated out as waveforms of varying frequencies. The Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology (1996) established a standard for categorizing these frequency ranges:

High Frequency -- .15 - .4 Hz
Low Frequency -- .04 - .15 Hz
Very Low Frequency -- .0033 - .04 Hz
Ultra Low Frequency -- < .0033, beyond biofeedback measurement technology

Psychophysiological research suggests that these frequency ranges reflect the following biological influences:

High Frequency – parasympathetic pathways, the influences of respiration in normal frequencies on vagal tone
Low Frequency – influence of BP rhythms (baroreceptors) on heart rhythms (meditative/slow breathing augments this range)
Very Low Frequency – sympathetic activation, or more probably the withdrawal of parasympathetic braking, also the influences of visceral and thermal regulation. Rumination and worry augment this range.
Ultra Low Frequency—slower acting biological influences

Biofeedback training can focus on increasing the amount of total HRV in a specific frequency range. To date, it appears optimal to increase the amount of heart rate change in the Low Frequency Range. Evgeny Vaschillow, the Russian physiologist, hypothesizes that there is a "resonant frequency," native to each organism, which is optimal for overall health. For most persons that resonant frequency involves a dominance of heart rate change in the Low Frequency (LF) range, around 0.1 Hz. HRV biofeedback can therefore guide and reinforce trainees for shifting their overall heart rate variability into the LF range. (Objective 3 = increasing percentage of overall heart rate change falling in the LF range).

This 0.1 Hz frequency is most frequently produced by persons in a relaxed mental state, with a positive emotional tone, breathing diaphragmatically at a rate of about 5-7 breaths per minute. Relaxed breathing at six breaths per minute produces a spike of heart rate variability at 0.1 Hz. Remember that one tenth of a Hertz equals one tenth of a cycle per second, so that 0.1 Hz equates mathematically to six cycles per minute. The other measures of HRV also tend to maximize when heart rate change is dominated by rhythms in this Low Frequency range. The amplitude of variation is higher, because the effects of the baroreceptors on heart rate are added to the effects of slow breathing on heart rate. So finally, HRV biofeedback can reinforce breathing in the 5-7 breaths per minute range, and reinforce the production of a dominant spike in HRV at 0.1 Hz. (Objective 4 = breathing at 6 breaths a minute and producing a dominant spike of HRV at 0.1 Hz.)

Tools in Modifying Heart rate Variability

Diaphragmatic Breathing:A number of strategies are helpful when an individual wants to control heart rate variability. First, diaphragmatic breathing is a critical tool for increasing heart rate variability and creating a coherent heart rhythm. In diaphragmatic breathing, the individual breathes deeply, smoothly, and fully, using the diaphragm muscles below the lungs. With each breath, the individual fills the lungs fully but without effort, and then empties the lungs fully and smoothly. Breathing continues evenly and smoothly at a rate of about six breaths per minute.

The calming effects of slow, full breathing have long been recognized in schools of meditation and yoga. Traditional Chinese medicine long ago observed the reciprocal relationship between regular breathing and the subject's mental state: "… the tranquility of the mind regulates the breathing naturally and, in turn, regulated breathing brings on concentration of the mind naturally." (*Questions and Answers of Meisha*, Yue Yanggui, Qing Dynasty, cited by by Xiangcai, 2000, p. 7). The same source noted that: "…the mind and breathing are interdependent and regular respiration produces a serene mind." (Yue Yanggui, cited by Xiangcai, 2000, p. 7).

Relaxation and Meditation: It is helpful to relax both physically and mentally, letting go of anxious thoughts, disturbing emotions, and muscular tensions. A variety of relaxation techniques are helpful, including progressive muscle relaxation, Autogenic Training, and visualization techniques (Lehrer & Carrington, 2003). Meditation techniques are also helpful, enabling the individual to quiet and focus the mind (Baer, 2003; Carrington, 1993), since worrisome thoughts produce more sympathetic nervous activation, and disrupt the efforts to achieve one's Resonant Frequency.

Cultivating Positive Emotion: It is also helpful to cultivate positive, "feel-good" emotions, such as warmth, caring, and love, which appear to help the person enter a resonant frequency (Bhat & Bhat, 1999). For example, imagining someone like Mother Theresa caring for a sick child creates a warm feeling for most persons, which increases the orderliness or "coherence" of heart rhythms. In contrast, negative emotions such as anger and bitterness decrease the coherence of heart rate, and block the resonant frequency. A line graph tracking heart rate shows a ragged and irregular pattern during moments of anger; during positive emotion one sees a smooth sinusoidal variation with increasing amplitude in variation. A spectral analysis of heart rate shows a significant difference in heart rhythms during negative versus positive emotions, with much of the overall activity focused in the low range of Heart Rate Variability. Spectral displays during positive emotional states show a unimodal peak in heart rate variation, at about 0.1 Hz, corresponding to a relaxed, full and slow process of breathing at about 6 breaths per minute.

Both research and clinical practice show the harmful impact of negative emotions on cardiac health. Ironson, et al. (1992) reports that remembering anger decreases the ejection fraction of the heart, and Boltwood, et al. (1993) shows that remembering anger produces a spasm in arteries clogged with atherosclerosis. The Heart Math Institute in California has promoted training in positive emotions as a basic tool for health and wellness, and as a stepping stone toward optimal control of heart rate variability (Childre & McCraty, 2001; McCraty, Atkinson, & Tiller, 1995). In the same direction MacLean (2004) argues that that retraining heart rhythms can transform the person in emotions, relationships, and mode of awareness – toward "open-hearted" living and loving. In this sense HRV biofeedback presents a tool for personal transformation and not just for addressing medical disorders.

Summary

Diaphragmatic breathing, relaxation, meditation, the cultivation of positive emotion, and heart rate variability (HRV) biofeedback are interrelated techniques which can be helpful in improving heart health as well as overall well-being. Both the early research by the Laceys and more recent work at the Heart Math Institute shows that HRV changes are integrally connected with transformations in thought and emotion. Recent research suggests a positive role for HRV biofeedback in the treatment of anxiety, asthma, chronic obstructive pulmonary disease, irritable bowel, and other autonomically mediated conditions. Several training strategies can be effective in training subjects to increase heart rate variability, and today's computer interfaced biofeedback systems can be programmed to reward each of the training criteria.

The author has developed software screens for the Thought Technology Infinity biofeedback system, pursuing each of the training strategies described here, and rewarding the subject automatically for achieving the training criteria formulated for each strategy.

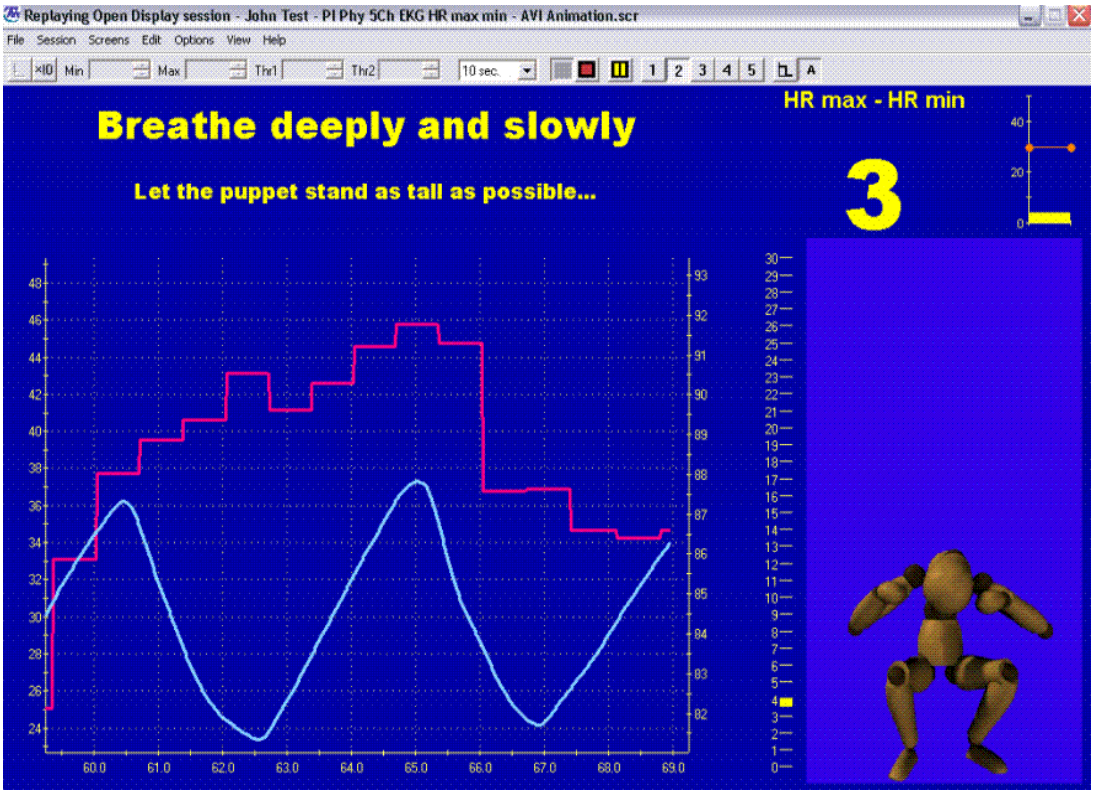

Figure I. This screen displays respiration and heart rate on a multi-line graph. A digital display shows the difference between maximal HR and minimal HR for each heart rate change cycle. The animated puppet stands taller as the "HR max-HR min" value increases. The instruction guides the trainee to "Breathe deeply and slowly," increasing the variability of heart rate, and letting the puppet stand tall.

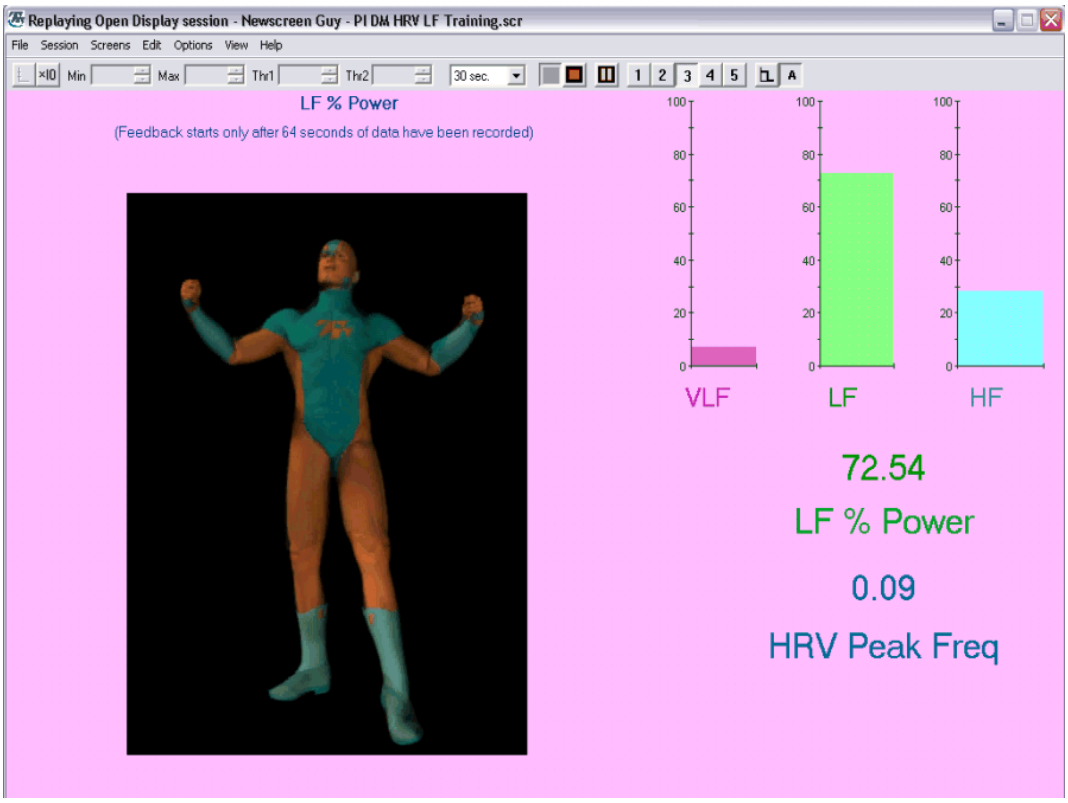

Figure 2. This screen provides a bar graph display with the Percent Power in the Very Low Frequency (VLF), Low Frequency (LF), and High Frequency (HF) ranges of Heart rate Variability> It also provides digital displays of the Low Frequency percent power, and the current peak frequency of Heart Rate Variability. The animated boy morphs into a superhero when the percent of power increases in the desired Low Frequency range. The trainee can also be encouraged to shift color in the bar graphs, increasing green (Low Frequency activity), and decreasing lavender (Very Low Frequency) and blue (High Frequency). Increases in percent power in the Low Frequency range reflect slow, full diaphragmatic breathing, a cessation of anxious thoughts, and a relaxed, positive emotionality.

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Original article

Post Traumatic Stress disorders (PTSD)

There are the best laid plans and then there is Biofeedback

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The following article describes a psychological intervention that was done with a group of adolescents who survived a terrorist bomb at a discotheque in Tel Aviv Israel on June 1, 2001. The article outlines the different components of the intervention and discusses specific recommendations based on the outcome of the group intervention.

Group participants were 8 students, 2 Males 6 Females, from one school ranging in age from 14-16 years who had witnessed a terrorist blow himself up, kill 21 of their friends (and/or fellow citizens) and wound 33 others in the attack. The students who participated in the group had not been physically injured in the attack. The long-term emotional impact of this trauma on these young people remains to be seen. In an effort to prevent the development of PTSD we developed and implemented an early intervention strategy. The goals of the group trainers were to introduce de-briefing and coping skills and to normalize the symptoms and responses the victims were having as a result of the horrifying images they had witnessed.

The intervention was conducted at the school 19 days after the traumatic event. All of the students had been given the opportunity to speak with the school psychologist in the days following the trauma. However, a systematic intervention or formal de-briefing had never been done. The group was led by a clinical psychologist with 12 years of experience in treatment of trauma and the use of biofeedback and a school advisor who knew the children. The group setting offered the students an opportunity to talk about their experiences, to show support for one another, and to learn relaxation techniques and coping skills. A unique component of the intervention was the use of biofeedback as a method to enhance both individual coping and group support and empathy.

Interventions

The interventions included: Imagery, relaxation training, cognitive coping skills, thermal and GSR biofeedback

Response

Students were initially reluctant to participate in the group. They reported that they had spoken about the trauma and were ready to try and put it behind them. They were not interested in opening up the pain of the event. They believed that they had been sufficiently debriefed and were ready to move on in their lives. In fact, several students left the group when they felt they could no longer stand the pain of discussing the events. So the focus of the group moved from one of psycho-education and debriefing to one of coping and support. The adolescents were taught relaxation skills, including diaphragmatic breathing and muscle relaxation. Again, they were reluctant to participate in such techniques.
Actually it looked like they were doing it only to satisfy their school advisor and to close the intervention. This negative response completely had changed when they were introduced with the option of biofeedback. The use of biofeedback was an excellent tool to facilitate this process. Each student was given a hand held thermometer and asked to try and increase the temperature as much as they could. Students reported that they enjoyed this activity and succeeded in increasing their hand temperature. A few of them were exposed to computerized GSR biofeedback, while modeling to the others how they lower their galvanic skin response. They learned that they had some control over their physiology and they were excited about that.
As a final exercise, students were asked to sit in a circle holding hands and to work together to lower their physiological arousal. The two students at either end of the circle were hooked up to the biofeedback equipment and the rest transferred energy and heat through their hands and the readings appeared on the computer screen. It became a group effort to lower the graph on the screen. This group effort taught them the importance of team work, supporting each other and working toward a common goal. They had all been through a traumatic event together, something that was beyond their control. Here they were able to learn that they could help themselves and each other manage some of the physical symptoms that resulted from the event.

Outcome

The intervention taught us several things about this particular group of students:

1) Debriefing was unwelcomed 19 days after a traumatic event. At that point students no longer wanted to talk about the traumatic event they had experienced. It is recommended that students receive psycho-education about the effects of a trauma immediately following the trauma as well as be given the opportunity to speak with a counsellor at school or a mental health professional if they wish additional support and treatment.

2) Group interventions should focus on coping skills (e.g. relaxation, imagery, and cognitive restructuring of faulty attributions) rather than discussion of the traumatic events and symptoms.

3) When conducting the group intervention, the presence of school staff who knows the children is essential in case students leave the group or require additional support during the group time.

4) The use of biofeedback equipment was an excellent tool to help students bond together toward a mutual goal of relaxation and support. Particularly with adolescents, biofeedback serves as unique way for them to learn relaxation techniques that they may otherwise see as not relevant for them. Furthermore, for the use with people who are suffering from acute stress (or PTSD) who have difficulty closing their eyes because they see images of the trauma before them, the use of biofeedback equipment and the concentration on the computer screen appears to be an ideal way to practice relaxation.

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News from Science

This section includes interesting news from science that may be related to Biofeedback , may be helpful in addition or should just be known as a basic knowledge for treatments.

- ***Double-blind, randomised, controlled trial of fish oil supplements in prevention of recurrence of stenosis after coronary angioplasty***

I Bairati, L Roy and F Meyer
Department of Social and Preventive Medicine, Faculty of Medicine, Laval University, Quebec City, Ste-Foy, Canada.

Background:
Previous studies suggest that recurrence of coronary stenosis after percutaneous transluminal coronary angioplasty (PTCA) might be prevented with dietary supplements rich in omega-3 fatty acids. The purpose of the present study was to evaluate this hypothesis. In addition, the relation between usual dietary consumption of omega-3 fatty acids and restenosis was assessed.

Methods and results:
A double-blind, randomized, controlled trial was conducted in which 205 patients undergoing a first PTCA received 15 capsules per day containing 1 g of either fish oil (2.7 g/day of eicosapentaenoic acid, 1.8 g/day of docosahexaenoic acid) or olive oil. The treatment was started 3 weeks before PTCA and continued for 6 months thereafter. Dietary intake was assessed by food frequency questionnaire. At 6 months after PTCA, patients underwent a control angiography. All angiographic lesions were measured by quantitative computer analysis. Four criteria were used to define restenosis. Restenosis occurred less often in the fish oil group (22.0-35.6% depending on the definition) than in the control group (40.0-53.3%). After controlling for other risk factors of restenosis, the association of fish oil supplementation with a lower frequency of restenosis was statistically significant ($p = 0.03$) for three of four definitions. After adjustment, a dietary intake of omega-3 fatty acids of more than 0.15 g/day was also associated with a lower frequency of restenosis (p less than or equal to 0.03).
CONCLUSIONS: This trial documented the protective effect of fish oil supplements on the recurrence of coronary stenosis 6 months after PTCA. The study results suggest that a dietary intervention could be useful in preventing restenosis.

http://circ.ahajournals.org/cgi/content/abstract/circulationaha;85/3/950

- ***Impact of Acute Mental Stress on Sympathetic Nerve Activity and Regional Blood Flow in Advanced Heart Failure: Implications for `Triggering' Adverse Cardiac Events***

Holly R. Middlekauff, MD; Alison H. Nguyen, BS; Carlos E. Negrao, PhD; Egbert U. Nitzsche, MD; Carl K. Hoh, MD; Barbara A. Natterson, MD; Michele A. Hamilton, MD; Gregg C. Fonarow, MD; Antoine Hage, MD; ; Jaime D. Moriguchi, MD

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http://circ.ahajournals.org/cgi/content/abstract/circulationaha;96/6/1835

Key Words: death, sudden • kidney • heart failure • nervous system, autonomic • stress

Background:

Evidence is accumulating that specific "triggers," such as intense psychological stress, may precipitate myocardial infarction and sudden death. Patients with advanced heart failure have increased resting sympathoexcitation, which has been directly related to increased mortality. The impact of triggers on sympathetic nerve activity and regional blood flow in heart failure has not been examined in patients with heart failure.

Methods and Results:

Twenty-seven patients with heart failure (NYHA functional class III or IV) and 26 age-matched normal control subjects were studied. Muscle sympathetic nerve activity, heart rate, mean arterial pressure, forearm blood flow, and renal blood flow were measured during mental stress testing with mental arithmetic and Stroop color word test. Patients with heart failure had elevated levels of resting muscle sympathetic nerve activity and heart rate. Mental stress significantly increased muscle sympathetic nerve activity and heart rate in both patients with heart failure and control subjects, although the magnitude of increases tended to be blunted in patients with heart failure. Nevertheless, absolute levels of sympathetic activity in patients with heart failure remained significantly higher than levels in control subjects during mental stress. The decrease in renal blood flow in patients with heart failure was similar to that of control subjects, despite greater resting renal vasoconstriction. The increase in forearm blood flow during mental stress testing in patients with heart failure was blunted compared with that of control subjects.

Conclusions:

Patients with heart failure do not have augmented muscle sympathetic nerve activity responses to mental stress, despite elevated resting levels of sympathetic activity, but they do have markedly higher absolute levels of sympathetic nerve activity during mental stress as well as at rest.

- ***Novel Mechanisms Responsible for Postmenopausal Hypertension***

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http://hyper.ahajournals.org/cgi/content/short/43/5/918

Key Words: endothelin • renin-angiotensin system • oxidative stress • obesity • diabetes mellitus • sympathetic nervous system

Blood pressure increases in many women after menopause. Hypertension is one of the major risk factors for cardiovascular disease. However, the mechanisms responsible for the postmenopausal increase in blood pressure are yet to be elucidated. Various hormonal systems have been proposed to play a role in postmenopausal hypertension, such as changes in estrogen/androgen ratios, increases in endothelin and oxidative stress, and activation of the renin-angiotensin system (RAS). In addition, obesity, type II diabetes, and activation of the sympathetic nervous system are common in postmenopausal women and may also play important roles. However, progress in elucidating the mechanisms responsible for postmenopausal hypertension has been hampered by the lack of a suitable animal model. The aging female spontaneously hypertensive rat (SHR) exhibits many of the characteristics found in postmenopausal women. In this review, some of the possible mechanisms that could play a role in postmenopausal hypertension are discussed, as well as the characteristics of the aged female SHR as a model to study.

- ***Biofeedback Aids Kids With ADHD: Therapy holds hope for improvement without medication*** *(no authors mentioned)*

Children with attention-deficit hyperactivity disorder (ADHD) benefit from Biofeedback therapy. That's the claim of a study in the December issue of *Applied Psychophysiology and Biofeedback* . The study found that a year of medication and counseling helped relieve ADHD symptoms in a group of children, but only the children who also received Biofeedback therapy maintained that improvement after going off medication.
The study, by researchers at the FPI Attention Disorders Clinic, included 100 children aged 6 to 19 years old. They were followed through a year of ADHD treatment that included special parenting classes, treatment with the medicine Ritalin and school consultation.
About half the children also received EEG Biofeedback therapy. It uses an electroencephalograph to measure different kinds of brain waves (electrical activity) produced in certain brain areas.
Previous research indicates that reducing slow (low frequency) brainwaves and boosting the number of fast (high frequency) brainwaves can reduce some ADHD symptoms.
The children in this study who received EEG Biofeedback therapy were rewarded for their attempts to change slower brainwaves to faster brain waves after they were shown how specific behaviors affected their brainwave patterns.
The study found that the year's worth of treatment with the drug Ritalin improved attention deficit and impulse control in most of the children. That improvement was independent of the parental counseling and Biofeedback therapy.

When the children stopped taking the medicine, their ADHD symptoms returned. Not so for those children who had received Biofeedback therapy. The study found that Biofeedback therapy was the only one of the treatments that greatly reduced the level of slow brainwaves in the children.

More information: The U.S. National Institute of Mental Health has more about ADHD

http://www.hon.ch/News/HSN/510953.html

- ***Neurofeedback treatment for attention-deficit/hyperactivity disorder in children: a comparison with methylphenidate.***

Fuchs T, Birbaumer N, Lutzenberger W, Gruzelier JH, Kaiser J.

Institute of Medical Psychology and Behavioral Neurobiology, Eberhard-Karls-University, Gartenstr. 29, 72074 Tubingen, Germany.
Clinical trials have suggested that neurofeedback may be efficient in treating attention-deficit/hyperactivity disorder (ADHD). We compared the effects of a 3-month electroencephalographic feedback program providing reinforcement contingent on the production of cortical sensorimotor rhythm (12-15 Hz) and beta activity (15-18 Hz) with stimulant medication.

Participants were N = 34 children aged 8-12 years, 22 of which were assigned to the neurofeedback group and 12 to the methylphenidate group according to their parents' preference. Both neurofeedback and methylphenidate were associated with improvements on all subscales of the Test of Variables of Attention, and on the speed and accuracy measures of the d2 Attention Endurance Test.

Furthermore, behaviors related to the disorder were rated as significantly reduced in both groups by both teachers and parents on the IOWA-Conners Behavior Rating Scale. These findings suggest that neurofeedback was efficient in improving some of the behavioral concomitants of ADHD in children whose parents favored a nonpharmacological treatment.
Appl. Psychophysiol. Biofeedback. 2003 Mar;28(1):1-12.

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Healthy Computing with Biofeedback wins Californian Governor's Employee Safety Award for outstanding Safety and Health Service at the Worksite

Biofeedback machine attached to her right arm, staff member Sarah Chaput listens as Erik Peper describes proper posture for healthful computing

The Ergonomic Safety Program Team at SFSU was recently awarded Gov. Schwarzenegger's Employee Safety Award for its groundbreaking program that helps employees practice healthy computing habits.

The six-week program, offered every spring, combines basic ergonomic principles with instructions on how to break unhealthful work habits. Staff members who complete the two-hour-per-week training become coaches equipped with the knowledge and skills to train their co-workers or employees. As of today, more than 150 employees have been trained.

"There is no other campus I know of in the CSU that has a program in which employees train other employees," said Michael Martin, director of risk management. "SFSU's Ergonomic Safety Program is relationship driven and ongoing, and through the program we have completely eliminated all of the back-logged requests from employees regarding pain or discomfort resulting from work. We have helped hundreds of employees on the campus."Through the use of biofeedback monitors, they learn to gauge unnecessary and excessive muscle tension in the arms, neck, wrists and shoulders, which commonly occurs while computing. They also learn how a workstation should be set up to avoid excessive strain on the muscles and eyes. In addition, they are taught healthy computing habits, such as taking breaks and breathing deeply. The program includes many quick tips -- from dropping the hands to the lap every 30 seconds to blinking at the end of sentences -- which computer users can incorporate into their daily routines. Developing healthful work habits is very important, says holistic healing studies director Erik Peper who helped create the program.

"Just because you're sitting in the best ergonomic position doesn't mean inside you're doing the right things," Peper said. "We developed the program to incorporate self awareness so that behaviors change -- because so many of us get busy and forget about our bodies while we work."Since completing the training and receiving an ergonomic adjustment last spring, Advancement services coordinator Patricia Okamoto says the arm pain she had been experiencing disappeared. "Adjustments to my work space and taking breaks have made all the difference," Okamoto said. "Now that I have completed the training I'm ready to train other employees. My confidence in the program -- due to how much it has improved the way I feel -- really helps with my approach to coaching others."

Student Writer Elizabeth Davis with William Morris: www.sfsu.edu/~news

The Olympic Games – News from the world of sports

“Now that the Olympics are over, the serious training begins for world's elite athletes..."

Olympic medals come once every four years, but training to be the best of the best involves both mental and physiological training. Biofeedback, a technology that integrates training and biomedical technology, helps elite athletes learn to more reliably max out their peak performance.

from left to right: *Henk Kraaijenhof, George Dales, Lawrence Klein*

One sports psychology program, Mind Over Muscle, was co-authored by Lawrence Klein with Major (Ret’d) Nory Laderoute, former Director of Combat training for the Canadian Armed Forces. The program incorporates a GSR2™ personal electrodermal biofeedback monitor for Athletic Peak Performance. According to Klein, who is VP of Thought Technology, “Dozens of countries’ Olympic training centers have our GSR biofeedback based programmes. Indeed, in the last 30 years we have contributed to Olympic performances, with perhaps 10,000 Olympic athletes using our Mind Over Muscle program and Biofeedback instruments."

The use of skin conductance, temperature, heart rate, respiration and EKG instruments are used not only for mental training for hundreds of sports, but also to teach relaxation and stress management to help with many stress related disorders. Each medical specialty has its own range of biofeedback applications, to treat specific disorders.
World famous sports psychologist consultants, such as Vietta “Sue” Wilson of York University, have taught biofeedback to over 700 Canadian Olympic athletes and coaches. George Dales, the President of the International Track and Field Coaches Association, invited Coach Kraaijenhof of Netherlands to teach a workshop on the use biofeedback instrumentation to coaches at the Athens Olympics.

The oldest Olympian, 95 year old Peter Clentzos, said that whether one uses bamboo or Kevlar in pole vault, mental toughness is still as important as ever. The joy of sport is being shared by more people these days, worldwide. Marathons that used to draw hundreds now draw hundreds of thousands. The Olympic ideal has been reborn and drug free performances need to harness the most importance force – our mental strength. Biofeedback works not only for Olympic performances, but for weekend athletes who want to take 10 strokes off their golf game.
Surprisingly, one secret to harnessing the power of the mind is deep relaxation. Training the mind is often begun by controlling the body. Through a variety of simple techniques, which are accelerated through moment to moment monitoring, you can know what is happening to your body and you can quickly learn which exercises works. Indeed, the opening and closing of the pores of your skin mirrors your body and mind’s stress level. By relaxing, your mind can then focus on your perfect performance, and a powerful mind/body connection can not only be practiced, but verified by monitoring your body responses and your brain.

You can also strengthen your mental rehearsal both by amplifying the firing of the muscles involved in your sport, and/or by monitoring your brain waves, while you visualize. In a few hours, athletes learn that they can 'do mental pushups' similar to physical ones. Complex skills can be practiced , correctly, thousands of times mentally, thereby reinforcing the physical ones. You may be able to only hit a few hundred balls physically, but a few thousand mental swings have a powerful carry-over to your game.

Bruno De Michelis PhD of AC Milan's Milan lab says, "Our ability to monitor muscle activity, as well as the psychological and physiological preparedness of our athletes, has allowed them to perform at their peak, as well as enabling the team to decrease injuries by 90%". This computerized equipment allows them to look at many muscles simultaneously, so they can see how they all work together, and can even monitor brain, heart and respiratory functions at the same time, so athletes learn what patterns produce the most effective performance.

As the new world of drug-free Olympics emerges from a past with its steroid-enhanced world records, the future of new world records rides on the use of drug-free mind-body optimization technologies putting the hardware and software to work.

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Best exercises for changing mind and body

As New Year is coming soon and many people wish for something for the upcoming year and give up soon for many reasons here is one exercise taken from Sue Wilson's* CD EDUTAINMENT to use for yourself or your clients to hopefully be more successful next year.

- **What you want versus don't want: Advanced version.**

Have the student think of some specific mild or moderately intense event that they are anxious about in the future. Specify mild or moderate intensity because group trauma is kind of messy. Now notice if they can become anxious when they think about this event. They have created a future memory of what they don't want so that when they look toward the future they become anxious. Now allow them to imagine going out in the future to ten minutes after the successful completion of the event about which they were worried. Imagine the most realistic, optimistic future possible. Now where is the anxiety, is it gone? They have now replaced the future memory with what they want and the anxiety tends to disappear.

It is better to focus upon what you want, as opposed to what you don't want because you are likely going to get them either way.

This exercise teaches the role of our thinking in creating anxiety and the power of changing our thinking to focus upon what we want for anxiety relief. If you can create anxiety well, you can already do the process of failure imagery. By using the same process and changing the content to what you want, you can successfully do the process of success imagery.

**We thank Sue Wilson for her Contribution*

FUN SECTION

Research found a new stress elimination skill called:

QSR
Quick Stress Relief

Instructions:

1) Place kit on firm surface
2) Follow direction in circle
3) Repeat Step 2 until unconscious
4) If unconscious, cease stress reduction activity

Position announcements

POSITION DESCRIPTION
TENURE-TRACK POSITION IN HEALTH PROMOTION/DISEASE PREVENTION
The Department of Health Education, College of Health and Social Services, San Francisco State University (SFSU) invites applications for a new position.

POSITION: Assistant Professor

QUALIFICATIONS: Doctoral degree in Health Education, Behavioral Medicine, Health Psychology, Medical Anthropology, or Community Health-related field. Advanced degrees in Public Health and training in self care or complementary approaches to health is desirable. For this position knowledge of health promotion/disease prevention, behavior change theory and practice (individual/community), the contribution of culture to health and healing, and strategies to mitigate health disparities are relevant to this position. Other appropriate areas include: self care, resiliency, social support, chronic disease management, alternative medicine and indigenous health care systems, stress management, personality theory, social-cognitive-affective factors in health, harm reduction, cross-cultural studies, and trauma. Applicants should have the potential of securing funding for applied community-based research and a commitment to quality teaching.

RESPONSIBILITIES: The candidate will teach courses in the Master of Public Health and the Bachelor of Science program in health education (includes tracks in holistic health, community health, and school health). Along with teaching the position requires grantsmanship, scholarly publication, university/community service.
STARTING DATE: August, 2005
THE UNIVERSITY: San Francisco State University is a dynamic urban university, located in one of America's finest cities. The University serves a highly diverse student body of approximately 27,000 undergraduate and graduate students. Excellence in teaching is a primary goal at SFSU, along with innovative research and university/community service. The University is dedicated to a broad ethnically and culturally diverse faculty, staff, and student body. SFSU is one of 23 campuses in the CSU system.
APPLICATION: Application review will begin Dec 8, 2004 and continue until position is filled. Submit curriculum vitae, description of current teaching and research interests, representative publications to committee chair. Three letters of recommendation (with information on teaching experience if applicable) and University transcripts will be requested of finalists:

Zoe Clayson, Ph.D,
Chair, Search Committee
Department of Health Education, HSS 326,
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Editorial:

Finally an idea came true.
It was my idea at the last meeting that it would be nice if there would exist also an European Biofeedback magazine and as my head is always full of ideas I suggested this to Erik Peper. It was definitely not my idea that I could do that job!!!
However Erik Peper was truly excited about my idea and didn't stop asking me whether I could do that.
After many discussions and emails I finally decided that I will at least try.
It was not an easy birth giving procedure as I have no experience with a work like that at all and English is just my hobby and my mother tongue German. Many obstacles like lay - out and content of the magazine appeared on this way – however here it is and I hope your judging will be mild.

As we all want that "Baby" to grow and as a real magazine needs an advisory board and some co- editors I want to encourage you to think of supporting me with some advices when needed. Please let me know.
Hopefully we can introduce you to the new advisory board in our next issue which is planned to come out right before the next BFE meeting in Hasselt/Belgium in February 2005.

Finally I want to encourage all of you to forward me interesting information, articles and abstracts that we could publish (don't forget to mention the copyrights) to help "Psychophysiology today" growing. And I want to thank Don Moss and Daniel Hamiel for their trust that they offered the first articles to publish, Erik Peper, Larry Klein, Hans Stodel and Don Moss for their support and feedback and Katherine Hughes Gibney for their corrections in terms of language.

Cordially

Monika Fuhs

Finally we ´d hope that you found some interesting information in this magazine and that you will support us with your feedback, ideas and materials in the future.
The BFE wishes all
a Merry Christmas and a Happy New Year